

# ABSTRACT BOOK



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A tribute to John Lowry

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## Foreword

Dear friends and colleagues,

It is a great honour for me to have been elected the President and given the chance to host the 21st Congress of the EACMFS in Dubrovnik, Croatia. We have done our best to offer a great scientific and clinical conference, but also to give you the chance to get to know Croatia.

The scientific programme has 24 masterclasses, 8 keynote lectures, 10 symposia of guest societies, 6 panels as well as over 400 free papers and 500 poster presentations.

The times have changed and it became more usual to have the abstracts in the digital form and to refrain from a classic printed edition. The abstracts are published as a pdf document and can be downloaded from the congress site as well as the EACMFS site [www.eurofaces.com](http://www.eurofaces.com).

This book comprises abstracts of all the free papers to be presented during the Congress. This covers the individual oral presentations and the posters as well. The abstract book has been arranged in such a way that you should be able to follow individual sessions quite easily since the abstracts have been grouped accordingly. In addition to the abstracts, complete poster presentations can be viewed online. Just follow the link at [www.eacmfs2012.com](http://www.eacmfs2012.com)

I would like to thank the Scientific Committee for reviewing the abstracts in a very short time. Authors were notified that their abstract will be included as sent without language corrections. However with the help of Peter Ramsey-Baggs, some important corrections were made.

On behalf of the Organizing Committee we trust that you will leave Dubrovnik with fond memories of your stay in Croatia. At the same time we I hope that in addition to the academic pursuits, new friendships will have been formed and new liaisons created.

Welcome to Dubrovnik.

Mišo Virag, MD, PhD, FRCS  
President EACMFS 2010-2012

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# ORAL PRESENTATIONS

## Session 1. FACIAL REJUVENATION, AESTHETIC SURGERY AND SCULPTURING

O-0101

### MODERN CULTURAL PERCEPTIONS OF BEAUTY; RACIAL PRESERVATION OR TRANSFORMATION? A LITERATURE REVIEW

*Atheer Ujam<sup>1,\*</sup>, Navin Vig<sup>1</sup>*  
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It is widely accepted that there are established standards for the ideal facial proportions regardless of racial background. However, changing population demographics of the UK require that the facial surgeon must have a robust understanding and appreciation of the needs of patients seeking cosmetic surgery. In a multicultural society, patients have different perceptions of beauty and will seek facial surgery to correct perceived abnormalities.

Historically, it appears that racial transformation - a desire to change one's natural appearance to that of the predominant culture - was the overwhelming philosophy adopted by patients and surgeons. However, it appears now that there is a shift towards racial preservation of facial identity. These behaviours may be diverse and particular to a culture at a specific period of time. What is important is that the outcome of any surgery is satisfactory to the patient.

We undertook a literature review to identify current racial behaviour with regards to seeking facial cosmetic surgery and furthermore, what aspects of facial beauty are universal to all races. By understanding the differences and similarities of cultural aesthetic taste, the facial surgeon will be better equipped to provide successful surgery.

O-0102

### ENDOSCOPIC BROW LIFT FOR FACIAL REANIMATION. OUR EXPERIENCE.

*Thomas Barry<sup>1,\*</sup>, Austen Smith<sup>1</sup>, Aidan Fitzgerald<sup>1</sup>, Afshin Yousefpour<sup>1</sup>*  
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**Introduction:** Traditionally, the correction of brow ptosis resulted in facial and scalp scarring and morbidity. Minimally invasive approaches have reduced such problems. Endoscopic Brow Lift is an established procedure in the management of brow ptosis in the aging face and in facial palsy. We present our experience with this procedure.

**Aims**

1. Evaluate our referral base.
2. Qualify patient satisfaction.

3. Assess the type and incidence of post-operative complications.
4. Quantify the Length of Hospital Stay (LOS).

**Methods:** A retrospective analysis was conducted on all Endoscopic Brow lift case notes looking at complications, LOS and referral base. Patient satisfaction rates were assessed using a qualitative self-report questionnaire utilising a modification of the Facial Clinimetric Evaluation Scale (FaCE) scoring system.

**Results :** Unilateral or bilateral endoscopic brow lift was performed on 36 patients (Male : Female 1:2, Age range: 31-74 years) over a 2-year period (2008-2010). Some patients had synchronous additional facial procedures which included blepharoplasty, face lift or a combination of both. There was a 5% relapse rate and post-operative complication rate included temporary Temporal Branch nerve injury and forehead paresthesias. The average LOS was 3 days (Range 1-8). Interestingly our referral base was from Plastic Surgery(40%), Ophthalmology (10%), Neurosurgery (32%) and others (GP, OMFS 18%). The modified FaCE survey demonstrated improved visual fields and social behaviour score.

**Conclusion :** This study demonstrates that Endoscopic Brow Lift is well tolerated by the patient, having minimal complications. It has also been shown to improve quality of life. We believe that this procedure has a position in the management of Post-traumatic and Post-Ablative surgery facial paralysis and in the aging face with functional deficit.

O-0103

### SECURING THE BROW USING ENDOTINE®

*Geert Van Hemelen<sup>1,\*</sup>, Nasser Nadjmi<sup>1</sup>, Joël Defranco<sup>1</sup>, Lieven Renier<sup>1</sup>, Bruno Vanassche<sup>1</sup>, Jan Van de Perre<sup>1</sup>, Herman Vercruyse<sup>1</sup>*  
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Endoscopic release of the forehead is widely accepted as a well tolerated technique to lift the brow. The different fixations methods though differ from bandaging to external screw fixation.

We retrospectively examined 17 patients ( all F) about pain, hair loss, sensitivity of the forehead up to one year postoperatively. We noted no infection, some tenderness was present for the first 3 months. One patient noted itching sensation in the hair line. Two patients suffered temporary hair loss (1 cm<sup>2</sup>).

**Discussion:** There are different techniques to anchor the brow and variable success rate is shown. We feel that this resorbable device can offer a dual benefit. It fixes well and disappears in time. The initially used Endotine® plates are now reduced in size (Triple™). Since the use of these very tiny plates the sensation in the hairline is hardly present.

**Conclusion:** Endotine Triple™ is accepted as a reliable and well tolerated anchoring system in endoscopic browlifting procedure. Minimal morbidity in a transient zone of two months postoperative recovery can be expected.

#### O-0104

### FOREHEAD CONTOURING AND BROW BOSSING RESHAPING OF OLD MALUNITED FRACTURES IN TWO CASES.

Hisham Fattah<sup>1,\*</sup>

<sup>1</sup>National Cancer Institute, Cairo University, Egypt

Fractures of the frontal bone pose certain treatment dilemmas for the facial trauma surgeon. Their mismanagement may lead to potentially life-threatening intracranial complications.

This study reviewed two male patients referred to the department of oral and maxillofacial surgery at the National Cancer Institute, Cairo University on 2007 with a large painless swelling in the forehead and eyebrows area on the left side covered by normal skin. Their ages were 12 and 28 years.

Clinical examination revealed a large mass in the forehead and eyebrows region of the face. The swellings were hard, painless to palpation and covered by normal skin. The swelling gradually increased over the years to the present size. Patients past medical history were not significant except history of past automobile accidents. They were admitted to the hospital for treatment of a cerebral contusion or cerebral haematoma associated with facial fracture. In both patients priority was given to the treatment of cerebral contusion and its complications neglecting the facial fractures. Photos were taken at different stages of treatment.

A three-dimensional computed tomogram revealed a well-demarcated intracortical lesion. Symmetry and facial projection and height must be re-established with harmonious alignment. Cranioplasty of the frontal region was carried out. Masses in the scalp and skull are not always neoplastic. The management of cranio-maxillary fractures takes considerable time and thought. Skilful and experienced personnel are mandatory, as is collaboration by the anesthesiologist, maxillofacial surgeon, ENT specialist or general surgeon, in order to have an outcome with minimal risks and maximal success.

However we have also come to realize that each fracture must be assessed on an individual basis.

#### O-0105

### TRANSCONJUNCTIVAL SOOF PAD LIFT BLEPHAROPLASTY

Miguel Borgeño García<sup>1,\*</sup>, Jorge Guiñales Díaz de Cevallos<sup>1</sup>

<sup>1</sup>University Hospital La Paz, Spain

**Introduction:** The term transconjunctival sub-orbicularis oculi fat (SOOF) pad lift blepharoplasty was first introduced by Sean Freeman in 2000 as a new approach to perform a lower lid blepharoplasty in a plane between the septum and the orbicularis muscle. This procedure is principally indicated in those patients with depression on

the nasojugal groove. It allows the cosmetic surgeon to improve the relative abundance of fat tissue in the lower lid, avoiding the incision over the skin and the muscle and therefore, without modifying the lower lid position that gives the patient and unnatural appearance. Minimal excision combined with resuspension of the fat pad to fill the nasojugal groove, improves the aesthetic results achieving a more natural and youthful appearance. In those cases with lower lid skin redundancy, a skin excision without involving the muscle could be performed.

**Materials and methods:** We present our experience with the transconjunctival SOOF pad lift blepharoplasty approach over the last two years. A revision of the benefits of this procedure, compared with the classic blepharoplasty techniques is done detailing surgical tips and pitfalls.

**Results:** The application of this surgical approach results in a less traumatic injury reducing the morbidity and the recovery time. Without modifying the orbicularis position, less ectropion and scleral show is achieved with a more natural effect. The results in all cases were excellent with no complications during the follow-up.

**Conclusions:** More than a decade after it was first described, the transconjunctival SOOF pad lift blepharoplasty remains as a reliable procedure with optimal aesthetic and functional results in the correct selected patients.

#### O-0106

### AESTHETIC IMPROVEMENT OF THE FLAT FOREHEAD USING METHYL METHACRYLATE

Yong Tai Song<sup>1,\*</sup>

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**Purpose:** There is a tendency to aspire to protruding, more rounded foreheads in Asians with flat ones. For the purpose of augmenting these planar foreheads, various methods using alloplastic implants have been reported. The author presents a relatively simple and easy procedure of correcting the forehead by inserting methyl methacrylate which has been proven to be one of the safest and most effective materials.

**Materials & Methods:** From July of 2006 to March of 2012, 180 patients underwent forehead augmentation with methyl methacrylate. There were 42 male patients (23%) and 138 female patients (77%) whose ages ranged from 20 to 65 years, with a mean of 33 years. The procedure was performed under local anaesthesia. A 5-6 cm-long incision was made in the scalp behind the hairline. Subperiosteal dissection was done into parts of the frontal bone above the supraorbital ridges. To make the methyl methacrylate putty, methyl methacrylate copolymer powder and liquid monomer are mixed thoroughly until saturation. After two to five minutes, the methyl methacrylate develops a doughy consistency. When a doughy consistency was achieved, the methyl methacrylate was inserted into the desired location of the forehead through the incision. The soft methyl methacrylate putty was molded into the desired shape, manually with the aid of wet gauze, through the skin, until it hardened. The amount of methyl methacrylate used ranged from 10 to 40 g, with a mean of 25 g, and varied according to the degree of flatness of the forehead. The scalp incision was closed in layers with absorbable sutures and surgical staples.

**Results:** The average follow-up period was 18 months.

Comparative imaging analysis was conducted using photographs before and after the procedure. The aesthetic appearances of all patients were much improved and no major complications occurred.

**Conclusion:** The author has used methyl methacrylate for cosmetic correction of the flat forehead and believes that the method of forehead augmentation using methyl methacrylate is a highly safe and effective surgical method.

#### O-0107

### DECISION MAKING IN FACIAL WASTING REHABILITATION

Raffaele Rauso<sup>1,\*</sup>, Gianpaolo Tartaro<sup>1</sup>  
<sup>1</sup>Second University of Naples, Italy

**Introduction:** The development of effective antiretroviral therapies for the treatment of human immunodeficiency virus (HIV) has drastically changed management for infected patients, with treatment approaches now similar to those of chronic disease rather than fatal illness. As rates of opportunistic infections and other conditions associated with immunodeficiency are minimized, patients are able to live longer, more fulfilling lives. However, these therapies are not without side effects, some of which can be quite debilitating. A medication-associated condition that has become prevalent among HIV-infected patients is HIV-associated lipodystrophy. The physical features of the condition, especially facial lipoatrophy, also known as facial wasting, can have a significant psychological impact on affected patients, both in serving as a visible reminder of the disease and in association with the social stigma of HIV infection.

**Material and Methods :**Between July 2007 and January 2012, 89 patients (52M, 37F) affected by facial wasting where treated at the Head & Neck Dept., II Univ. of Naples, with structural fat graft, permanent and semi-permanent dermal fillers. Pre and post operative photos were taken to compare the results during the follow up.

**Results :**A high degree of satisfaction was reached in all the cases, no major complications were registered.

**Conclusion:** Because of the decrease in morbidity and mortality associated with HIV infection, an increasing number of people with HIV receiving highly active antiretroviral therapy are presenting to facial plastic surgeons requesting the improvement of the side effects of their treatment protocol.

Authors presents their experience in facial wasting rehabilitation and discuss about the decision making process between structural fat graft, permanent and semi-permanent dermal fillers.

#### O-0108

### STRUCTURAL FAT GRAFTING OF THE CRANIO-ORBITO FACIAL AREA. VOLUMETRIC & MORPHO-AESTHETIC IMPLICATIONS

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**Key words:** Lipostructure, fat grafting, regenerative medicine, stem cells, facial reconstruction

**Summary:** The authors overview the application of structural fat grafting in the management of volumetric deficit in the cranio-orbito-facial area.

**Introduction:** Autologous transplantation of fat tissue is not a new technique. Structural fat grafting was introduced as a way to improve facial aesthetics, and in recent years has evolved into applications in cranio-orbito-facial reconstructions.

**Methods:** The fat is aspirated using very thin liposuction cannulas attached to a 10 cc syringe. The fat must be gently woven in several layers to pick up a blood supply, allowing the fat cells to survive and maintain the filamentous architecture. The fat is slowly absorbed by the body, although the amount of reabsorption is sometimes unpredictable; however, this percentage varies from patient to patient. If a significant amount of fat is reabsorbed, a second or third procedure may be considered to improve the final result. In fact, using more fat tissue in a single-step corrective procedure can cause poor vascularization and more resorption, particularly in areas covered by a thin layer of soft tissue, such as the maxillofacial area.

**Results:** The primary indications for structural fat grafting to the cranio-orbito & maxillofacial area are for restoration and rejuvenation of different facial defects. Recent applications include the correction of localized tissue atrophy, loss of substance due to trauma, post tumour, and congenital complex orbito craniofacial deformities, burns and hemifacial atrophy such as Romberg syndrome and scleroderma.

**Conclusion:** Fat grafting can be an excellent means for facial recontouring. Recent studies have proved that human adipose tissue represents a rich source of mesenchymal stem cells. The Authors overview some indications for volumetric soft tissue restoration in the cranio-orbito-facial area.

#### O-0109

### THE AUTOLOGOUS FAT GRAFT FOR THE TREATMENT OF LOWER LIP INCOMPETENCE

Jordi Rodríguez Flores<sup>1,\*</sup>, Cecilia Mazzara Bou<sup>1</sup>, Óscar González Sarrión<sup>1</sup>, Esther Montané Sala<sup>1</sup>, José Javier Bara Casaus<sup>1</sup>  
<sup>1</sup>Hospital Universitari Capio Sagrat Cor, Spain

**Aim :** Autologous fat grafting is a common procedure in maxillofacial reconstructive surgery widely used to fill up the soft tissue defects. The purpose of this presentation is to show a method to improve oral competence and cosmetic appearance by autologous fat grafting.

**Material and methods:** Two patients who undergone lower lip cancer ablation and complicated genioplasty resulting in oral incontinence were treated with a structural and intramuscular fat grafting technique in order to enhance vertical dimension of the chin and lower lip competence.

**Results:** The autologous fat graft in the lower perioral region presented a resorption of 50% 6 months after the procedure. An improvement of the oral continence and good contour was achieved in both patients.

**Conclusions:** The autologous fat grafting technique is useful for the revision of lower lip incompetence. The dynamicity of the oral region and the postsurgical fibrosis decrease the maintenance of the transplanted fatty tissue.

**O-0110****RECONTOURING OF THE AGED FACE***Nasser Nadjmi<sup>1,\*</sup>*<sup>1</sup>*Craniofacial Association Antwerp, Belgium*

The evaluation of the aging process of the face is complex and multifactorial. The soft tissue problems that a maxillofacial surgeon encounters in rejuvenating of the face are:

1. The dermal component in relation to the intrinsic and extrinsic facial aging (dermal elastosis).
2. Descent of the facial fat, with jowling and deep nasolabial fold as the result.
3. Increase or decrease of the facial fat during the aging process.

Each individual patient shows different degree of the above mentioned problems at the time of consultation for facial rejuvenation. The specific need of each patient lies on the basis of the correction of the mentioned aging components.

Our experience in facial recontouring with Extended SMAS Facelift in combination with eyelid surgery and endoscopic brow lifting is presented.

The above mentioned procedure has been used in our department for the last 12 years in more. No major complications occurred except a post-operative haematoma in one patient, which healed uneventfully after drainage.

Utilizing extended SMAS technique enables the aesthetic surgeon to deal with the challenging reconstruction of the aged face, without compromising the natural facial appearance.

**O-0111****LOWER BORDER OSTEOTOMY - NEW PERSPECTIVES FOR GENIOPLASTY***Maciej Jagielak<sup>1,\*</sup>, Andrzej Wojtowicz<sup>1</sup>, Marcin Socha<sup>2</sup>, Anna Jagielak<sup>3</sup>, Wojciech Lambrecht<sup>3</sup>*<sup>1</sup>*Department of Dental Surgery Medical University of Warsaw,* <sup>2</sup>*Private surgical practice, Warsaw, Poland,* <sup>3</sup>*Ortodontyka private surgical and orthodontic practice, Raszyn, Poland*

**Introduction:** Contemporary cosmetic surgery employs two methods of genioplasty: augmentation with implants and various types of osteotomy.

The first method improves of the facial profile as well as widens the en-face contour with very minor functional improvement.

The second - usually limited to the anterior aspect of the mandibular border changes the profile with limited improvement of the frontal appearance, although functional results are usually satisfactory (lip closure, periodontal health improvement etc).

The presented method of genioplasty combines the advantages of these two surgical procedures.

**Material and Methods:** In the years 2006-2012 the authors performed 152 genioplasties. In 107 cases genioplasty was an adjunctive procedure in other osteotomies in treatment of different types of the facial skeletal deformities. In 45 cases genioplasty was solitary procedure with neither other surgical nor orthodontic treatment.

Out of 152 - 127 were performed by means of piezoelectric saw. 86 osteotomies were limited to the frontal interforaminal area

46 osteotomies involved the entire lower border of the mandible and were performed with the piezo equipment. Plating, compression screws and lines were employed as fixation system.

The authors present the surgical procedure, discuss the results and present various cases.

**Results:** In all patients esthetic and functional improvement was achieved. The lower border osteotomy allowed for major (up to 15mm) chin advancement together with a marked improvement of the frontal facial contour (widening elongation or shortening). Bone healing, nerve function recovery was uneventful.

**Conclusion:** Osteotomy of the lower mandibular border performed by piezoelectric saw gives new possibilities in facial aesthetics.

New powerful piezoelectric systems with special cutting tips make this procedure relatively simple with low complication rate.

**O-0112****UP-DATE IN GENIOPLASTY STRATEGIES***Giuseppe Consorti<sup>1,\*</sup>, Riccardo Tieghi<sup>1</sup>, Manlio Galiè<sup>1</sup>, Stefano A Denes<sup>1</sup>, Luigi C Clauser<sup>1</sup>*<sup>1</sup>*Unit of Cranio Maxillo Facial Surgery, Centre for Craniofacial Deformities & Orbital Surgery - S. Anna Hospital and University, Ferrara, Italy*

**Introduction:** The chin is an important structure of the maxillofacial complex, principally in harmony and esthetic proportion into various areas of the face. In general, a retruded chin is associated with femininity; a prominent chin with masculinity. The chin is one of the movable physical characteristics of the face and may have been useful to display aggression and strength in more primitive times. The stronger mandible and more protuberant chin are distinctive features of the male face.

Therefore, genioplasty is an important procedure particularly in male aesthetic skeletal surgery.

The chin is one of most prominent and visible structures of the face, and the surgical modifications should pay attention in alterations in dentofacial deformities.

**Material and Methods:** Osteotomies of the chin have been described as the simplest of all the craniomaxillofacial osteotomies. Yet, genioplasty should not be considered a trivial or incidental procedure.

The face is divided into thirds; the lower third is further divided into thirds with the labial commissure demarcating the upper third border. The chin is the largest variable in the lower two-thirds of the lower third of the face.

Cephalograms are not mandatory but are useful for the less practiced clinical eye and when aesthetic improvement requires movement in more than one dimension. Digital imaging software is part of the up-date in genioplasty strategies.

**Results:** Certainly, the low rate of complications reported in large series of craniofacial operations must be met and

exceeded in aesthetic procedures. Our experience has shown that careful planning; adequate surgical exposure, good technique, rigid fixation, autogenous graft materials, and respect for soft tissue and its blood supply can reduce complications to a level acceptable for aesthetic facial skeletal surgery.

Skeletal changes are truly structural and architectural modifications of the face. One should remember that “form ever follows function”.

*Conclusion:* It is a technique used with esthetic finally, to good facial balance. The importance of facial analysis and the objectives of cephalometric and predictive analysis were confluent to obtain facial harmony.



## Session 2. IMAGING AND SIMULATION

### O-0201

#### SIMULATION GUIDED NAVIGATION IN CRANIO-MAXILLO-FACIAL SURGERY

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**Purpose:** Navigation is a way to reach your aim, using knowledge and experience to let reality and your map meet each other. Three-dimensional (3D) technologies are continuously improved and increasingly applied to many fields of craniomaxillofacial surgery for diagnosis, surgical planning and surgical aid. We present our experience in transferring individualized 3D virtual plan of surgery in the operating room, using a Navigation system (Simulation-Guided Navigation). Our aim was to evaluate if this new method can provide an increase in intraoperative reproducibility of the preoperative 3D virtual plan.

**Methods and Materials:** We applied this technique to the main fields of maxillofacial surgery: oncology, traumatology, pediatric surgery, but we predominantly applied this technique to orthognathic surgery.

We studied 44 patients affected by facial deformities. All the patients have been investigated with a preoperative Cone-Beam CT of the facial skeleton and soft tissues, which let us obtain a 3D model of the deformity. An orthognathic plan was performed in conjunction with the orthodontist (3D Surgical Treatment Objective) paying attention to functional and aesthetic issues.

The surgical procedure was performed virtually on the 3D model with a dedicated software, which elaborates the postoperative appearance of patient's soft tissues. Then the virtual plan was loaded on the Navigation system. This way we were able to directly see the extent of movements applied to the mobilized segments of the facial skeleton and check their correct position intraoperatively. All the procedures were as well performed with surgical splints.

After surgery all the patients underwent a new Cone-Beam CT, which was matched with the preoperative 3D virtual planning, providing this way an evaluation of the reproducibility of the procedures.

**Conclusion:** According to our results, we can assume that Simulation-Guided Navigation is a helpful procedure to improve reproducibility of the preoperative virtual surgical planning in every field of maxillofacial surgery, especially in orthognathic surgery, where our experience is stronger.

### O-0202

#### VIRTUAL PLANNING OF CRANIOMAXILLOFACIAL SURGERY – IS THERE STILL A NEED FOR “REAL” MODELS? EXPERIENCES OF ONE CENTRE USING COMMERCIALY AVAILABLE SOFTWARE

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**Introduction:** In complex craniomaxillofacial procedures individual 3D models may be required for visualisation of skeletal problems and consecutive treatment planning. Model production however is cost and time consuming. Modern computer assisted surgery systems more and more allow for virtual simulation of even complex surgical procedures which might overcome the known drawbacks of the classic surgical models. The potential of a commercially available software application should be evaluated according to various craniomaxillofacial procedures.

**Materials & Methods:** For surgical planning of complex craniomaxillofacial procedures patient specific models have been produced by SLS-technique based on CT-acquired DICOM data. With the same data-sets virtual patient models and simulation of the surgical procedure was performed using Materialises` Surgicase CMF / Synthes ProplanCMF software by online cooperation between surgeon and engineer. Virtual simulation was performed for secondary correction of dish-face deformity, mandibular distraction in severe growth deficiency, pediatric maxillary distraction in CLP, and craniofacial correction of hypertelorism.

**Results:** Information of both planning tools was used in a synergistic way in all patients. Simulation of the procedure corresponded well with the real surgical result. Transfer of the planning was mainly dependent on individual anatomy although surgical cutting guides proved to be helpful. Main advantage of the software planning certainly is the possibility to “play around”, simulate different types of skeletal displacements and visualise their expected effect. 3d models however feature a certain “haptic” component and are easy to handle.

**Conclusion:** There was a synergistic effect of both planning tools. Additional work and expenses may be justified by increased possibilities of visualisation, information, instruction and documentation.

### O-0203

#### VIRTUAL MODEL SURGERY AND FABRICATION OF A SURGICAL WAFER SPLINT FOR CORRECTION OF A SEVERE MANDIBULAR ASYMMETRY

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**Background:** Surgical correction of mandibular asymmetry can be a challenging task for both the orthodontist and the maxillofacial surgeon. Traditional two-dimensional cephalometric analysis is of limited value in treatment planning. In case of complex two-jaw procedures manual model surgery can be complicated, time-consuming and may contain potential errors. The introduction of high resolution computed tomography and sophisticated virtual planning software technologies opened up a

new avenue for visualizing and planning of orthognathic procedures. The aim of this study was to report a case of facial asymmetry where two-jaw surgery was planned virtually.

*Patient and methods:* A 26-year-old male complained of severe facial asymmetry. Clinical evaluation revealed severe right-sided hemimandibular elongation with small compensatory transverse canting of the maxillary occlusal plane. Cross bite was observed on the left side and scissor bite on the affected side. Technetium isotope scan did not show increased uptake in the condylar regions. Following presurgical orthodontics virtual Le Fort I osteotomy was performed and the symmetry of the maxilla was corrected with the help of an in-house developed three-dimensional surgery planning software. A virtual intermediate surgical wafer was designed and fabricated with a three-dimensional printer. The mandible was rotated into the correct position with virtual bilateral sagittal split osteotomy to visualize the movements of the osteomized segments. The two-jaw osteotomy procedure was performed according to the virtual plan.

*Results:* In surgery the splint fitted well. The facial symmetry was improved significantly after the operation. The occlusion is stable and the patient is satisfied with his facial appearance. There is no sign of relapse after 6 months following the procedure.

*Conclusions:* Latest computerized and rapid prototyping technologies let us fully imagine, design and control orthognathic procedures without information loss among the surgeons, orthodontists and dental technicians. Although this is a single case, it supports the usage of three-dimensional surgical planning software for the correction of facial asymmetries.

#### O-0204

### VIRTUAL PLANNING AND NAVIGATION GUIDED RECONSTRUCTION IN FRONTOORBITAL TUMOURS. PRESENTATION OF 2 CASES.

*Cristina Maza<sup>1,\*</sup>, Julio Acero<sup>1</sup>, Carlos Navarro<sup>1</sup>, Roberto Garcia<sup>1</sup>, Santiago Ochandiano<sup>1</sup>, Rodolfo Asensio<sup>1</sup>*

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*Introduction:* bone reconstruction of the craniofacial region is technically complex. Bone grafts have a limited surface and higher morbidity than artificial implants. Moreover, a detailed planning of the reconstruction is necessary in order to achieve good aesthetic and functional results. Virtual planning and computer assisted designed implants can improve the reconstruction of complex defects of the cranio-orbital region.

*Objective:* we present two cases of complex of cranio-orbital resections due to meningioma showing the virtual preoperative planning of the resection and the reconstruction method.

*Materials and methods:* preoperative 3D virtual planning of the resection and the reconstruction was made according to Materialize Synthex procedure. A CAD-CAM PEEK prosthesis was produced according to the planned resection. Digital data including the virtual planning and MRI of the patient were download in the navigation system (Brainlab) thus allowing for a exact resection according to the previous planning and a quick and precise im-

plant placement.

*Results:* we used this method in two patients with satisfactory results. The resection was performed according to preoperative planning. In both cases, the implants were perfectly adapted to the defect thus reconstructing the anatomical shape of the cranio-orbital region in continuity with the cranial vault.

*Conclusions:* Individual implants are especially suitable for complex or large-surface defects in the cranio-orbital region. They guarantee simultaneously a perfect aesthetic result with a high stability also saving surgical time.

#### O-0205

### ADVANCED DIGITAL PLANNING FOR HEAD AND NECK RECONSTRUCTION.

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<sup>1</sup>Guy's and St Thomas' NHS Foundation Trust, UK

*Introduction:* Innovations in computer technology in engineering, entertainment and industry have spear-headed the development of a variety of advanced clinical tools now available to the head and neck surgeon. We will introduce the tools, techniques and methodology for planning complex head and neck reconstruction within our institution using a multidisciplinary approach.

*Methods :* 43 consecutive patients had volumetric reconstruction of contrast computer tomography data which were used to precisely measure the dimensions of the potential ablative defect. The tumour volume and required resection margins were calculated in 3-dimensions using threshold segmentation techniques in order to determine the volume of hard and soft tissue required for free tissue transfer. Templates were also constructed to guide the surgeon with bony and soft tissue resections margins.

Where free tissue transfer was required the length of the pedicle from the ablative site to potential donor vessels was also calculated as well as the diameter of potential recipient vessels. Pedicle positions were also simulated using virtual surgery techniques.

*Clinical Relevance:* By using advanced digital technology for head and neck reconstruction the surgeon has an opportunity to build a repertoire of quantitative information for long term functional and aesthetic outcome analysis.

#### O-0206

### VIRTUAL SURGERY SIMULATION (V.S.S.) FOR ORBITAL RECONSTRUCTION

*Giorgio Novelli<sup>1,\*</sup>, Gabriele Tonellini<sup>1</sup>, Fabio Mazzoleni<sup>1</sup>, Davide Sozzi<sup>1</sup>, Luca Ferrari<sup>1</sup>, Alberto Bozzetti<sup>1</sup>*

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*Introduction:* First introduced in craniofacial surgery in the early nineties, surgical navigation has increasingly played a wider role in medical practice in Maxillofacial Surgery Units. In the orbital region, it is very important to obtain an adequate reconstruction that preserves both function and aesthetics.

The authors present their personal experience in reconstructive surgery of the orbit and clarify how much, nowadays, computer technology is necessary to achieve better morphological and functional results in a safer and easier way. The aim of this work is to present some clinical cases, focusing on the surgical planning, which was developed using Virtual Surgical Simulation (V.S.S.).

**Materials and methods:** We analysed a series of 10 patients: 6 of them had orbital or orbitozygomatic fractures, 3 patient had a previously untreated orbital fracture with enophthalmos and diplopia and 1 patient had a left orbital osteoblastoma.

In order to develop an accurate surgical plan, including both the demolition and the reconstructive stage, we used iPlan® 3.0 CMF software (BrainLAB-Germany). Planning the resection for the surgical oncology case, we carried out the virtual removal of the tumour and a stereolithographic model was then created (3 Diemme®-Italy).

For the reconstructive stage of the orbit we used a pre-moulded titanium mesh to restore the orbital walls (Synthes®)

When using virtual surgical navigation with Vector Vision® (BrainLAB-Germany), a real time navigation on the digitally scanned stereolithographic model was performed to verify the compatibility between the reconstruction and what was planned on the computer. The next step was to scan the position of the reconstruction plates, in order to reproduce the same position during the surgical procedure. Once the surgery was done, we validated the used protocol clinically and we made sure that the reconstruction reflected exactly what planned before.

**Conclusions:** An accurate presurgical planning, in association with the surgical navigation, makes surgery easier and save surgical time. During the reconstructive stage, the previously bended reconstruction plates can be positioned and fixed, with no further adjustments needed, just positioning the plates according to the data previously scanned from the stereolithographic model.

Surgical navigation gives us the support to reconstruct bone structures to the best of our skills, allowing to double check the virtual plan and the surgical outcome during the surgical procedure. The support of V.S.S. provides extreme accuracy in both resection and reconstruction stage, saving surgical time.

#### O-0207

##### **SIMOMI PROJECT : CAN WE ASSESS THE FACIAL MIMIC?**

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**Introduction :** We would like to introduce the SIMOMI project, which is a collaboration between our Department of Maxillo Facial Surgery (CHU Amiens) and the Biomechanical Research Department (Technological University of Compiègne). The question raised is to which extent a facial mimic can be evaluated objectively. In today's

clinical practice, we use grading systems based on muscular scale or testing, in order to evaluate a facial muscular disorder. This assessment remains subjective because we are deducing from surfacing cutaneous deformations the movement quality of the solicited muscle.

This qualitative approach is therefore an approximate approach and deserves to be better thought to plan a surgical treatment which involves mimic facial muscle (as rehabilitation of facial palsy, cleft palate for example), to monitor the results, and to follow the recovery and progress in physiotherapy care.

**Purpose :** the aim of this study is to correlate external soft tissue movement (essentially cutaneous) during facial mimic with internal movement (essentially facial mimic muscle) using qualitative and QUANTITATIVE indicators, and to perform a biomechanical model of selected mimic face's movement using the precedent data.

**Material and method:** Quantitative indicators are collected among healthy volunteer(s) without mimic facial disorders using different methods, which are currently under specific developments. 6 movements have been chosen arbitral for different reasons, which are exposed. The specific method development concerns video analysis, MRI, Motion capture, portable surface scan, stereo correlation.

**Results and discussion :** Our aim is to compare and correlate these methodology and to realize biomechanical models which integrate the collected data. First results (MRI mimic facial manual segmentation, video analysis and single muscle modelisation) of this project, which has been started for only a few months, are presented

#### O-0208

##### **3D-PHOTO SIMULATIONS OF POSTOPERATIVE RESULTS IN ORTHOGNATHIC SURGERY COMPARED TO REAL POSTOPERATIVE RESULTS.**

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**Purpose:** Computer generated predictions of postoperative results are available only recently. The technique combines 3D multi-camera photographs with matching DICOM CT data. Both data sets are uploaded to appropriate software and fused. Then the data can be manipulated, and all sorts of osteotomies can be performed. On the basis of the preoperative 3D photo the software computes the predicted 3D soft tissue changes.

The purpose of this study is to explain the technique, to assess the precision of predictions versus reality and to show clinical examples.

**Methods:** One day before orthognathic surgery we acquired 3D-photographs of the face (3dMDface System, 3dMD Ltd, London, United Kingdom) and a cone-beam CT of the face (NewTom VGi, QR srl, Verona, Italy). These data were loaded into dedicated software (3dMDvultus, 3dMD Ltd, London, United Kingdom) and fused, resulting in a 3D-photo with an underlying 3D DICOM hard and soft tissue skull. Surgery was then performed according to preoperative planning. Three months postoperatively we repeated the CT and photo acquisition. Next we simulated the in reality performed bone cuts on

the preoperative DICOM data set. We moved the bony segments of the initial data set in their real postoperative position as seen in the postoperative CT. The morphing function of the software subsequently computed the predicted changes of the skin. This prediction was then superimposed to the effectively obtained postoperative 3D photo. Afterwards the matching of prediction and reality could be evaluated by means of a colour-coded scale.

**Results:** Twelve patients were included in our study: mono-maxillary, bi-maxillary and chin osteotomies plus segmental osteotomies of the maxilla. Prediction and reality were assessed with a colour-coded scale. Simple mono- and bi-maxillary interventions result in an acceptable prediction. The more complex segmental and asymmetrical cases are less precise. The bigger the movements of the osteotomies, the bigger are the differences between prediction and reality.

**Conclusion:** Simple mono- or bi-maxillary osteotomies result in acceptable predictions. The more complex the osteotomies are, the less is the precision of the prediction. The bigger the movements of the osteotomies, the bigger are the differences between prediction and real postoperative results.

#### O-0209

### THREE-DIMENSIONAL ANALYSIS OF HEMIMANDIBULAR ELONGATION AND HYPERPLASIA

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**Introduction:** The mandibular deformity in hemimandibular elongation and hyperplasia is characterized by localized bone growth of the hemi-mandible. Although there are two-dimensional evaluations in the literature on this topic, nothing exists concerning a volumetric evaluation of these entities. The purpose of this study is to elucidate the various growth patterns in these bone pathologies by evaluating the three-dimensional volume of the affected mandible as compared to a same patient and age matched control.

**Patients and Methods:** We evaluated patients who presented to the Centre for Cranio-Maxillofacial and Oral Surgery at University Hospital Zurich with hemimandibular elongation and hyperplasia. Demographic information was obtained, and cone-beam CT data were analyzed by segmentation and volumetric calculations. Age- and sex-matched patients, without any bone pathologies, served as a control group.

**Results:** 47 patients (25 hemimandibular elongation, 22 hemimandibular hyperplasia) were included in this study. Age range was between 12 and 20 years of age. Significant ( $p < 0.001$ ) volumetric differences could be shown between the hemimandibular elongation and hyperplasia group. **Results** of the current study will be presented.

**Conclusion:** Three-dimensional analysis of the hemimandibular elongation and hyperplasia showed significant differences in localized bone growth within the mandible.

This underlines the diversity of these mandibular growth anomalies hemimandibular elongation and hyperplasia.

#### O-0210

### TREATMENT CONTROL DURING HELMET THERAPY

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**Objective:** The appraisal of helmet therapy regarding the initial classification of head deformity and control of the result after treatment is mainly based on subjective estimations. This subjectivity is afflicted with impreciseness and might lead to misinterpretation of the clinical finding. A reliable method to classify positional head deformities is essential.

**Material and Methods:** Based on standardized anthropometric craniofacial caliper measurements of all dimensions of a cohort of more than 400 healthy children, normative percentiles of the cranial shape were generated. Cranial measurements of more than 2500 children assessed for positional cranial deformity to our clinic were compared with the norm in dependence of age and gender. If a helmet therapy was performed, treatment outcome during the first year of life was likewise compared with the normative data in means of a treatment control.

**Results:** Of 2571 children assessed for cranial deformity, 61.3% showed definite aberrance in CVAI (n=1535, Plagiocephaly), 9.1% showed aberrance in CI (n=229, Brachycephaly) and 29.6% showed aberrance in CVAI and CI (n=742, Combination). 58.8 % of the 2571 children (n=1521) met the clinical criteria for the treatment with an orthotic helmet due to anthropometric measurements beyond the 90th percentile of the craniofacial norm. After helmet treatment, CVAI normalized in 83.3% of treated children. CI improved clearly during treatment. However, normalized values only could be observed in 35.2%.

**Conclusion:** The assessment of positional cranial deformity in infancy must be based on normative percentiles to assure objectivity. Helmet therapy is highly effective to normalize cranial asymmetry. It is less suitable for the normalization of brachycephaly.

#### O-0211

### DIGITAL VOLUME TOMOGRAPHY: INCIDENCES AND KNOWLEDGE OF DENTISTS IN GERMANY AND SWITZERLAND

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**Introduction:** This study investigated the knowledge about digital volume tomography (DVT) and radiation in a representative population sample of Switzerland and Germany.

**Material and method:** A standardised questionnaire about knowledge on DVT was personally handed out or sent by post to 1000 dentists in Switzerland and the same ques-

tionnaire was sent to 1000 dentists in Germany (return postage was free for the dentists). 164 German and 278 Swiss dentists returned the questionnaire. Descriptive statistics as well as correlations of general variables and answerers of the questionnaires were evaluated.

**Results:** For example- 58% of the German and 54% of the Swiss dentists use the DVT for the planning of dental implants. 79% of the German dentists and 87% of the Swiss dentist were aware that a magnetic resonance imaging in comparison with the DVT is better for the imaging of the articular disc but only 68% of the German and 49% of the Swiss dentists answered a question about DVT and tooth decay correctly. 81% of the German dentists and 86% of the Swiss dentist knew that a DVT requires less radiation than standard computed tomography. Significant ( $p=0.05$ ) more Swiss dentists had a DVT in their private practise or available, referred patients to DVT or CT and used the DVT for implant planning.

**Conclusions:** Most dentists in both countries are aware of the radiation and potential use of the DVT. Since this survey revealed a broad interest in further education, these results will help us to provide detailed teaching in this field.

#### O-0212

### OPTIMIZING PARAMETERS OF MAGNETIC-RESONANCE-IMAGING (MRI) DATA FOR VISUALIZATION OF DENTAL AND MAXILLO-MANDIBULAR STRUCTURES BY 3T-MRI

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**Objectives:** MRI has emerged as a feasible alternative to CT in general clinical routine and is still rapidly progressing and improving. Purpose of this study was to demonstrate the feasibility of imaging the mandible and maxilla by 3T MRI in the field of dental and oromaxillofacial surgery (OMFS). The MR imaging techniques were optimized in terms of resolution and contrast of different tissues and structures.

**Material and methods:** Ten healthy volunteers with different dental status were examined by T1- and T2-weighted 3D high resolution (0.8mm<sup>3</sup> isometric) MRI using a 3T MR unit (Siemens, Skyra, Erlangen, Germany) with a 20-channel standard head&neck coil. The neck was supported to bring the jaws close to the upper 2-4 elements of the coil which were used for imaging. All other coil elements were switched off. Mean age of the patients (m/f = 6:4) was 33.08 y (range, 25.5-62.75 years), with a variety of oral findings, including iatrogenic artefacts.

**Results:** 3T MRT provided excellent images which allowed excellent discrimination between dental pulp, periodontal and adjacent tooth, bone, bone marrow and mandibular canal. Panoramic reconstruction allowed the distinct analysis of intraosseous findings, e.g. the topography of retained teeth.

**Conclusions:** MR Imaging is a very promising tool for

visualization and detection in the field of dental and oromaxillofacial diseases, especially with the potential high-field MRI.

More evaluations should follow to prove the potential benefit in clinical practicability.

**Keywords:** Magnetic Resonance Imaging, 3 Tesla, Image Quality, dental structures, maxilla, mandible

#### O-0213

### SHAPE AND FORM VARIABILITY OF THE MANDIBLE INVESTIGATED ON THE BASES OF A STATISTICAL MODEL.

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**Objectives:** The aim of the study was the development of a statistical model of the Caucasian mandible. On the basis of the evaluation a mean mandible should be generated and the shape and the size variability should be investigated.

**Methods:** Using the software Amira® eighty computed tomographies of Caucasian mandibles (40 male, 40 female) were segmented. In the following a virtual statistical mandible model was computed. The model was investigated concerning shape and size variability using visualization and principal components analysis.

**Results:** The most variable regions of the mandible were visualised using a colour scale. , With 7-5 mm the coronoid process, the angle and the condyle showed the maximum deviation from the mean model. The major components analysis illustrated that the size of the mandible itself and not the shape represents the first major principal component. As second major component the change of the corpus regarding width and angulations could be revealed. In the third major component the form of the coronoid process varies particularly, in the fourth the variance of the angle, the chin region and again of the coronoid process becomes apparent. Beside these form variances, deviations from around 3.5 mm could be seen at the outer surface of the mandible in the region of the oblique line, the chin region and the basal mandible contour. A dependency of the variance on the gender could only be shown according the mandible size but not the shape.

**Conclusion:** The statistical model reveals a distinct form and shape variability of the Caucasian mandible. The model could deliver information for the development and improvement of osteosynthesis material. Regarding the idea to develop generic preformed mandible reconstruction plates in particular from ramus to ramus, the model shows that the main shape variability can be found in the plate relevant regions of the mandible. From the practical point of view this casts the serial production of such plates into doubt. Another option for the application of such a model may be the use as a virtual template for bone grafts in the planning of mandible reconstructions.

**O-0214****VALIDATION OF A NOVEL APPROACH FOR 3D RENDERING OF CONDYLES BASED ON 3D REGION GROWING ALGORITHM USING CONE-BEAM COMPUTER TOMOGRAPHY DATA**

Tong Xi<sup>1,\*</sup>, Wout Heerink<sup>2</sup>, Bram Van Loon<sup>1</sup>, Luc Verhamme<sup>1</sup>, Stefan Bergé<sup>1</sup>, Thomas Maal<sup>1</sup>

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The 3D rendering of condyles using cone-beam computer tomography (CBCT) data has always been problematic due to the diversified and complex morphology of condyles on the one hand, and the low contrast resolution and distortion of grayscale value in CBCT scans on the other hand. Various approaches have been developed to depict the anatomic contour of condyles in 3D. These methods require manual outlining of the condylar contour on cross-sections of a volumetric dataset and complex imaging algorithms. In order to reduce the hands-on and computing time, a novel approach for 3D surface rendering of condyles was developed and validated in the current study.

CBCT datasets of ten adult patients were selected from our CBCT database. All CBCT datasets were cropped to the volume of interest (condyle). In the test group, every fifth axial slice (key slice) of the condyle was presented to the observer. By clicking on a voxel on the condylar outline (seeding point), an appropriate grayscale threshold value was determined using a 2D region growing algorithm. By interpolation, the local grayscale threshold values for all other axial slices were calculated from the key slices. The final 3D region growing used a central seed point from which the condyle started to grow in three dimensions. The final condylar outline was restrained by the varying local grayscale threshold values throughout the condyle. In the control group, the condylar contour was manually outlined. The Dice coefficient and condylar volume were calculated to evaluate the similarity of the 3D rendered condyles between the test group and control group.

The volume of segmented condylar process using the 3D region growing algorithm did not differ significantly to the control group ( $p=0.20$ ). The intra-class coefficient for volumetric measurements between both groups was 0.94. The similarity of the 3D rendered condyles between the test and control group was excellent (Dice coefficient=0.95).

The novel semi-automated approach for 3D rendering of condyles based on local thresholding and 3D region growing was shown to be accurate and reliable. It has significantly reduced the computing time in comparison to the previously used methods.

**O-0215****SURGICAL DECORTICATION IN CHRONIC OSTEOMYELITIS BASED ON 18F-NAF-PET/CT IMAGE FUSION**

Matthias Feichtinger<sup>1,2,\*</sup>, Mauro Pau<sup>1,2</sup>, Knut Ernst Reinbacher<sup>1,2</sup>, Christian Gstettner<sup>1,3</sup>, Reingard-Maria Aigner<sup>1,3</sup>, Hans Kaercher<sup>1,2</sup>

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**Background:** Chronic osteomyelitis is a disease that affects both cancellous and cortical bone. The treatment of choice is surgical decortication that leads to loss of bone. Especially in the head and neck region this may also lead to loss of function. Until now the surgeon had to rely on preoperatively taken images based on Tc99M scintigraphy. A major disadvantage is the fact that these pictures can only be depicted two dimensionally. The aim of this study was to present a new method of navigationally guided decortication in cases of chronic osteomyelitis based on 18F-NaF-PET/CT image fusion. This technique enables the surgeon to intraoperatively work with the preoperatively acquired 3D scans.

**Material and Methods:** We present ten cases of chronic osteomyelitis of the jaw bones. All ten patients had previously undergone multiple surgical interventions failing to stop progression of the disease. All patients received three-dimensional navigationally guided resection of the infected bone based on 18F-NaF-PET/CT image fusion.

**Results:** Postoperative Tc99M scintigraphy confirmed complete removal of the infectious bone in nine patients. All nine patients were clinically uneventful and showed good function. One patient however, showed progression of the disease after 6 months and is scheduled for another surgical intervention

**Discussion:** Three dimensionally navigated resection of chronic osteomyelitis based on 18F-NaF-PET/CT image fusion is a new, promising method in cases of progressive disease. This technique allows the surgeon to depict the region of interest three dimensionally in the operation theatre and may help to preserve important structures.

## Session 3. HISTORY OF CRANIO-MAXILLO-FACIAL SURGERY

**O-0301**

### PAUL TESSIER'S LEGACY

*Luigi Clauser<sup>1,\*</sup>, Henry Kawamoto<sup>1</sup>, Anthony Wolfe<sup>1</sup>*

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Dr. Paul L. Tessier was a giant in the field of reconstructive surgery, creating a new surgical speciality and helping many whose severe facial deformities had previously been untreatable. For him it was not enough that patients should "look better than they did before we started". He believed that "if it is not normal, it is not enough". Furthermore, the revolutionary techniques he devised for the treatment of craniofacial birth defects have been successfully extended across geographical and generational boundaries into the seemingly disparate arenas of craniofacial cancer surgery, trauma and facial aesthetic surgery. He had developed an interest in facial plastic surgery after seeing cleft lips treated while a resident, and he was finally able to join the paediatric service at the Foch in 1946.

At about this time he started visiting Britain regularly to watch the "fathers of plastic surgery", Sir Harold Gillies, and Sir Archibald McIndoe, where he learnt many new techniques. Tessier organised a symposium in 1967 to present his revolutionary techniques to distinguished international peers, inviting their critical appraisal before continuing. Paris became a haven where Tessier inspired and trained the first generation of craniofacial surgeons worldwide. In 1973 he carried out the first such procedure in Britain at Great Ormond Street Hospital for Children, which he continued to visit for 25 years. Dr. Tessier's capacity for work was remarkable but he was not without other interests. Sculpture was incorporated into his study of facial forms.

He was born in 1917 and operated well into his 80s and was still making contributions to the field up to his death in Paris on June 5th at the age of 90. His habitual answer to a challenge -- "Pourquoi pas?," French word for "Why not?" -- became an International motto. In 2000 was given the Jacobson Innovation Award by the American College of Surgeons and was awarded the French Legion of Honor, in 2005.

Paul Tessier was a great innovator in the medical profession, the creator of a new surgical speciality which brought hope to many with severe facial deformities that had previously been untreatable. He is acknowledged as the father of craniofacial surgery and his contribution is recognised internationally, crossing the boundaries of the related specialities of plastic, maxillofacial, ophthalmic and neurosurgery.

**O-0302**

### I WAS REFERRED TO PAUL TESSIER'S OFFICE IN 1957....

*Benjamin Guichard<sup>1,\*</sup>, Julien Davrou<sup>1</sup>, Ludovic Arzul<sup>2</sup>, Aline Berners<sup>3</sup>, Bernard Devauchelle<sup>1</sup>*

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My name is Maurice ANQUETIL, I was 25 when I came to Dr Tessier's office.

I had a really particular face with big eyes and a big chin that made me look as a dumb.

No one could really say what my disease was but Paul Tessier did some research and found that it was Crouzon syndrome.

He changed my life when he changed my face with a new technique he adapted from Sir Harold Gillies.

It wasn't easy for him, but neither for me. I had many surgical issues and many operations to correct my deformity.

My face and my clinical case was a starting case of a surgical revolution leading to cranio-facial surgery.

My medical file is now within the Tessier collection in Amiens, and 45 years later, we can rediscover all the steps, ideas and issues that Paul Tessier was confronted with to create the new specialty. In these archives there are other medical files, pictures, drawing and skulls, all witness to the work of Paul Tessier.

**O-0303**

### REFERENCES TO HEAD AND NECK SURGERY, ANATOMY AND PATHOLOGY IN THE WORKS OF GALEN OF PERGAMON

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Galen (Galenos, Galenus AD 129-c 210) is one of the most influential physicians in the history of medicine. Personal physician to the stoic philosopher emperor, Marcus Aurelius (the author of the Meditations) he had a vast medical output, writing on many other subjects.

His surviving works run to 20 volumes, comprising approximately 10% of all surviving Greek texts up to the split of the Roman Empire to East and West. He was not only a follower and promoter of Hippocratic medicine but also dissector, demonstrator and a practising physician and surgeon, who learned his surgery on gladiators' injuries. He studied medicine as if he had been on a modern day Erasmus program, from Smyrna to Alexandria, the cutting edge of ancient experimental science.

No other physician can boast that his teaching endured for 1500 years, vastly influencing different cultures from India to Britain. Though he was regarded as a pagan, different religions (Christian, Muslims) accommodated his teaching and system. It was not until well into the Renais-

sance that serious erosions were made into his teaching, although he was taught compulsorily at Universities until the 19 century. He has acquired an undeservedly bad reputation in the last 300 years as his teachings were ossified by the medical profession even though he personally extolled later generations to obtain wide knowledge, based on observations and experiments.

He was a fierce debater and a practical demonstrator of anatomy and physiology. He demonstrated in animals that the tying of the vagus cranial nerve caused the animal to lose its voice, correctly identified the importance of the central nervous system and gave detailed advice on making a diagnosis on the feeling of the pulse (On the pulse for beginners). He made an attempt to describe and classify mental diseases. He left a detailed anatomical and dissection 'manual' (On anatomical procedures). He recognised the interdependence between body and soul (psyche) and the importance of diet (On the properties of foodstuffs)

Some of his relevant and curious findings, demonstrations and thoughts relating to the current maxillofacial field will be presented of this, now undeservedly overlooked, ancient physician who worked and published into his eighties.

#### O-0304

#### CRANIO-MAXILLOFACIAL SURGERY IN BYZANTIUM

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**Introduction:** Byzantine physicians, especially those interested in Surgery, developed concepts, views and opinions describing therapeutic methods for both conservative and surgical management of diseases and injuries related to the field of Oral and Cranio-maxillofacial Surgery and Pathology.

**Materials and Method:** In this study, the original texts of Byzantine physicians, written in ancient Greek, as they are preserved in the electronic platform Thesaurus Linguae Graecae, University of California, Irvine, CA, USA, were investigated in relation to Oral and Maxillofacial Surgery, aiming at identifying opinions, techniques, surgical instruments, pharmacologic treatments, conservative and interventional management referring to the various entities of Oral and Cranio-maxillofacial Surgery and Pathology.

**Results:** The most eminent physicians of the Early (4th-7th century A.D.) and Middle (8th -12th century A.D.) Byzantine Period, in particular Oribasius Pergamenus, Aëtius Amidenus, Alexander Trallianus, Theophilus Protospatharius, Paulus Aegineta, Meletius, and Leo Medicus, give their attention to various subjects concerning Oral and Maxillofacial Surgery in their works. These references include topographic and surgical anatomy of the head and neck, dentoalveolar surgery, oral and cervicofacial infections, trauma of viscerocranium and neurocranium as well as biomechanics of traumatic brain injuries, temporomandibular joints dysfunction as a consequence of mandibular dislocation, surgical oncology of the head and neck, re-

constructive surgery of the head and neck, oral pathology, surgical pathology of salivary glands, therapeutic management of facial nerve dysfunction, preprosthetic surgery, craniofacial surgery, deformities of the facial skeleton, and particularly anthropologic and craniometric observations, determining clinical examination in the frame of orthodontic and orthognathic surgical approach of patients presenting with corresponding functional and esthetic problems, and finally specific bandages of the head and neck for treating traumatic injuries of the viscerocranium and neurocranium, diastasis of the cranial sutures, dislocations of the mandible (unilateral and bilateral), as well as inflammatory diseases of the parotids and the neck.

**Conclusion:** Byzantine physicians had been particularly interested in various subjects of the mouth, jaws, face, and head and neck in general, in the frame of course of their general surgery practice. Oral and Cranio-maxillofacial Surgery was practiced in the Surgical Departments of the Byzantine "Xenons" (Hospitals), at least from the 6th century A.D. and afterwards, whereas earlier it was also practiced in the frame of General Surgery, but on a private basis through the chief physicians 'archiatroi', or even by ordinary surgeons.

#### O-0305

#### FACIAL CHANGES OF LOUIS XIV – AN ANALYSIS OF THE ARTWORKS FROM THE SEVENTEENTH CENTURY.

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**Background:** Louis XIV, known as the Sun King, was a Bourbon monarch of France and Navarre between 1643 and 1715. He was the longest-reigning king in European history: 72 years.

**Methods:** This was a retrospective cohort study. It was common for monarchs in ancient times to have many portraits of them drawn during their lifetime. We analysed different facial portraits of Louis XIV in each decade of his life.

**Results:** We included 7 portraits representing Louis XIV's face from 5 until 63 years of age. The portraits showed normal development during his childhood and young adulthood. The King had a mild mandibular prognathism, which was frequent in the Habsburg monarchy. Later portraits demonstrated his midfacial hypoplasia because of dental caries and subsequently early loss of upper teeth. Although the King's face had pox scars, these scars have never appeared in the portraits. In his middle adulthood, the King encountered maxillary abscess and an oroantral fistula after dental extractions. The portraits of his late life displayed a retruded midface and a significant loss of lip volume.

**Conclusions:** Although portrait painting of the 17th century can be idealised, or even overidealised, the portraits of Louis XIV appear to be realistic and are evidence of his maxillofacial health history

**Keywords:** Louis XIV; facial changes; portraits



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#### O-0306

### THE HISTORY OF ORTHOGNATHIC SURGERY: AN OVERVIEW

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The historical development of orthognathic surgery has not been uniform and continuous but has rather followed a stepwise, intermittent course. The early-phase surgery was mainly limited to the mandible, while maxillary procedures were to come later. Orthognathic surgery was originally developed in the United States of America. The first mandibular osteotomy is considered to be Hüllihen's procedure in 1849 to correct a protrusive malposition of a mandibular alveolar segment caused by a burn (Hüllihen 1849). Osteotomy of the mandibular body for the correction of prognathism was first carried out in 1897 as so called 'St Louis operation'. The osteotomy was performed by Vilray Blair, who later described several methods to correct maxillofacial deformities and was the first to present a classification of jaw deformities: mandibular prognathism, mandibular retrognathism, alveolar mandibular and maxillary protrusion and open bite. He was also the first to underline the importance of orthodontics in treatment. (Steinhäuser 1996). The first phase of development in the USA came to an end at World War I, when surgeons had to concentrate on trauma surgery. Kostecka (1931) who worked in Prague described a horizontal osteotomy just between the sigmoid notch and the mandibular foramen. The great German schools developed with Günther Stock, Martin Wassmund and Schuchardt in Berlin who systemized and refined osteotomy techniques both for the midface and mandible in the 1920s and 30. The third phase, which began in the early 1950's, was a period of rapid development in the whole field of orthognathic surgery. In Europe became later on the centre of progress. Günther Stock Pupils of the 'Vienna School' of maxillofacial surgery, Trauner and Obwegeser (1957), introduced intraoral bilateral sagittal split ramus osteotomy, although the first description was published as early as 1942 (Schuchardt). Plating techniques were developed primarily in Europe by Spiessel and Luhr. More contributions have been given by Wunderer. Orthodontics is an essential part of modern orthognathic surgery. This was stressed by the surgeon Converse and the orthodontist Horowitz in 1969. The introduction of occlusal wafer splint was an important step in allowing surgery to occur before orthodontic detailing of the occlusion was completed.

#### O-0307

### THE CHANGING FACE OF ORAL AND MAXILLOFACIAL SURGERY IN AUSTRALIA

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In Australia, Oral and Maxillofacial Surgery (OMS) has been an evolving speciality over the past few decades. In 1996 the training pathway for Oral and Maxillofacial Surgery was altered to not only include a registerable dental degree but also a registerable medical degree as a prerequisite to obtaining a fellowship and registration as a specialist surgeon. This has led to a shift in the demographics and scope of practice of Oral and Maxillofacial Surgeons over the past 15 years.

A survey regarding basic demographic information, education and training, current work practices and perceptions of OMS practice was sent to 145 members of the Australian and New Zealand Association of Oral and Maxillofacial Surgeons (ANZAOMS). One hundred and one responses were received.

This data was analysed and compared to previous studies and the results are presented herein.

## Session 4. ORTHOGNATHIC SURGERY I

O-0401

### ATTRACTIVENESS OF FACIAL PROFILES IN RELATION TO NORMAL VALUES OF DIFFERENT ANALYZING METHODS

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**Introduction:** Every orthognathic procedure includes changes in the facial profile, which influences the esthetic impression of the face. Therefore profile analyses are an important tool in diagnostic and outcome evaluation for maxillofacial surgeons as well as orthodontists. Because assessment of facial aesthetics is subject to changes in the course of time, our study investigates how far normal values of two different methods of profile analyses are still applicable concerning esthetic evaluations by subjects.

**Material and methods:** 90 patients were categorized by the Schwarz's profile analysis. On the basis of profile photographs facial convexity was then determined with two different analyzing methods (Legan and Burston 1980, Subtelny 1959). 31 persons of different age and profession without dental or surgical background evaluated the anonymized photographs concerning the complete facial profile as well as different parts of the profile. A standardised questionnaire including esthetic and positioning criteria was used. Data were analyzed with ordinal logistic regression models.

**Results:** The facial appearance – the complete profile as well as particular parts -was judged as most attractive when the analyses showed values within the normal range for both investigational methods. The more the measurements deviated from normal values the less attractive the profiles were judged. However, for particular measurements significant differences between subject-evaluation and regression model were found.

**Discussion:** Both analyzing methods are still valid and suitable diagnostic tools. Their normal values reflect the actual esthetic feeling well. An ordinary profile without extreme characteristics is deemed as the esthetic optimum and these results confirm the statements of multiple authors. But the significant deviations detected in evaluations of singular criteria prove that besides the profile parameters many other and individual factors influence the esthetic impression of a face.

O-0402

### GOLDEN PROPORTION IN TREATMENT OF THE PATIENTS WITH DENTOFACIAL DEFORMITY

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**Introduction:** The analysis of face is the main part of the clinical examination. The Golden Proportion is one of the oldest parameters identified with esthetics.

**Aim of the study:** The aim of the study was to assess the usefulness of the Golden Proportion Rule in orthodontic - surgical treatment with dentofacial deformities.

**Material and methods:** The study consisted of 132 patients - 95 female and 37 male, aged 18 to 36, admitted to the Department of Cranio-Maxillofacial Surgery of Medical University of Warsaw due to dentofacial deformities. In order to assess the usefulness of the Divine Proportion in combined orthodontic - surgical treatment of patients with dentofacial deformities, the following material was examined: Photographs of faces and X-ray examination of the head before and after surgical treatment.

**Results:** Average values of all 15 soft tissue proportions and 12 hard tissue proportions by Ricketts and Ghyka before surgical treatment were different from the Golden Number - Phi 1.618. An average positive change Golden Proportion after the surgery was observed in 20% to 80% patients.

**Conclusions:** Values of proportions regarded as the Golden Proportions different from Phi = 1.618 as well as incorrect values of clinical and cephalometric parameters are observed before and after surgical treatment. Golden proportion cannot be used independently, in isolation from other parameters evaluating the anatomy and esthetic of facial skeleton.

O-0403

### DIGITAL MANAGEMENT OF FACIAL MIDLINES IN ORTHOGNATHIC SURGERY

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Facial asymmetry is a common deformity. Its correction is often a priority for the patient, even when more important sagittal, vertical or transverse dentofacial anomalies are present.

The surgical planning to correct a facial asymmetry is quite complex, because the deformity may involve the whole facial skeleton and the soft tissues in variable combination. It needs a thorough three dimensional evaluation of the spatial position in order to define the correct movements of the osteotomized bone fragments.

Even with the most accurate planning, slight asymmetries or minimal deviations of the facial midlines may often result.

Aim of this study is to evaluate the correct alignment of the facial midlines and symmetrization of the facial structures, following orthognathic surgeries planned with classical or digital surgical guides.

Two different planning procedures were compared:

1) the classic standard orthognathic planning, in which the examiner collects the data of aesthetic facial analysis and cephalometry and makes the pre-surgical VTO and surgical simulation on the articulated plaster casts, obtaining acrylic surgical wafers(intermediate splint).

2)a digital planning procedure, where is the computer that acquires the DICOM data of a three dimensional cranial CT (bone and soft tissues) and combines the digital pictures of the face, creating an augmented model of the patient, by which the operator can simulate the surgery and obtain the intermediate splint, as a computer-generated plastic wafer [Maxilim® - Medicim, Mechelen,

Belgium].

A sample of 20 patients, with different rates of facial asymmetries, was split in two homogeneous groups of ten patients each, with reference to the planning method adopted. In the first group, the orthognathic bimaxillary correction was planned classically, while, in the second group, similar surgeries were planned virtually and digital intermediate splints were processed.

Clinical and radiographic alignment of the facial and dental midlines was assessed, and the differences between the two groups were measured and recorded. Statistical analysis was therefore made, showing that the 3D image based digital planning and computer-generated surgical wafers are a reliable and more precise method to manage the midlines alignment in orthognathic surgery, compared to the classic procedure with biplanar radiographs and model surgery.

#### O-0404

### ORTHOGNATHIC SURGERY: A COMPARISON OF ESTHETIC AND FUNCTIONAL RESULTS

*Simion Bran<sup>1,\*</sup>, Mihaela Baciut<sup>1</sup>, Grigore Baciut<sup>1</sup>, Ileana Mitre<sup>1</sup>, Horatiu Rotaru<sup>1</sup>, Ioan Barbur<sup>1</sup>, Cristian Dinu<sup>1</sup>, Ioan Moldovan<sup>1</sup>*

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The paper makes a parallel between the esthetic and the functional results obtained after orthognathic surgery interventions on of 312 patients, during the last 6 years.

In all the osteotomies carried out, we have used the piezo-electric device, the cephalometric analysis was made on CBCT, and the simulation of the bone displacement was made with the Surgicase.

#### O-0405

### WHEN ORTHODONTICS MAKES SURGERY ALMOST IMPOSSIBLE: HOW CAN WE SOLVE THE CASE IN ACCEPTABLE TIME?

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**Introduction:** Orthodontist and surgeon should work in close contact during orthodontic-surgical treatments.

In general, a dental decompensation must be performed orthodontically, in order to create a harmony between skeletal and dental patterns.

Unfortunately, sometimes this does not happen and orthodontics goes in opposite direction to the ideal one, with the result to make surgery impossible.

**Material and methods:** A female patient with class III skeletal pattern was sent by her orthodontist for surgical correction, nevertheless she presented a perfect class I dental occlusion.

This happened because the patient was originally planned to be operated in another centre and no real ortho-surgical plan had been made; so the orthodontist set up a treatment by herself, simply to correct the malocclusion, and she did this perfectly.

No surgery was possible now, because every jaw displacement would have created a malocclusion.

The patient presented a very concave profile, she was psychologically suffering from it and she expected great results from the surgical correction.

The problem was obviously how to make the dental discrepancy equal to the skeletal one and in a reasonable period of time, considering that the patient had already a 4 years orthodontic treatment behind her.

The case was treated with anterior mandibular osteotomy for dento-alveolar distraction to create a negative incisal over-jet, till a class III canine malocclusion was developed and a one-tooth space between cuspids and 1st premolars was created.

A remarkable class III skeletal profile was created at the lower lip level, in accordance with the existing basal-bone (chin) skeletal situation.

**Results:** Now, a realistic surgical plan was possible: a bimaxillary osteotomy with occlusal plane clockwise rotation plus genioplasty were performed.

At the end of the treatment, two implants were inserted in the distraction spaces, so the patient finally had three premolars in each side of the mandibular arch, with class I canine and class II molar relationship.

Occlusal and skeletal-aesthetic result was satisfactory.

**Conclusions:** After this experience, every time that a severe dento-basal discrepancy is present, a frontal dento-alveolar distraction osteogenesis technique is carried out in the pre-surgical orthodontic treatment, making the occlusal and skeletal relationship equal.

#### O-0406

### ASSOCIATION BETWEEN SKELETAL BASED MALOCCLUSION AND PROGRESSION TO ORTHOGNATHIC SURGERY

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**Background:** The perceived success of orthognathic surgery depends greatly on patient motivation. In our study we aimed to determine trends between skeletal pattern and associated malocclusion and progression to surgery. This would allow us to use the patient's dentofacial deformity to predict the likelihood of them opting for surgery and determine criteria for future allocation of resources.

**Methods:** We conducted a Retrospective review of departmental database, clinical notes and study models of patients seen in the joint orthodontic and orthognathic clinic at Kings College Hospital between 2005 and 2011. Both occlusal and skeletal measures along with the patient demographics were collated for a cohort of 120 consecutive patients.

**Results:** Of the total cohort of patients seen in clinic 34.7% male (n=42) and 64.5% female (n=78). Mean age was 21.7 (SD 7.58) (range 12-44). 1.7% were skeletal class I, 40.5% skeletal II and 57.9% skeletal III. 50 patients opted for orthodontic treatment only. A total of 70 had surgery; 28.6% male (n=20) 71.4% female (n=50). 44.3% were skeletal class II and 55.7% skeletal III.

No significant difference in age between those operated on and those not (p=0.194). No significant difference in skeletal malocclusion between those operated and those not (p=0.847). The cephalometric measure ANB was significant for predicting progression to surgery in the

severe forms where severe class II was ANB 4 to 10 and severe class III was ANB -4 to -10 ( $p=0.026$  95% CI 7.933 to 46.267). No other measure of skeletal discrepancy was significant for predicting progression to surgery. No correlation evident between IOTN (index of treatment need) and decision to proceed to surgery.

*Conclusions:* Our data indicates that females are more likely to undergo orthognathic surgery; in particular class III females. Patients with class II deformities have a higher motivation for orthodontics than surgery. The cephalometric measure ANB did predict motivation for surgery in the severe forms. Our preliminary analysis of the patients dental and aesthetic IOTN was not a strong predictor for chosen treatment. No other measure of skeletal deformity was defined as a predictive of patient progression to orthognathic surgery.

#### O-0407

### THE ARTICULATORY EVALUATION BEFORE AND AFTER SURGICAL CORRECTION OF SKELETAL MANDIBULAR PROGNATHISM USING ELECTROPALATOGRAPHY (EPG) : A PRELIMINARY REPORT

*Motoki Katsube<sup>1,\*</sup>, Kenji Kusumoto<sup>1</sup>, Yasuko Shirasawa<sup>1</sup>, Toshihito Mitsui<sup>1</sup>, Masanobu Yoshihara<sup>1</sup>, Kengo Nakajima<sup>2</sup>, Taku Yamamoto<sup>2</sup>, Ichiro Yamamoto<sup>2</sup>*

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The major functions of the lower face are mastication, breathing and articulation. After the surgical correction for jaw deformities, facial appearance, occlusion, maxillo-mandibular relationship, oral cavity and respiratory tract are changed. For morphological evaluations a cephalometric analysis has been commonly used. Patients with mandibular prognathism frequently have articulatory disorders particularly in /s/, /t/ phonation. In some of them, we have recognized the change of articulation after surgical correction.

However, such changes of articulation have been rarely reported. Lips, tongue and soft palate play main roles in articulation. The surgical correction for jaw deformity causes changing the intraoral cavity and the position of a tongue. We considered that the change of tongue movement accompanying the change of tongue position is the most important factor to change the articulation.

To evaluate the tongue position and movement, cephalometric analysis and palatography have been used commonly as a static analysis, however, up to now a dynamic analysis such as electropalatography (EPG) has rarely been used for that. EPG is a computer-assisted instrument which provides information for the location and timing of the tongue contact to the hard palate during articulation.

We performed the surgical correction for two cases with mandibular prognathism, and studied the articulation in EPG with simultaneous phonation to estimate tongue-palatal attachment in several phonation before and after the surgery. EPG research was included /s/, /t/ consonant and /a/ vowel phonation. The EPG pattern and the hearing impression have been improved in both cases, especially, in the case which had a severe anterior crossbite preoperatively.. EPG pattern and phonation have improved prominently.

We present the results of the functional improvement and discuss the dynamic evaluation of articulation using EPG before and after the osteotomy against mandibular prognathism as a preliminary report.

#### O-0408

### IMAGE-GUIDED POSITIONING OF THE MAXILLA DURING MAXILLOMANDIBULAR ORTHOGNATHIC SURGERY

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*Introduction :* Maxillo-mandibular surgery aims at correcting functional and aesthetic deformities of the jaws. Most surgeons move the maxillary bone segment first by doing a Le Fort I osteotomy, then adjust the mandible with a bilateral sagittal split ramus osteotomy. Intraoperative positioning of the maxilla is usually guided by caliper measurements or by an occlusal wafer relating the maxilla to the mandible. We have developed a technique which uses image-guided navigation surgery to track the maxillary movements intraoperatively.

*Material and method :* A specific software was developed, allowing preoperative simulation of the planned procedure with three-dimensional surface reconstruction of the computerized tomography data of the patient. A link was made to the VectorVision optical tracking system (Brainlab, Feldkirchen, Germany) using the OpenIGTLink library. A maxillary splint equipped with passive optical markers was designed to be detected by the navigation system.

*Results :* This technique enables intraoperative real-time tracking of the movements of the maxilla during maxillo-mandibular surgery. It guides the surgeon during the procedure, showing the actual position of the bone segment and the goal to be reached on a three-dimensional reconstruction of the patient's skull.

*Discussion :* This new technique of computer-assisted orthognathic surgery offers several advantages. It helps the surgeon position the maxilla after a Le Fort I osteotomy, directly guided by three-dimensional images of the preoperative planning. It does not require occlusal wafers, which can imply errors from dental impressions, plaster casts, facebow recording, articulator mounting or unexpected movements of the mandible during the procedure. Experimental work is in progress to assess the accuracy of the technique.

**O-0409****3D EVALUATION OF BSSO AND LE FORT I OSTEOTOMIES USING THE BONESCALPEL ULTRASONIC OSTEOTOME WITH A NOVEL 30 MM STRAIGHT BLADE**

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**Purpose:** The use of a new ultrasonic osteotome enabled us to modify well-established orthognathic osteotomies to achieve a more favourable utilization of the anatomy and to reduce the perioperative and postoperative complications as bad splitting, bleeding, oedema, lesions of nerve and soft tissues. Based on morphological analysis of the jaws, a universal ultrasonic 30 mm blade was developed and studied.

**Material and methods:** To assess the quality of the split on the lingual side of the mandible and the pterygomaxillary separation, preoperative and postoperative 3-dimensional CT scan were performed on 10 patients who underwent orthognathic surgery using straight 20 or 30 mm blades with depth markers. All osteotomies were performed purely ultrasonically without use of saws or burrs, and with minimal requirements of chisels. The same procedure was applied on 10 cadaver heads, using the 30 mm blade. On the preoperative 3D-scan, measures were done on the mandible and the maxilla: the mean distances from the anterior border of the ramus to the antilingula, the mean distance from the dental nerve to the external border and the basila, and the average distance from the piriform rim to the descending palatine artery. On the postoperative 3D-scan, the pterygomaxillary separation was measured, and the shape of the mandibular split was identified. These measurements and shapes were compared to patterns described in literature.

**Results and conclusions:** In the Le Fort I series, an adequate pterygoid disjunction was observed and the maxillary down-fracture was easily completed. Using the blade's depth markers, the osteotomy of the pillars and nasal septum can be performed with the 30 mm blade without risk of touching the palatine artery. In the BSSO series, significant reductions in nerve impairment and bad splits were observed. The shape of the split was influenced by the length of the medial osteotomy. The 30 mm straight blade seems to improve the shape of the lingual split. The authors concluded that the use of the ultrasonic osteotome with the 30 mm straight blade enables improved control over the quality of osteotomies in orthognathic surgery.

**O-0410****NAVIGATION ASSISTED MAXILLARY POSITIONING OF LE FORT I OSTEOTOMY IN ORTHOGNATHIC SURGERY**

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Many publications have previously shown that maxillary positioning in Le Fort I osteotomy can be inaccurate according to the preoperative planning in orthognathic sur-

gery (using the classic model-based and positioning splint technics).

As a consequence, in this patients with more than 2mm or 4° of error, inaccuracy can have unexpected aesthetic consequences. In order to improve this situation, we developed an image-free navigation system to have accurate measurements during the positioning of the bone. This can help the surgeon to accurately reproduce his preoperative planning.

About 30 cases were navigated according to this procedure (2D or 3D planning were used in those cases). First measurement is done at beginning of the procedure without displacement and then maxillary bone is positioned with a classic splint. References are fixed on this splint and subsequent measurements are possible to help surgeon to control positioning in the three dimensions. **Results** are visual representation of the displacement and 6 degrees of liberty values (3 translations and 3 rotations). Validation of the measurements was assessed by postoperative CT-scan (inframillimetric precision is obtained).

In our experience, this tool appears very useful to avoid incorrect positioning in bimaxillary surgery. The procedure is simple, low time-consuming and very precise.

**O-0411****PREDICTABILITY OF AUTOROTATION OF THE MANDIBLE AFTER LE FORT I MAXILLARY IMPACTION IN CASES OF VERTICAL MAXILLARY EXCESS**

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Vertical maxillary excess is usually corrected by a surgical repositioning of the maxilla by performing a Le Fort I osteotomy with impaction of the maxilla and autorotation of the mandible anteriorly and superiorly.

Nine clinical and cephalometric parameters of 25 patients who underwent the surgical maxillary repositioning with mandibular autorotation were measured preoperatively and 6 months postoperatively in order to determine in which cases autorotation occurred as predicted.

In this study, the occlusal plane angle in the mandibular autorotation group was significantly higher preoperatively than in the non-autorotation group and there were more cases of anterior open bite in the non-autorotation group.

The findings of this study indicated that patients with a vertical maxillary excess who demonstrated an anterior open bite with a low occlusal plane angle preoperatively will probably fail to achieve a mandibular autorotation and will be more prone to postoperative relapse.

**O-0412****RECOVERY OF MAXILLARY TEETH SENSIBILITY AFTER LE FORT I OSTEOTOMY**

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**Introduction :** The section of the superior alveolar nerves

during the Le Fort I osteotomy is unavoidable and usually results in the loss of maxillary teeth sensibility. Sensory recovery after surgery is common but the mechanisms are unknown. The aim of the study was to analyse the speed of recovery of postoperative tooth sensitivity and factors that can influence it.

**Material and method:** A prospective study was carried out in patients undergoing a single Le Fort I osteotomy (LFI), or combined with a mandibular osteotomy (MMO) or intermaxillary disjunction (IMD). Movements made during the procedure (forward, impaction, lowering, rotation) and importance was rated. One tooth by alveolar sector (incisal-canine (ASAN), premolar (MSAN), molar (PSAN) was tested in each patient using an electric pulp-tester. The tests were performed preoperatively (D-1) and 2 days (D2), 15 days (D15), 2(M2), 3(M3) and 6 months (M6) postoperative.

**Results:** Twenty patients (mean age 34 years, range 16-53) were included. 8 maxillo-mandibular osteotomies, 7 intermaxillary disjunctions and 5 single Le Fort I osteotomies were carried. At D-1, 91.9% of teeth tested were sensitive. On day 2, 17.7% of teeth were sensitive. At D15, M2, M3, and M6, the percentage of sensitive teeth were respectively 33.3 43.1 50 and 61.8%. The sensory recovery was significantly faster and more complete in less than 35 years old patients and for the teeth located in the MSAN. The loss of sensitivity was significantly lower in patients operated on for a IMD. There was no significant difference according to the movements made. Analysis based on the importance of the movement could not be conducted because of the too small size.

**Discussion:** The Le Fort I osteotomy do not cause a sensitivity loss in all cases on D2. The sensory recovery occurs from D15 and seems to continue beyond M6. An age less than 35 years and the IMD procedure are sensitive injury limiting and recovery promoting factors. A large range of movements seems to be an aggravating factor. The maxillary teeth sensitivity is not only from the superior alveolar nerves and the recovery of tooth sensitivity after Le Fort I osteotomy could be explained by substitutions from the autonomic nervous system carried in from vascularisation

#### O-0413

### EFFECTS OF LE FORT I ADVANCEMENT ON UPPER LIP, NASAL SOFT TISSUES AND MAXILLARY INCISOR EXPOSURE WITH SIMPLE CLOSURE OR SOFT TISSUE MANIPULATION (CINCH SUTURES/VY CLOSURES).

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**Aim:** To assess prospectively the effect of Le Fort I maxillary advancement +/- impaction in maxillary incisor exposure at rest/smiling, upper lip and nasal soft tissues, comparing simple closure to soft tissue manipulation procedures (alar base cinch sutures, VY closures).

**Subjects & Method:** Forty one consecutive patients undergoing Le Fort I maxillary advancement +/-impaction were invited to participate. Lateral cephalometric radiographs and clinical measurements with digital callipers were taken pre-operatively and up to 6 months post-operatively. One examiner undertook all measurements. Intra-examiner reproducibility was tested by re-measuring 30 volunteers at three time points (10 minutes and 2 weeks apart) to include assessment of smiling reproducibility. Ten ran-

domly selected lateral cephalometric radiographs were retraced two weeks apart.

**Results:** Thirty one participants completed the study (19 female, 12 male) with a mean age of 25.5 yrs (16.9-49.9 yrs). Twenty-six received bimaxillary surgery. Fifteen had simple closures, ten cinch and VY closures (ACVY) and six cinch sutures. Mean maxillary advancement and impaction were 3.34mm and -1.6mm respectively. Soft to hard tissue ratios increased from pronasale (Prn:A 0.32) to stomion superius (Stms:Utip 1.14). Those with ACVY closure showing increased ratios. Nasolabial angle increased (5.68°), associated with significant columella upturning (6.57°). Surgical movement and cinch sutures explained 52% of this change. Upper lip height (1.55mm), alar (2.62mm) and alar base width (3.09mm) significantly increased, with no significant difference imparted by cinch sutures. Mean maxillary incisor display increased significantly on posed smile (1 mm). Pre-surgical lip thickness, cinch and VY closure partly explained changes in maxillary incisor exposure whilst, weak correlations were found with hard tissue movement. Intra-examiner reproducibility, tested with intra-class correlation, was excellent.

**Conclusions:** Soft to hard tissue horizontal ratios increased progressively from pronasale to stomion superius, with a trend towards ACVY increasing these further. Maxillary advancement and impaction increased nasolabial angle via upturning of columella. Cinch sutures increased this further and did not prevent alar widening. Upper lip height increased with VY closures leading to increased upper vermilion exposure. Maxillary incisor display changes were better explained by the pre-surgical upper lip thickness and soft tissue manipulation (cinch, VY closures) than skeletal movements.

## Session 5. OMFS EDUCATION & STRATEGIES

**O-0501**

### EACMFS EDUCATION PROGRAMS

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According to the Constitution of the European Association for Cranio-Maxillofacial Surgery (EACMFS), Objectives of the Association are to promote cranio-maxillo-facial surgery in theory and practice and to advance education, training and unity in the specialty, among others. Education is one of the pillars leading to the progress of any Surgical Specialty.

In this paper we review the main guidelines of the educational programs developed by the EACMFS during the last 10 years. The philosophy of the different projects and the impact in the progress of the specialty throughout Europe, especially in Eastern Europe is reviewed.

**O-0502**

### EUROPEAN LAW FOR THE EUROPEAN MAXILLOFACIAL SURGEONS III

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At the Bologna (1) and Bruges (2) Congresses 4 and 2 years ago brief summaries were given of the history of the European Union and how medical and dental practices and regulations developed since the Treaty of Rome in 1957.

Recently momentous events have taken place in Europe, in particular in the EU. The final ratification of the Lisbon Treaty in 2009 introducing fundamental and considerable changes to the structure of the EU and how it is being run. The EU became a single organisation, no European Community and pillar structure any more. The Treaty reformed the EU from the European Council with its appointed President through common EU foreign and defence policy, increased role of European Parliament to a new voting system for decision-making.

What was not foreseen in the Lisbon Treaty was the financial crisis which has been gripping Europe and the EU in the last few years. A raft of agreements have been or being put in place since the Congress in Bruges in 2010. The Treaty on Stability, Coordination and Governance in the Economic and Monetary Union (also called Fiscal Stability Treaty), Stability and Growth Pact, The Euro-Plus Pact (also called Competitiveness Pact or the pact for the Euro).

These measures will have immense impacts on the citizens of the EU and on those who aspire to be part of it. Therefore these agreements will have immeasurable impacts on all maxillofacial surgeons who are practising or wish to do so in the EU and their patients, in years to come. It contains such measures than the abolition of Wage Indexation, central evaluation of long term and youth unemployment and labour participation rates as well as tax policy coordination and financial stability which will be measured quantitatively by the level of private debt for banks, households and non-financial firms.

The author who is a practising maxillofacial surgeon as well as a Barrister at the English Bar will give a brief summary on those aspects which may well be special interest to maxillofacial surgeons practising and living in the EU or wish to do so.

1. European Law for the European Maxillofacial Surgeons J Craniomaxillofac Surg 36(S):58, 2008

2. European Law for the European maxillofacial Surgeons II www.eacmfs2010.org, p6

**O-0503**

### FACEMAP-UK: THE NATIONAL FACE OF ORAL & MAXILLOFACIAL SURGERY

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*Introduction:* The Internet has increasingly become a powerful source of information. Previous work by our group has demonstrated that the online information about Oral & Maxillofacial Surgery (OMFS) units in the UK is inconsistent, out of date, and fails to satisfy patient expectations. There is a need to develop a nationwide online 'face' of our speciality that overcome the current problems.

*Aim:* To introduce a UK national website link for OMFS that allows the public, professional bodies, colleagues to access consistent online information on OMFS units and clinicians.

*Material and Methods:* Patients' feedback on what they expect from an OMFS website was used to guide the development of a novel national website for OMFS in the UK (FACEmap-UK). An interactive map of the UK that shows all OMFS units has been created. Using website development technology, browsers will be able to search any region in the UK using an interactive map or the postcode via an OMFS unit locator. The nearest unit to patient residence and full useful information about a particular unit can be accessed.

*Results:* A prototype of FACEmap-UK is complete and will be presented.

*Conclusion:* The presence of useful information about various OMFS units in the UK is sketchy, inconsistent and largely out of date. The development of an informative, consistent and relevant nationwide web link to portray a uniform image of the specialty is highly desirable. The FACEmap-UK represents a step in this direction and its potential benefits and long-term vision will be discussed.

**O-0504**

### ORAL AND MAXILLOFACIAL CLINICAL FELLOWS: THE UK MODEL

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*Introduction:* In the UK a number of junior trainees in Oral and Maxillofacial Surgery (OMFS) work in local OMFS departments whilst studying medicine or dentistry as a second degree. Despite the potential advantages to the trainee and OMFS department this is not widespread practice. We have conducted a survey to highlight the working patterns of these trainees and the possible benefits

to pursuing a career in OMFS.

**Methods:** Surveys were sent to trainees undertaking a second degree in medicine or dentistry either through the British Junior Trainees Group or via the OMFS units in which they were employed. Trainees who had recently achieved dual qualification were contacted also. Only trainees who work or have worked in OMFS departments during their second degree were included.

**Results:** There were 45 respondents of which about 70% had previous OMFS experience before commencing their second degree. Eighty per cent worked in one or two OMFS departments at a Senior House Officer or Clinical Fellow level, with 78% on a regular contract. In addition, working in this way improved clinical skills in 89% of trainees and also increased their desire to pursue a career in this speciality. However, 98% perceived their university to be neither supportive or unsupportive, or unsupportive towards working in OMFS alongside their university studies.

**Discussion:** Working in OMFS whilst studying for a second degree benefits the trainee and OMFS unit alike, and previous OMFS experience should not be a prerequisite to working in a local department. These commitments need not be onerous and working with a regular contract has the added advantages of providing financial support, the opportunity to make pension contributions and annual leave entitlements. We would encourage OMFS units to employ trainees undertaking a second degree and trainees to seek work in a local OMFS department where possible. More emphasis should be placed on engaging universities to help support those who wish to enhance their training whilst undertaking a second degree.

#### O-0505

##### ASSESSMENT OF ONLINE VISIBILITY OF THE BRITISH ASSOCIATION OF ORAL AND MAXILLOFACIAL SURGEONS

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**Introduction:** The Internet is a powerful method of disseminating information to wide range of users. In business/ marketing literature there is clear emphasis on online presence and its impact on organizational reputation.

**Aim:** • To study the pattern of Internet use by OMFS outpatients in two centres to assess BAOMS online visibility and its reflection of reputation.

**Method:** Self-administered questionnaires were completed by all adult patients attending the OMFS outpatient departments at the John Radcliffe and Sunderland Royal Hospitals over a 6 week period.

**Results:** Of 450 questionnaires, there was an 89% response rate with equal sex distribution and normal age distribution. The respondents span all educational levels and report 84% access to the Internet (with 20% reporting access weekly or more frequently) and agree it is a powerful source of information. However, whilst 59% felt the Internet is a trustworthy source for health related information, only 10% thought it more believable than the GP or a doctor.

65% of respondents link online presence with reputation

and value sites with professional input, only 4% had previously accessed the local hospital website, and 1% reporting previous knowledge of the BAOMS website.

**Conclusions:** The Internet is a powerful source of information and online visibility seems to correlate with organisational reputation and keeping up with technological advances. These findings may be used to inform development of the BAOMS website and guide future publicity strategies.

#### O-0506

##### AN AUDIT OF THE DOCUMENTATION STANDARD ON THE WRITTEN OMFS HANDOVER

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**Aims:** Handovers are a critically important time, especially since the implementation of the European Working Time Directive (EWTD). Accurate documentation is essential for communication between team members. The handover documentation forms a legal document.

**Materials and Methods:** All handovers sheets from August 2010 till April 2011 were analysed with 4 day intervals and alternated between AM and PM handover sheets with a structured proforma including general patient information, medical parameters and OMFS specific information with parameters assessed according to risk with reference to NHS datix forms on risk management and patient safety.

**Results:** A total of 65 handover sheets were assessed, and the occasions where information was entered correctly recorded. The average number of patients on the handover varied depending on the month between 5.1 -9.8 patients with the number of correctly completed themes varying. Patient information (Hospital ID, Location, DOB) varied in completion from average of 3.3-8.0 patients per handover. OMFS specific data (e.g. operation specific, post operative plans) trended an increase from 5.0-8.2 of number of correctly completed patients.

**Conclusion:** The standard of handover improved as SHO's became more experienced, with allergy status being the most inconsistently recorded. Operation data for more complex operations (oncology and orthognathic) was inconsistently recorded compared to the more common operations (e.g. mandible fracture). An SHO teaching as part of departmental induction is recommended to improve the standard of handovers. Oncology patients should be listed separately on the handover to allow a more structured handover sheet to optimize their care.

#### O-0507

##### QUALITY AND QUANTITY OF ICD10 CODES REPRESENTATION FOR ORAL AND MAXILLOFACIAL DISEASES

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**Introduction:** The International Classification of Diseases (ICD) is used to classify diseases, enable the storage and retrieval of diagnostic information for clinical and other purposes, provide for the compilation morbidity statistics



and as a tool for reimbursement and resource allocation decision-making in Croatia and in numerous other countries. Maxillofacial diagnoses are included in 18 out of 20 chapters of ICD 10. Some of the diseases are properly presented (like neoplasms) but the other, like facial fractures, are not.

*Aim:* The coding of diseases is important for the clinical morbidity analysis as well as for resource allocation. In Croatia the payment for hospital services is based on Classification of Health Interventions on the basis of ICD codes, therefore the analysis of representation of codes influences the medical statistics and the resources.

*Material and method:* The ICD codes from inpatients medical records in Department of Maxillofacial and Oral Surgery in Zagreb for the period January 2005- June 2012 were analyzed and compared to clinical diagnoses.

*Results:* A total of 15469 main discharge codes and related clinical diagnoses were assessed. 773 different ICD codes were found, but 20 of them were used in 44,54% records. 570 were occasionally used (less than 10 records). In comparison to clinical diagnosis, the most appropriate coding was found for neoplastic and dental diseases. For facial fractures, deformities and TM joint diseases there was a lack of proper coding to describe different clinical observations.

*Conclusion:* The aim of ICD coding (medical statistics, clinical information, etc.) cannot be fulfilled with the represented codes. The revision should be based on the significance of clinical diagnosis rated by maxillofacial surgeons.

## Session 6. ORTHOGNATHIC SURGERY II.

O-0601

### MANDIBULAR LATEROGNATHIA: A DIAGNOSIS LEADING TO SURGICAL DISASTERS

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Initial mistake is to believe that mandibular laterognathia is a diagnosis. It is not! It is a sign whose causes are many. As in all healing arts, failure to make a proper diagnosis will surely lead to poor results from treatment. The most obvious causes of mandibular asymmetry such as craniofacial microsomia, unilateral coronal synostosis, hemifacial hypertrophy, progressive hemifacial atrophy, condylar fractures and condylar tumors should be easily detected.

Yet, the most common cause is almost universally overlooked. Thus, conventional preoperative measures using presurgical face bow registrations, model surgery, etc. guarantee poor results.

This presentation will focus on making a proper diagnosis, altering the surgeon's perceptions and preoperative preparation, thus changing the surgical endpoints to avoid disappointing results.

O-0602

### TACTICAL FEATURES OF SURGICAL TREATMENT FOR PATIENTS WITH II CLASS OF MALOCCLUSION.

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The successful outcome of surgical treatment of different form of malocclusion strongly depends on diagnostics, planning and treatment tactics. The knowledge of different types of facial anatomy is crucial for successful treatment planning.

The aim of this study was to determine the correlation between planning, treatment tactics and facial anatomy in patients with 2 class of malocclusion.

**Materials and methods.** From 2009 till 2011 we have examined and treated the total of 47 patients with 2 class of malocclusion (both hypo and hyperdivergent facial types), age varied from 18 to 37 years, 31 women and 16 men. The usual examination methods were used with the special consideration to photometry and CBCT measurements.

**Results.** For the 1st group several face characteristics were noted: reduced lower facial height and lower lip, convex profile and retrusive chin, deep labiomental fold, thick lower lip. For the 2nd group: increased lower facial height, hyperactive buccal and menton muscles with the lips in contact. The mandible body and angle contours were not clear outlined in both groups. We have found that in hyperdivergent group relationships between middle and

lower facial heights were increased up to 15%, upper and lower heights – up to 24%, facial angle reduced up to 5,3%, sagittal relationships between maxilla and mandible increased up to 56,3%. In hyperdivergent group there was a significant increase in length of upper lip. Such a characteristic allow to compensate disproportion of the lower facial height. Upper lip relates to lower lip and chin up to 22%. Facial angle decreased by 4.8%, ANB angle increased up to 42.9%. We found that attractive faces were slightly in hyperdivergent group. Women had retropositioning of the lower third of the face, mostly mandible, increased thickness of the menton, protrusive lower lip, while in men the bigger nose and larger mandibles were found to be more appealing.

In conclusion it is important to observe the pattern of vertical facial growth depending on type of divergence in patients with II class of malocclusion in order to analyze the sagittal pattern of growing. Such a morphological feature helps specialists to compose an exact treatment planning and to get predictable and stable outcome.

O-0603

### PERIORAL SOFT TISSUE MOVEMENT IN UPPER JAW SURGERY

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**Introduction:** The soft tissue changes after upper jaw surgery are primarily situated in the perioral and nasal structures. The relationship between soft tissue and bony tissue movement has been widely described in literature. We review the nasal and labial changes after Le Fort I surgery using anthropometric evaluation.

**Methods and Materials:** This study was conducted in a population of patients treated with a Le Fort I osteotomy at our department. Preoperative and 1-year postoperative data were analysed. Changes in clinically documented anthropometric measurements, such as maximal nose width, nostril wing implantation, philtrum length, total upper lip length, overbite, overjet and incisor exposure were correlated to the bony movement of the upper jaw. In this group of 30 patients four groups of patients with a similar vector of upper jaw movement were defined: intrusion, extrusion, intrusion and advancement, extrusion and advancement. A V-Y closure in the midline and an alar base cinch suture were performed in all cases. Simple linear regression analysis was performed to analyse our data.

**Results:** Thirty patients were included in the study. The mean age was 22,8 years with a variation from 16 to 48 years. The female to male ratio was 2 to 1. No significant widening of the alar base was documented in the four vector-specific subgroups ( $p > 0,05$ ). Also no significant shortening or lengthening of the upper lip was caused by the upper jaw surgery ( $p > 0,05$ ).

**Conclusion:** Additional soft tissue procedures are of great importance in avoiding unfavourable nasal and labial changes following maxillary surgery. We conclude that a combination of V-Y closure and alar base cinch suture are surgical techniques of good value when striving for the most ideal esthetic result after performing upper jaw sur-

gery.

#### O-0604

### SOFT TISSUE CHANGES AFTER ORTHODONTIC-SURGICAL CORRECTION OF JAWS ASYMMETRY EVALUATED BY 3D SURFACE LASER SCANNER

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**Introduction:** Aesthetic correction of facial asymmetry is an essential goal of treatment and it is often difficult to achieve. Reliable three-dimensional (3D) measurements are required to support outcome studies.

**Patients and Methods:** In the present study, 15 Caucasian adult subject, 9 females and 6 males, with maxillo-mandibular asymmetry and malocclusion were studied. The patients were treated with orthodontic and different surgical procedures in single or multiple steps. Posterior-anterior (PA) and lateral (L) cephalometry and 3D facial surface data were obtained before (T0) and one year (T1) after surgery. Facial scan data at T0 and T1 were pooled together by electronic surface averaging to obtain the mean pre and post-treatment facial model. A symmetric facial model was constructed by averaging the actual T0 scans and their mirroring to obtain the virtual optimal symmetric face (S). Different linear and angular measurements were then calculated for comparison of the mean T0 and mean T1 models.

**Results:** In L cephalograms an increase of posterior facial height and a normalization of overjet and overbite were observed. Comparing the PA measurements between T0 and T1, normalization of maxillo-mandibular dental mid-line alignment and of occlusal plane tilt, and a great improvement of lateral deviation of the chin were observed. The comparison of measurements of the cutaneous landmark distances on T0 and T1 revealed that the major post-surgical changes were in the lower face. In the frontal view an improvement of symmetry of the nasal base and an important correction of the lips, both vertically and horizontally, were observed. Increased support of the lips and increase of the inter-commissural distance were also shown. Residual defects were documented in the post-operative symmetry of the chin.

**Conclusion:** Orthognathic surgery performed for the treatment of facial asymmetry, combined with dental occlusion problems, is still a challenge for maxillo-facial surgeons. Orthognathic surgery can give an important improvement of the facial asymmetry, but further changes of techniques are still possible. 3D evaluation results an effective method to support outcome studies on the surgical correction of complex facial deformities.

#### O-0605

### AN ANALYSIS OF THE BILATERAL SAGITTAL SPLIT OSTEOTOMY - DETERMINATION OF CRITERIA FOR AMBULATORY SURGERY AND REVIEW OF POTENTIAL BARRIERS

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The purpose of this study was to review the course of 46 consecutive patients undergoing a bilateral sagittal split osteotomy (BSSO) at the Victoria General Hospital in Winnipeg, Manitoba, as an ambulatory procedure from January 8, 2007, to February 4, 2008, and note any unanticipated admissions to hospital or unplanned emergency room visits.

The patients ranged in age from 15 to 53 years, and were American Society of Anaesthesiologists (ASA) Class I to III. The procedure was done under general anaesthesia and patients were then transferred to a day surgery unit to recover until anticipated discharge. Of the 46 patients, one (2.1%), who was ASA Class III based on systemic disease, required admission for additional monitoring due to swelling in the surgical area.

It is concluded that the bilateral sagittal split osteotomy is a safe, predictable procedure in the ambulatory care setting, especially when specific patient and surgical criteria related to medical status and surgical length are met.

#### O-0606

### MODIFICATION OF AIRWAY ANATOMY AFTER ORTHOGNATHIC SURGERY: VOLUMETRIC, AREAL AND LINEAR STUDY WITH CONE BEAM CT

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**Introduction:** according to recent studies the surgical treatment of OSAS with maxillo-mandibular advancement is indicated for patients with a moderate to severe OSAS, who have had no benefit from ventilation therapy, regardless of the presence of dento-skeletal malocclusion. The documented high efficacy of the treatment, around 95%, and the long-term stability of the results obtained are not, however, exactly related with the extent of bone movements.

**Objectives:** Identify the qualitative and quantitative correlation between the surgical movements carried out and the changes in the airways after jaw surgery. This will improve pre-operative planning and increase the chances of successful surgery in patients with OSAS.

**Methods:** 34 patients requiring jaw surgery (LeFort I + Mandibular Sagittal Split Osteotomy) for correction of dentoskeletal deformities were enrolled in this study. Each patient underwent a CBCT scan of the entire maxillo-facial complex (Field of Investigation 17 cm) before and after surgery. Upper airways were reconstructed three dimensionally combining CBCT data with a specifically designed software; for each patient volume and areas of the upper airway tract were calculated using landmarks not subject to change before and after surgery. Then these data were statistically linked to the surgical movement of the repositioned bone segments derived from the cephalometric treatment planning.

**Results:** Upper airways volume increased in 97.1% of the patients with an average volume enlargement of 46%.

The statistical analysis of airways changes together with surgical movements showed a positive correlation between anterior-posterior movement of the mandible and volume changes, between counterclockwise rotation of the occlusal plane and volume. In both cases a linear relationship was found.

The correlation between the upper jaw and the volume was also positive, but not statistically significant given its plateau for feed values (greater than 5 mm).

*Conclusions:* What mostly affects the volume of the airway is the mandibular movement, followed by the counterclockwise rotation of the occlusal plane.

The bimaxillary surgery is to be preferred over isolated mandibular surgery because it leads to a greater degree of movement and allows counterclockwise rotation of the maxillomandibular complex.

#### O-0607

### **SURGICAL STEPS IN COMPLEX ORTHOGNATHIC TREATMENT OF PATIENTS WITH MANDIBULAR ASYMMETRIES ACCOMPANIED BY UNILATERAL CONDYLAR HYPERACTIVITY.**

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*Introduction:* orthognathic treatment of patients with mandibular asymmetries, accompanied by unilateral condylar hyperactivity (UCH) has many difficulties according to diagnosis and treatment planning. Nowadays there are many precise diagnostic and treatment planning tools which help to analyze every clinical case in details. It also helps choose the best tactics and define the steps and amount of the forthcoming treatment.

*Aim* of this study is to improve diagnosis and treatment of patients with mandibular asymmetries accompanied by UCH to receive maximally precise and stable long term post-operative result.

*Materials and methods:* we performed diagnosis, planning and treatment of 44 patients with mandibular asymmetries accompanied by UCH. 60% are female, 40% - male. All the patients underwent standard X-ray, clinical photography, cephalometry diagnostics. We also performed CT and MRI for all the patients in our group. Bone scintigraphy was used to determine presence of UCH. All the forms of UCH such as hemimandibular hyperplasia, hemifacial elongation and all the mixed forms were included in our research.

*Results:* during the diagnosis we found that 63% of patients with mandibular asymmetries accompanied by UCH had skeletal class III occlusion, 24% - skeletal class I occlusion, 13% - skeletal class II occlusion. 22% of our patients had maxillary narrowness. First surgical step in complex orthognathic treatment for patients in our group was: for 22% patients - simultaneous high partial condylar resection, rapid maxillary expansion and third impacted molars extraction, 34% patients - simultaneous high partial condylar resection and third impacted molars extraction, 20% patients received isolated high partial condylar resection, 23% patients had inactive form of UCH and no indications for first surgical step. Second surgical step in

complex orthognathic treatment for all patients was common orthognathic surgery included Le Fort I osteotomy, BSSO and genioplasty.

*Conclusions:* accurate diagnosis and treatment planning for patients with mandibular asymmetries accompanied by UCH, allows us to select a proper treatment strategy, determine surgical steps, reduce risk of complications and relapse and as a result of complex treatment receive maximally predictable and stable long term outcome.

#### O-0608

### **IMPACT OF THE MANDIBULAR DIVERGENCE ON THE POSITION OF THE INFERIOR ALVEOLAR NERVE AND MYLOHYOID NERVE: A COMPUTED TOMOGRAPHY STUDY AND ITS RELEVANCE TO BILATERAL SAGITTAL SPLIT OSTEOTOMY.**

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*Introduction:* Bilateral sagittal split osteotomy (BSSO) is the most common procedure used to treat mandibular deformities. BSSO procedures include the Epker technique and the Dalpont technique. Because of the intramandibular pathway of the inferior alveolar nerve (IAN), neurosensory disturbance of the lower lip and chin is the most common complication of BSSO. This study performed quantitative measurements from computed tomographic (CT) data obtained on dry human mandibles. The main aim of the study was to evaluate if mandibular divergence can predict the position of the IAN and the mylohyoid nerve (MHN) in order to prevent nerve injury.

*Methods:* After CT and 3D-reconstruction of 65 dry mandibles, 30 measurements were made on 3 planes for each hemi-mandible. This allows analysis of the IAN and MHN pathways. Three groups of hemi-mandibles were created depending on their divergence, and a statistical analysis was performed.

*Results:* Eight out of the 30 measurements showed a significant difference among the 3 groups.

*Conclusions:* The IAN seems to have a more superior position in the two extreme groups of mandibular divergence. Orthognathic surgeons should use a more superficial retromolar bone incision in these cases. Finally, the Epker technique would be safer for preserving the MHN in normo- and hypo-divergent patients.

#### O-0609

### **THE RELIABILITY OF A SURGERY-FIRST ORTHOGNATHIC APPROACH WITHOUT PRESURGICAL ORTHODONTIC TREATMENT FOR SKELETAL CLASS III DENTOFACIAL DEFORMITY**

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*Background:* Orthognathic surgery with pre and postsurgical orthodontic treatment is the most widely accepted method for the correction of skeletal or dentoalveolar malocclusion. However, recent advancements in simulations for pre and postsurgical orthodontic treatments using

microscrews have shown remarkable stability and control of the occlusion following orthognathic surgery. Thus, we have adopted a surgery-first orthognathic approach without presurgical orthodontic treatment based on the novel presurgical simulation process using a dental model. We hypothesize that this treatment modality will be ideal and feasible for skeletal class III dentofacial deformity patients.

*Materials and Methods:* This prospective study investigated intervention outcome in 24 standard orthodontic treatment-first approaches and 32 surgery-first approaches. The patients included in this study were skeletal class III patients who underwent orthognathic surgery between December, 2007 and July, 2010. The follow-up period ranged from 12–36 months (average, 20.5 months). The average age of the patients was 22.4 years, with 16 male and 40 female patients. Changes in cephalometric landmarks were compared between the standard and surgery-first groups in the preoperative, immediate postoperative, and postoperative periods. A linear mixed model was used for statistical analysis. In the surgery-first approach, the novel preoperative simulation process on the dental model was performed, as in the standard approach, in order to determine the final occlusion between the maxilla and mandible without actually performing presurgical orthodontic treatment. We refer to this temporary occlusion as “surgical occlusion”. Based on this model surgery, we could create the intermediate and final wafers for orthognathic surgery without presurgical orthodontics.

*Results:* Our data reveal that the surgery-first approach without presurgical orthodontic treatment is possible and can give similar results to traditional orthognathic surgery. The statistical analysis of the data showed us that changes in skeletal cephalometric landmarks were similar in the surgery-first and traditional approach groups, according to each time period. However, the cephalometric landmarks relating to the dental component showed changes between treatment groups at different time points but similar final values. This suggests that the benefits of postsurgical orthodontic treatment following the surgery-first approach could catch up to those of the traditional postsurgical orthodontic treatment with a presurgical orthodontic approach.

*Conclusions:* The surgery-first orthognathic approach without presurgical orthodontic treatment was found to be predictable and applicable to treat class III dentofacial deformities. These findings suggest a possible paradigm shift in the traditional orthognathic approach.

## Session 7. RHINOPLASTY & NOSE RECONSTRUCTION

O-0701

### AUGMENTATION RHINOPLASTY

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Nasal augmentation is needed in various cases (saddle nose, septal necrosis, congenital nasofrontal dysplasia, nasal dorsum and/or tip deformities).

The purpose of this presentation is to describe indications, surgical techniques and outcomes for nasal dorsal and/or tip augmentation among our experience.

We used autogenous grafts, septal cartilage, costal cartilage and calvarial bone grafts in 40 patients aged from 4 to 65 years, treated in maxillofacial department of Sousse Tunisia. The correct height of the nasal dorsum is determined according to the position of the nasion and the nasal tip, whereby the desired height may also be influenced by the sex of the patient as well as his/her notion of an aesthetic ideal. Access is chosen according to the extent of the planned correction but external access was preferred. Patient results, complications and future directions are presented.

Overall, satisfying aesthetic results (balanced tip projection, dorsum fullness, widening of internal nasal valve angle, minor scar retraction) were achieved for both patient and surgeon in 78% of the cases.

O-0702

### FEATURES OF THE RHINOPLASTY PLANNING IN ORTHOGNATHIC SURGERY.

Alexander Glushko<sup>1,\*</sup>, Alexey Drobyshev<sup>1</sup>, Leonid Pavluk-Pavluhenko<sup>2</sup>, Konstantin Kurakin<sup>1</sup>, Kate Lonskaya<sup>1</sup>

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**Objective:** to assess the predictability of the pre-surgery rhinoplasty planning, with the post-surgery results in patients with malocclusion who underwent one-stage orthognathic surgery and septorhinoplasty.

**Materials and Methods:** there were 16 patients (women from 17 to 45) with different classes of malocclusion, who underwent one-stage orthognathic surgery and septorhinoplasty. Computer simulation of the future nose shape with the standard pre-surgery and 3-6 month post-surgery protocol were made: clinical examination, rhinoscopy, CT, anterior active rhinomanometry. Orthognathic surgery consisted of the maxillary osteotomy, BSSO and genioplasty. In septorhinoplasty we used close surgery protocol with some aspects: full exposure of the nasal septum with modification, excising and reposition; precartilaginous incisions; full exposure of the big alar cartilages with inner portion resection; in hump noses, intersection of the bone and cartilage hump with leaving of the soft-tissue distal pedicle in the upper region of the internal valve, it's

handling and returning to original location; in saddle noses we use auto- or allocartilage; osteotomy with manual reposition; countering plastic; inferior turbinate displacement; dressing and external bandage.

**Results:** All data collected during pre-surgery observation, intra-surgery and post-surgery were correlated and compared. In all 16 patients intraoperative nose deformation was marked. In 1 patient improvement in the nose shape was found, which was required a small correction. In 7 patients there was a significant change in nose shape that is connected with severe dental abnormality and facial asymmetry. A slight change in the nose shape marked in 8 patients. Changes in the nose shape had a type of worsening of an existing deformation or the change of one deformation type to another. In 3 patients, after the orthognathic surgery, nose shape was changed from the hump to saddle, due to a significant shift of the septum. In 13 patients changes varied within the range of available deformation. **Conclusions:** changes in the nasal structures after orthognathic surgery have varying degrees of severity. Therefore, pre-surgery planning of the septorhinoplasty in patients with malocclusion is a very difficult task with a low fidelity results.

O-0703

### RHINOPLASTY USING FREE SKIN GRAFT AFTER RHINOPHYMA ELIMINATION

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**Introduction:** Rhinophyma is a serious disease, leading to overgrowth of the soft tissues of the external nose, with extensive tip and alae deformation. The skin of the nose, especially its lower part becomes red and purple, sometimes with telangiectasia. Medical and social rehabilitation of these patients requires the development of methods of treatment for this disease.

**Objective:** To analyze in clinic and work out the method of rhinophyma elimination and closure of wound surface of the external nose with split-thickness skin graft.

**Material and methods:** We operated on patients with late-stage development of rhinophyma, which did not respond to conservative treatment. Surgeries were performed on eight patients under general anaesthesia, intubated through oral cavity. Overgrown tissue of the tip, dorsum and alae of the nose has been excised for the entire thickness of the dermis using a scalpel. At the same time sections of tissue were removed from the wound surface modeling the external nose, and giving it the desired shape. Compression and electrocoagulation haemostasis was performed using hot isotonic sodium chloride solution with antiseptic. Then, in three patients from the shoulder, and three from the hip, split-thickness skin grafts 0.4-0.5 mm thick and consistent in size and shape of the nose wound surface were taken with an electrodermatome. The skin grafts were fixed on the wound surface of the nose with separate interrupted sutures. Tamponade of nasal cavity and the outer nose bandage with gauze sponges with 5% synthomycine emulsion and aminocaproic acid. Dressings were changed until complete epithelization of wound surface.

**Results:** Rhinophyma is resolved. In all patients, sutures were removed on day 12-15. Split-thickness skin grafts settled down completely and good aesthetic results of operations achieved. Donor sites completely epithelized.

**Conclusion:** Based on the clinical results of the study, it was found that the wound surface after removal of rhinophyma can be successfully closed by the transplantation of split-thickness skin autograft, what proves the feasibility of using this method for treatment of rhinophyma.

#### O-0704

##### POSTRHINOPLASTY MUCOUS CYST: WHAT ARE RISK FACTORS?

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**Background:** Postrhinoplasty mucous cyst (PMC) has been reported sporadically in the literature. Its aetiology remains inconclusive but may be linked to entrapment of the nasal mucosa, patient's age, surgical trauma and the use of a nasal septal cartilage graft (NSCG). The aim of this study was to identify the risk factors for PMC.

**Patients and methods:** This retrospective cohort study enrolled a sample of rhinoplasty patients treated between January 2003 and December 2008. The predictor variables included age at surgery, use of a NSCG and operative length. The primary outcome measure was the presence of PMC. Other study variables include demographic, operative and postoperative data. Appropriate descriptive and univariate statistics were calculated, and  $P < 0.05$  was considered statistically significant.

**Results:** This cohort was composed of 375 rhinoplasty patients (141 females [37.6%]) with a mean age of  $19.1 \pm 14.4$  years (range 0-65). Three patients had a PMC after secondary cleft rhinoplasty with a NSCG. Average disease interval was  $26 \pm 19.3$  months postoperatively (range 12-48). There was no significant association between the presence of PMC and the 3 predictor factors: patient's age, NSCG transplantation and operative time ( $P > 0.05$ ).

**Conclusions:** These study findings suggest that young age, use of NSCG and long surgery are not risk factors for PMC.

**Keywords:** mucous cyst; rhinoplasty; risk factor; postoperative complication

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#### O-0705

##### TOTAL NASAL RECONSTRUCTION WITH OR WITHOUT SKELETAL SUPPORT: OUR PROTOCOL.

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The reconstruction of nasal skin is relatively easy when the defect involves one to two subunits. These cases are effectively managed with local flaps. However, when an extensive defect involves more than two subunits or the entire nose, a global nasal reconstruction must be considered.

From January 2009 to December 2011 we have treated 10 patients who needed a total nasal reconstruction. In 5 patients the reconstruction involved the external skin only after extensive tumour removal. The remaining 5 patients needed a total nasal reconstruction including internal and external lining and the osteocartilaginous support. In detail we reconstructed 2 cases of congenital arhinia, 2 cases of nasal destruction secondary to cocaine abuse and one case of total nasal loss owing to a squamous cell carcinoma.

In all cases the nasal external skin was reconstructed with a paramedian forehead flap. In those patients where the hard tissue support was intact we only used cartilaginous grafts to support the alae.

In the cases of arhinia we performed a two-step surgery. In the first session we created a new nasal fossa by a LeFort Osteotomy and a skin graft; at the same time we positioned a forehead expander. In the second intervention we: removed the skin expander; created an internal lining with local flaps; created a skeletal framework with osteocartilaginous grafts; rotated a forehead flap to create the external lining.

In the two cocaine addicted we used the nasal remnants, deepithelialized, to create the internal lining, a costochondral graft to build the hard tissue framework and a paramedian forehead flap to create the external skin.

The patient who had his nose lost for oncological reasons was reconstructed with a prelaminate forehead paramedian flap. In a second surgical session the flap was modelled and a costochondral graft positioned to build the skeletal support.

We have observed very good results in all cases with minimal donor site morbidity.

While the technique is by itself not new, we believe that our protocol, that we here present, is ideal if we look at the results and applicable to different conditions that lead to major nasal defects.

## Session 8. SURGICAL HEAD AND NECK ONCOLOGY I

**O-0801**

### **SURVIVAL MODEL IN ORAL SQUAMOUS CELL CARCINOMA BASED ON CLINICOPATHOLOGICAL PARAMETERS, MOLECULAR MARKERS AND SUPPORT VECTOR MACHINES**

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**Background:** In previous works, we have identified different molecular markers and clinicopathological features that have been related to survival, in patients with OSCC. Management of these databases requires mathematical tools that may help us to reduce the error caused by the huge number of variables and few data available. The aim of the present study is to introduce an intelligent and efficient model, able to predict the survival in terms of other available variables, previously identified as relevant.

**Methods:** Clinical and pathological features of 69 patients who suffered an OSCC include eleven molecular markers, which results have been previously reported by our group. A total of thirty-four variables were available. A new method for variable selection and modelling was applied (Support vector machines or SVM) in order to select the most important variables related to survival. First, we proceeded to the selection of variables according to their importance by means of two methods applied in parallel (Non-concave penalty and Newton's methods) and compared the results obtained by means of both. Second, a predictive model is implemented using the SVM as a classifier algorithm. Finally, once we have obtained the most efficient model to assess survival, we have evaluated its classification ability by discriminant analysis.

**Results:** The most important variables were the presence of recurrence, number of recurrences and TNM stage. Classification rates reached a 97.56% and 100% for alive and dead patients, respectively (overall classification rate of 98.55%). These rates were considerably better than those obtained with all available variables (Global classification rate 95.6%; 95.1% and 96.4% for alive and dead patients).

**Conclusion:** The modelling techniques are based on adequate data to build tools able to predict with high accuracy the survival of a patient with OSCC.

**O-0802**

### **I-ONCOLOGY- A WEB BASED DATABASE TOOL FOR RECORDING COMPLICATIONS AND OUTCOMES IN HEAD & NECK ONCOLOGY**

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**Introduction:** Audit, governance and research are essential

tools for the development of clinicians, specialties and help to improve patient care. The importance of collecting clinical data must not be understated yet few clinicians have the luxury of dedicated data collection managers to carry this out. We present an easy to use web based multi platform accessible database tool which can be used by all team members throughout the patient's journey. The ease of use and accessibility ensures accurate and timely data entry on web connected devices. This facilitates audit, research and continuing professional development.

**Aims and objectives:** The clinical requirements were for a multi-platform system, accessible from different hospitals on networked computers, tablets and other mobile platforms.

**Methods:** Approval was sought from our local Tumour Working Board, Information Security Manager and Patient Data Protection Guardian at the design stage. An online database was developed and deployed on a dedicated secure virtual private server with the potential for 250 simultaneous users. Each member of the head and neck team was granted multi-level access to the system depending on their role.

The design of the database has ensured that users select options from pick lists with minimal manual data entry save for demographic details. We have incorporated the ability to add clinical photographs for database uploading as well as authenticating data entry with handwritten signatures. Clinicians have access to real time graphs depicting complications, survival and case mix to name a few and of course, reports or presentations can be compiled automatically to email to other team members.

We have extensively tested the usability of the software and altered its configuration to suit the users as a result of critical feedback.

A live demonstration of the software and our experience with the use of this novel tool shall be presented.

**Clinical Relevance:** By spreading the workload amongst the entire team and allowing individuals to take ownership of their own data, the burden of such an arduous but essential endeavor can be reduced. We believe we have a novel solution to what has been an ongoing problem for many units nationally and internationally.

**O-0803**

### **CANCER SURVIVAL RATE IN SLOVENIA**

*Andrej Kansky<sup>1,\*</sup>, Tadej Dovsak<sup>1</sup>, Andreja Eberlinc<sup>1</sup>, Aleš Vesnaver<sup>1</sup>, Vojko Didanovič<sup>1</sup>*

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Head and neck cancer is the sixth most common malignant disease among the adult population in Slovenia. As we analyzed our cancer database, we found that surgical treatment success rate of oral and oropharyngeal squamous cell carcinoma significantly exceeds the data from national Cancer Register. According to the official data of the Slovene Cancer Register, survival rate from 1991 to 2005 was under 30%. In comparison to Western Europe (57%) and USA (61%) database, the result is poor.

We wanted to prove, that our surgical treatment is not so inefficient. We collected the data of the surgically treated patients with oral and oropharyngeal cancer in University



Medical Centre Ljubljana, dept. of Maxillofacial and Oral Surgery and University Medical Centre Maribor, dept. of Otorhinolaryngology and Maxillofacial from 1.3.2003 to 31.12.2008. We did a random selection of 154 patients, data analysis clarified that 2-year survival rate was 73% and 5-year survival rate was 66%.

Our patients survival data rates are comparable with those from other developed countries. We are certain that the reasons for the bad results of the Slovene Cancer Register, which discredit the efforts of OMFS and ENT professionals are in inappropriate decisions, which give advantage to radiotherapy in front of surgery.

#### O-0804

### CLINICOPATHOLOGICAL PARAMETERS AND OUTCOME OF 500 PATIENTS OPERATED FOR ORAL SQUAMOUS CELL CARCINOMA AND STUDY OF SEVERAL BIOMARKERS IN THE DEVELOPMENT OF NODAL METASTASES

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**Introduction:** The outcome of 500 patients undergoing surgery for oral squamous cell carcinoma (OSCC) was evaluated in order to identify the prognostic value of several factors. Risk factors, tissue and biological markers (MET proto-oncogene, S phase kinase-associated protein-Skp2) have also been taken into consideration as possible indicators of tumour aggressiveness and predictors of the carcinogenic process and metastatic capability.

**Methods:** A total of 500 patients were studied who had undergone surgery for OSCC between 1989 and 2011. For each patient, personal data, alcohol and tobacco consumption, symptoms, histological findings, treatment and outcome were recorded and analyzed statistically. Survival curves were calculated using the Kaplan–Meier algorithm, and the difference in survival among subgroups was examined.

The role of S phase kinase-associated protein (Skp2) and of MET gene mutation was investigated in 71 and 12 patients respectively.

**Results :** The differences in the 5-year survival were significant for the site of origin, N and pN status, TNM stage groups, grading, status of the resection margins, osseous infiltration, and perineural invasion. Vascular involvement was not statistically significant. In patients undergoing radiation therapy, only perineural invasion negatively influenced the 5-year survival prognosis.

Nine of the seventeen patients with Skp2 positive nuclei ( $\geq 20\%$ ) developed nodal metastasis. Conversely, only 6 of the 54 patients with a nuclear positivity lower than 20% developed a laterocervical metastasis ( $P=0.001$ ). When comparing survival curves of  $Skp \geq 20\%$  and Skp2. Over-expression of MET receptor is correlated to nodal metastases in all cases studied.

**Conclusions:** The prognostic value of many parameters is widely recognized. The combined evaluation of ‘composite factors’ is promising.

There is an important correlation between a Skp2 expression lower than 20% and the capability of the tumour not

to develop nodal metastases ( $p=0.001$ ).

Mutated MET can undergo clonal expansion during metastatic spread of human head and neck squamous cell carcinoma, suggesting that this gene might play an important role in the progression from primary cancer to metastasis.

#### O-0805

### RISK STRATIFICATION AND PREDICTION OF LOCOREGIONAL RECURRENCE IN PATIENTS AFFECTED BY ORAL SQUAMOUS CELL CARCINOMA (OSCC): THE NEOMARK PROJECT RESULTS

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**Background:** In patients affected by oral squamous cell carcinoma (OSCC) locoregional recurrence following treatment (25-48%) represents the most common cause of death for patients and have an important impact on physical appearance and function.

**Aims:** The main objective of NeoMark (ICT Enabled Prediction of Cancer Reoccurrence, Seventh Framework Program, CE) is to provide a proof of concept that integration of multiscale clinical, imaging and genomic data from a sufficient sample of patients diagnosed with OSCC can provide reliable indications on the evolution of the disease at diagnosis and can predict with a sufficient accuracy the onset the reoccurrence and its timing. At the end of the project the clinicians in participating hospitals validated the risk prediction results vis-à-vis the real evolution of the disease in subsets of patients, and in parallel verified the factors and genomic markers identified by NeoMark (disease bio-profile and disease evolution profile) against the most recent findings from the scientific research.

**Materials and Methods:** The scientific validation was performed on 86 OSCC cases treated with surgery (no preliminary radio-chemotherapy) with more than 12 months of follow-up after surgery and remission. It demonstrated that the approach proposed by NeoMark can enable the identification of integrated and reduced sets of markers, predictors of OSCC reoccurrence, and that the identified markers (clinical, imaging, tissue and blood genomics) are consistent with the most recent findings of research in this field.

**Results:** The presented final results of the Neomark Project obtained from the Baseline Data Analysis with the current state of the dataset are quite encouraging but need to be confirmed in the future.

#### O-0806

### INTRA-ORAL MAXILLARY SCC TUMOURS, THE NORFOLK AND WAVERNEY EXPERIENCE.

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Intra oral maxillary SCC tumours (IOMSCC) are comparatively rare tumours; as a result, data concerning their

pattern of behaviour is limited. Published data is usually from small cohorts and a general consensus regarding treatment for cervical lymphatics is lacking. This is in marked contrast to the management of floor of mouth, tongue and retromolar trigone SCC.

We present our experience at Norfolk and Waverney head and neck cancer unit with IOMSCC tumours with emphasis on patterns of lymphatic spread.

Our aim is to determine whether T-stage, degree of differentiation or anatomical features influence the pattern of spread or recurrence. We would also wish to provide evidence for the value of performing a dissection of cervical lymphatics during the surgical treatment of this comparatively rare presentation of IOMSCC.

#### O-0807

### INCIDENCE OF CHEST METASTASES IN HEAD AND NECK CANCER PATIENTS: IS CT NECESSARY WITH ALL PATIENTS?

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*Introduction:* Squamous cell carcinoma (SCC) accounts for the majority of tumours of the head and neck. The development of a malignant neoplasm of the lung, including distant metastasis and second primary cancer, is one of the confounding factors that limits the survival of patients with head and neck SCC (HNSCC).

Patients with distant metastases are generally considered incurable, and only palliative treatment may be offered. The lung is the commonest site for distant metastases with studies reporting an incidence of 8-15%. The incidence of synchronous second malignant tumours in the thorax is 4%. Dennington et al states that the incidence of distant metastases at the time of diagnosis is 7%.

Currently SIGN guidelines state that all patients should undergo Computed Tomography of the thorax. Routine screening by chest CT in patients with HNSCC is controversial and not cost effective.

*Aim & Objectives:* To assess the incidence of chest metastases in newly diagnosed patients with HNSCC at Northampton General Hospital between January 2010 - December 2011.

To investigate the relationship between tumour size, site, histological features, cervical lymph node metastases and the development of chest metastases.

*Method – Study Design:* 250 patients presenting with newly diagnosed SCC of the head and neck who had undergone CT thorax were identified on a retrospective basis. Their thoracic CTs and radiology reports were reviewed.

*Results –Data Analysis:* Results currently show that T1 and T2 stage cancers have not presented with metastases however, those with stage T3 and T4 tumours are more likely to have incidental metastatic findings.

*Discussion:* Chest CT indications vary widely as a screening tool for HNSCC. Keski-Santti et al and Tan et al demonstrated limited usefulness of routine chest CT screening in newly diagnosed patients. Hsu et al also showed a low rate of an abnormal chest CT scan at initial

diagnosis.

The selection of patients for whom chest CT is indicated should be related to the stage of the disease and to the stage of the disease. The presence of extra nodal spread and the number of metastatic neck nodes are prognostic factors influencing the risk of distant metastases developing.

#### O-0808

### SKULL BASE AND OROFACIAL FINDINGS ASSOCIATED WITH NUMB CHIN SYNDROME (NCS). A RARE AND OFTEN UNRECOGNIZED FINDING CAUSED BY SEVERE DISEASES

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*Purpose:* Numb chin syndrome is a sensory neuropathy characterized by numbness in the distribution of the mental or inferior alveolar nerve. For the occurrence of numb chin syndrome, both benign and malignant diseases are known, focal and systemic as well as neurological and dental in origin. The occurrence of numb chin syndrome is often misunderstood and in some cases may lead to delayed detection of malignancy and therefore seem to be an under appreciated sign.

*Patients and Methods:* We present different cases from our experience by demonstrating the different types of presentation and diagnostic approaches for the detection of the causes with a short review of the aetiology and pathogenesis and propose pathways for diagnostic work-up and management of numb chin syndrome.

*Results:* These patients with a NCS as the presenting and isolated symptom presented in our study did show different types of generalized malignancies, drug or iatrogenic induced diseases.

*Conclusion:* Both, medical practitioners and dentists need to be aware of the relationship between malignancies and paraesthesia of the chin or complete loss of sensation in partial segments of the jaw. Especially dentists should be aware of the diagnostic limitations of panoramic radiographs to detect underlying diseases beyond localized dental disorders.

**O-0809****CONCORDANCE BETWEEN THE SCC STAGES DETERMINED BY CT, MRI AND PET WITH THE REAL STAGE OBTAINED AFTER HISTOLOGICAL FINDINGS**

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**Introduction:** Squamous cell carcinoma (SCC) represents the 4-6% of all human tumors. Correct staging is critical as treatment is directly related with the disease stage, and related to the presence of cervical lymph nodes involvement. In the 90s, Jabour and Baylett started to use a new imaging modality, Positron Emission Tomography (PET) for oncologic diagnoses.

**Aims:** The aim of the study is to validate the sensibility and specificity of the CT, MR and PET in the SCC staging in the preoperative phase, comparing to the real staging results obtained with the histological findings after a neck dissection.

**Material and methods:** A serie of 52 patients diagnosed of SCC of the oral cavity were included in our study from September 2008 to October 2010. The study population is submitted to a prospective follow-up. All patients were susceptible of surgical treatment. They were staged in the preoperative phase based on physical examination, CT, MR and PET. The real stage was determined after histological findings and compared with the previous tests using a SPSS program as statistical analysis.

**Results:** The 80.8% of patients were male. A total of 73 neck dissections were performed; 31 patients underwent a unilateral neck lymph node dissection and 21 a bilateral dissection. The histological analysis of the lymph nodes showed 21 positive lymph nodes of a total of 30 metastatic lymph nodes. Two cases had 2 different neck levels affected and three cases had a contralateral node involvement. TC concordance referred to lymph node involvement had a 0.237 intra-class correlation coefficient. MR concordance had a better 0.506 intra-class correlation coefficient. PET concordance had a 0.908 intra-class correlation coefficient. Kappa index of concordance between PET staging and real staging was 0.7714, which represents an excellent result.

**Conclusions:** In our consecutive series, PET test is the best imaging test to identify metastatic neck lymph nodes in patients with SCC, resulting in a better and real staging, correlating with histological staging.

**O-0810****DIAGNOSTIC VALUE OF MAGNETIC RESONANCE IMAGING IN TONGUE CANCER: CORRELATION OF PATHOLOGICAL TUMOUR THICKNESS AND RADIOLOGICAL TUMOUR THICKNESS.**

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**Introduction:** The most important prognostic factor for survival in tongue cancer is the presence of cervical lymph node metastases. Their presence determines the therapeutic strategy. 20-30% of stage T1-2, N0 have micrometastases not detectable by conventional imaging. Tumour thickness is predictive for the presence of cervical metastasis in addition to being an independent prognostic factor for overall survival. MRI is the imaging test of choice in the preoperative study in tongue cancer.

**Aim:** The goal of this work has been to study the effectiveness of the radiological thickness measurements in tongue cancer from presurgical studies using Magnetic Resonance Imaging (MRI) compared to histopathologic thickness after tumour resection.

**Materials and Methods:** Retrospective analysis of 15 patients treated in the Maxillofacial Surgery Service HRU Carlos Haya in the period 2008-2010 was performed. Tumour thickness was measured by MRI on T1 with contrast and compared with the results of surgical pathology.

**Results:** The Pearson's linear correlation test with both measures gives an index of 0.897, which points to a strong positive correlation.

**Conclusions:** MRI is a useful tool for the presurgical evaluation of cancer in the tongue and has been proven as a reliable diagnostic method for the measurement of tumour thickness.

**O-0811****VIRTUAL 3D TUMOUR MARKING - INTRAOPERATIVE COORDINATE MAPPING IMPROVE POST-OPERATIVE RADIOTHERAPY**

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Post-operative radiotherapy is an essential part in the treatment concept for oral cancer. For the planning of the radiotherapy field information of the resection margins and limitations of the surgical resection are necessary. The information is typically gathered from the surgical and pathology report. This interface between radiotherapist and surgeon is restricted due to the complex three-dimensional anatomy of the midface especially close to the skull base.

A new language independent approach is the intra-operative virtual tumour marking which allows for precise allocation of intra-operative locations like frozen sections and resection margins or important surgical intraoperative information.

So far this technique was applied in 5 patients with advanced head and neck cancer. The workflow of the tumour marking included ablative surgery with navigation setting (BrainLab(R), Feldkirchen, Germany), superimposing of multimodal pre-operative data such as CT and MRI scan and segmentation of the tumour mass. Intra-operative

coordinates are stored within the 3D data set.

After labelling the data set could be transferred to communicate patient's specific tumour information (invasion to vessels and nerves, non-resectable tumour) to oncologists, radiotherapists and pathologists and could especially improve the three-dimensional radiotherapy planning.

#### O-0812

### COMBINED SPECT/CT IMPROVES DETECTION OF INITIAL BONE INVASION AND DETERMINATION OF RESECTION MARGINS IN ORAL SQUAMOUS CELL CARCINOMA COMPARED TO CONVENTIONAL IMAGING MODALITIES

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**Introduction:** Knowledge of the presence and extension of bone infiltration is crucial for planning resection of potential bone infiltrating squamous cell carcinomas of the head and neck region (HNSCC). Routinely, plain film radiography, CT and MRI are used for preoperative staging, but go along with a relatively high rate of false positive and negative information. Scintigraphy with <sup>99m</sup>Tc-bisphosphonate has the ability to display any increased metabolic bony activity. If combined with anatomical imaging, as in 3D SPECT/CT, it facilitates a precise localization of the malignant bone lesions. The aim of this study was to analyse the indications and advantages of SPECT/CT compared to standard imaging modalities and histology in respect of specificity and accuracy.

**Material and Methods:** 30 patients with biopsy proven HNSCC adjacent to the mandible underwent <sup>99m</sup>Tc-bisphosphonate SPECT/CT, MRI, CT and conventional radiography before decision making regarding partial or rim resection of the mandible was potentially indicated. Bone infiltration was first evaluated in plane films, CT and MRI. In a second reading SPECT/CT data were taken into account. **Results** were evaluated among the different imaging modalities and finally compared with histological specimens after surgical resection concerning size and depth of potential bone invasion. In order to assess the influence of dental foci on specificity all patients undergoing SPECT/CT were separated into toothless versus teeth in the area of potential tumour bone contact.

**Results:** Definite bone infiltration was found in 16 patients (64 %) when analysing conventional imaging modalities. Using SPECT/CT data, 3 additional up till then unidentified cases (12 %) of bone infiltration were obtained, which were all cases of discrete cortical bone erosion that were not visible by CT or MRI. The quality criteria for detecting bone involvement of HNSCC by SPECT/CT were calculated as follows: sensitivity 82.6%; specificity 86.9%; positive predictive value 82.6%; negative predictive value 86.9%.

**Conclusions:** Data showed that especially in toothless

patients hybrid SPECT/CT has high specificity due to the fact that it can provide important additional information about the existence and the local extent of initial malignant bone infiltration of the mandible. Due to this information, surgical intervention rim vs. partial resection can be planned and performed more precisely. Patient outcome can be improved by prevention of unnecessary or overextended bone resections.

#### O-0813

### THE VALUE OF CONE BEAM CT IN THE EVALUATION OF MANDIBULAR INVASION BY SQUAMOUS CELL CARCINOMA.

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**Purpose:** The preoperative staging of patients suffering from oral squamous cell carcinoma (OSCC) includes clinical and radiographic examinations; the latter often involves panoramic radiography (OPG), magnetic resonance imaging (MRI), computed tomography (CT) and single photon emission tomography (SPECT). Cone beam computed tomography (CBCT) is a relatively new radiological method, providing fast, accurate, high-resolution images at low radiation dose compared with e. g. conventional CT scans. CBCT is already a reliable diagnostic tool in such cases as dental implantology or trauma. The aim of this study was to prove its value in the evaluation of bone destruction in patients suffering from OSCC.

**Materials and Methods:** From April 2008 to April 2012 a total number of 50 cases of patients treated for OSCC underwent preoperative diagnostics in anticipation of oncological surgery and received CT, SPECT and CBCT prior to surgery. The results of the histological bone specimen were considered as gold standard. In this group consisting of matched cases every radiological method was analysed for sensitivity (SEN), specificity (SPE), positive predictive value (PPV) and negative predictive value (NPV).

**Results:** CBCT was found to be highly sensitive, but less specific than CT (SEN: 88% vs. 67%; SPE: 52% vs. 84%). SPECT showed to have the highest SEN (94%) but lowest SPE (41%), as is inherent in the physical method of this examination type. Comparing the PPV and NPV the SPECT was highest scoring in NPV (92%), while CT was in PPV (70%). CBCT scored at 85% and 58% respectively. **Conclusion:** While CBCT lacks the soft tissue imaging capabilities of conventional CT it can be used in detecting bony invasion of tumours of the oral cavity with reduced costs, CBCT can accurately evaluate treatment planning for malignant tumours. Combination of CBCT and MRI should be favoured for optimization of bony and soft tissues imaging of oral cancer with potential bone destruction.

**O-0814****ADVANCES AND INNOVATIONS IN COMPUTER-ASSISTED HEAD AND NECK ONCOLOGIC SURGERY**

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Over the past years computer-assisted surgery has gained more importance in craniomaxillofacial surgery, especially in primary and secondary treatment of head and neck malignancies. Basis for oncologic treatment of the head and neck region requires detailed planning using computed tomography (CT), cone-beam computed tomography (CBCT) or magnetic resonance imaging (MRI) in combination with computer-assisted infrared-based navigation system. These techniques allow a pre-planned image guided path to the tumor region for taking biopsies, resection or reconstruction. The aim of this work is to show the advances and technical benefits for tumor surgery in a daily clinical routine from the view of the craniomaxillofacial surgeon. The target of our working-group was to develop, and clinically evaluate a novel 3D planning and navigation software solution for treatment of craniofacial tumors.

This work was carried out on five categories for oncologic surgical procedures in which computer-assisted surgery was applied for: pre-planned trajectorial guided tumor biopsy, intraoperative image-controlled tumor resection, tumor mapping, reconstruction after tumor surgery (true to original), oral rehabilitation (backward planning). Successful preoperative planning, import of image data suitable for navigation and intraoperative precise infrared-based navigation was obtained for all five categories without any complications.

Image-guided navigation technique for head and neck oncologic surgery provides a precise, safe surgical method with real time excellent anatomic orientation. Regarding the advantages of computer-assisted surgery, this technique will play a major part in craniofacial reconstructive surgery and will address widespread general methodological solutions that are of great interest in multidisciplinary oncologic treatment.

## Session 9. CRANIO-MAXILLO-FACIAL TRAUMATOLOGY

### O-0901

#### ZYGOMATICOMAXILLARY COMPLEX FRACTURES AND THEIR ASSOCIATION WITH IPSILATERAL HEMI-NASO-ORBITAL-ETHMOIDAL FRACTURES: A 5 YEAR REVIEW

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**Introduction:** Zygomaticomaxillary complex (ZMC) fractures associated with ipsilateral naso-orbital-ethmoidal (NOE) fractures are more complex injuries than isolated ZMC fractures. This injury pattern can have significant long-term morbidity if not recognized and treated appropriately during the initial operation.

**Purpose:** The purpose of this study is to compare mechanisms of injury, treatment and outcome between patients with ZMC fractures and those with ZMC and ipsilateral NOE fractures.

**Methods:** A five year retrospective review of all patients treated with ZMC fractures at a level I trauma centre was performed. CT scans were reviewed to divide patients into those with ZMC alone and those with ZMC and ipsilateral NOE fractures. Demographics, treatment protocols, outcomes, complications, re-operations, and length of follow-up was identified for both groups and compared in order to determine differences between these populations.

**Results:** A total of 245 patients were identified by the CPT codes for ZMC fractures. 185 patients had ZMC fractures and 60 patients had ZMC-NOE injuries. The demographics for both populations were similar. There are differences between the groups with regards to mechanism of injury, operative findings and techniques. The patients with ZMC-NOE fractures had higher rates of postoperative complications and deformities.

**Conclusions:** Patients who sustain a ZMC fracture associated with an ipsilateral NOE fracture have a higher incidence of post-operative complications as well as deformities. It is important to recognize this fracture pattern early to help minimize post-operative morbidity. These fractures are frequently misdiagnosed and mistreated and are a major cause of post-treatment deformity in facial fracture repair.

### O-0902

#### FINITE ELEMENT ANALYSIS OF EXTERNAL LOADS RESULTING IN FRONTO-ORBITONASAL FRACTURES

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**Introduction:** The craniofacial skeleton is a structure that remains partly unrecognized as far as the properties of its mechanical strength are concerned. The evaluation of the craniofacial resistance to external loads and stresses in a live person is practically impossible in clinical conditions.

Thus, it seems valid to implement computer-aided methods of virtual design in the clinical practice, methods that have been so effectively applied to technical sciences.

**Aim of the study:** By means of the finite element method (FEM) technique to evaluate the maximal concentration of loads potentially resulting in fractures of the craniofacial skeleton that manifest themselves as fronto-orbitonasal fracture (FONF) under the influence of external forces.

**Material and methods:** A commercially available model of the skull was used for the study. The loads were applied to the frontal bone of the skull in order to locate dangerous stresses that are typical for FONF.

**Results:** As the area of force application changed, significant differences in the values, quality and the area of stress distribution were revealed.

**Conclusion:** Extending the area of force application changes the value and the area of stresses typical for FONF that occur at the base of the anterior cranial fossa.

### O-0903

#### PTERYGOID PROCESS FRACTURE ASSOCIATED WITH MAXILLARY TRANSVERSE FRACTURE: CLASSIFICATION AND CHARACTERISTICS

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**Objective:** This study aimed to classify pterygoid process fractures associated with maxillary transverse fracture.

**Study design:** Pterygoid process fractures in 100 patients with maxillary transverse fracture were observed two- and three-dimensionally using Mimics (10.01) software. Fracture line course and height, and sphenoid sinus involvement were recorded.

**Results:** Pterygoid process fractures were classified as: Class I: vertical (simple separation between medial and lateral plates); or II: transverse (three subcategories according to location of fracture line: II-1, within pterygoid fossa; II-2, above pterygoid fossa, not extending to sphenoid sinus floor; II-3, above pterygoid fossa, involving sphenoid sinus floor). Class I fracture was observed on five sides (2.7%), II-1 on 125 (66.5%), II-2 on 36 (19.1%) and II-3 on 22 (1.7%).

**Conclusion:** Pterygoid process fractures were predominantly near the upper edge of the pterygoid fossa. Pneumatization of the pterygoid process is a risk in fractures involving the sphenoid sinus floor.

### O-0904

#### LESS INVASIVE ACCESS THROUGH SOFT TISSUES IN TREATMENT OF FRONTAL SINUS FRACTURES - RATES OF COMPLICATIONS

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Despite the predominance of bicoronal accesses through soft tissue in treatment of frontal sinus fractures, more recently more conservative approaches have begun to be used.

The aim of this investigation is to estimate rate of complications in different accesses trough soft tissue in treatment of fractured frontal sinus walls, as well as rate of complication in cases where deperiostation of fragments was performed, compared to cases when it was not.

By clinical retrospective examination we analyze data from medical charts of 24 patients with fractured frontal sinus walls treated in the Department of maxillofacial surgery Medicine University Nis in period from 2002 - 2011. Chi square test was used.

There were 24 patients with male to female ratio 7:1, and age from 18 to 76 (mean 41.63). Six of patients developed complications in the postoperative period, such as: pain, rhinorrhea, unsatisfactory cosmetic result, paresthesia, depression in the operated region and infection. Highest rate of complications were present in group of patients who had bicoronal accesses through soft tissue (62,5%), followed by group of patients who had supraciliary accesses, with significant correlation between type of accesses through soft tissue and rate of complications  $p=0.009$ ,  $p < 0,05$ . All patients who developed complications had deperiostation of fragments in accesses through soft tissue, with significant correlation between accesses with deperiostation and rate of complications  $p=0.046$   $p < 0,05$ .

High rates of complications in group with bicoronal accesses can be explained by extent of injuries, but big elevation of soft tissue cannot be disregarded. Preserving of periostium on frontal sinus fragments cannot be always performed depending of type of injuries and planed surgical intervention but presence of a non vital tissue in operating area can raise the chances for complications.

High rate of complications can guide us to much conservative procedures, but with respecting of basic principles of treating fractured frontal sinus walls.

#### O-0905

### LONG-TERM COMPLICATIONS WITH CALCIUM PHOSPHATE BONE CEMENT IN FRONTAL SINUS OBLITERATION

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**Introduction:** Calcium phosphate cements (CPCs) are mouldable, biocompatible bone substitutes, which provide prompt stability while avoiding donor site morbidity. However it remains a matter of controversy whether such biomaterials should replace autografts in craniofacial reconstruction. We report our long-term major and minor complication rates using this material.

**Patients and Methods:** To evaluate the long term outcome of CPC treatment we reviewed 32 consecutive cases of CPC application in our department between September 2000 and June 2011. Seventeen cases included frontal sinus obliteration, while 13 patients received calvarian reconstruction only. Causes of defects consisted of traumatic injuries (41%), post surgical lack of tissues (19%), congenital anomalies (12%), tumour sequelae (9%) and chronic infections (12%). Follow-up ranged from 6 to 82 months, with a median duration of 34 months. Age of

patients ranged from 12 to 79, with an average of 35 years. The study population was predominantly male (91%) and presented a high percentage of habitual tobacco users (37%).

**Results:** Despite our promising initial results long term outcomes showed a 41% complication rate in patients treated with CPC for sinus obliteration. Complications included infection, abscess formation or fistulae, which required at least one secondary surgical intervention. Comparing calvarian reconstruction with frontal sinus obliteration the complication rate was significantly lower in the calvarian group (23%).

**Conclusions:** Possible causes for long term complications may include the unfavourable combination of a commonly contaminated environment (frontal sinus) with a large foreign body surface area (porous bone cement), surgical difficulty to completely remove all mucosa and challenging technical handling of the material (air bubble formation). Especially the comparison between our two patient groups (calvarian vs. sinus reconstruction) suggests residual mucosa as potential source of delayed infection. With regard to our results a return to autogenous grafting as an standard of care in frontal sinus obliteration might be considered. However our study population included a high percentage of trauma cases in the obliteration group (71%), and this may have been a confounding factor for the adverse outcome among these patients. Further evaluation is needed to determine the value of CPC in frontal sinus obliteration.

#### O-0906

### A MODIFIED TRANSVERSE TEMPORALIS-MUSCLE-SHORT FLAP FOR FRONTO-BASAL APPLICATIONS

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**Introduction:** Frontal skull base trauma often leads to cranialisation of the frontal sinus with dead space or bony defects requiring filling, sealing of the frontonasal tract as well as dura defects needing additional sealant. Traditionally a Temporalis muscle flap is one of the methods of achieving the above mentioned goals, where the anterior part of the muscle is rotated into the defect. We describe a modification of the temporalis muscle flap with significant aesthetic as well as extended reach possibilities in a case series of patients.

**Material and Methods:** A modified transverse Temporalis muscle flap was utilised in patients with the said indications after fronto-basal trauma. A transverse flap was raised with a 2-3cm anterior, retro-orbital base for vascularisation. Either uni- or bilateral flaps were raised with fixation of the flap to the opposite flap or to central bony structures. Patients were evaluated for post-operative cerebrospinal fluid leak as well as functional and aesthetic outcomes.

**Results:** In all subjects the Temporalis muscle reached to at least the midline. All patients had a satisfactory recovery with no sign of infection, persistent cerebrospinal fluid leak or other complications. As the slight temporal hollowing is located cranially and posterior to the normal temporal hollowing defect, the aesthetic outcomes were

acceptable.

**Conclusion:** The transverse Temporalis muscle flap as a modification of the traditional Temporalis flap extends its application in the frontal skull base area and can be recommended in its application in the reconstruction of the frontal skull base.

#### O-0907

##### HOW TO CLASSIFY A FACIAL FRACTURE?

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Facial fractures are classified by numerous clinical and radiological classifications. In various countries and hospitals different classifications are used. Current version of the International Classification of Diseases 10 differentiates by code S02 only several types. Midface and zygomatic fractures have the same code: S02.4 under a title: Fracture of malar and maxillary bones (Incl.: Superior maxilla, Upper jaw (bone), Zygoma). Therefore ICD 10 is not suitable for classification of facial fractures. The questionnaire was used to evaluate the differences between nomenclature of facial fractures. The greatest difference was found between the use of classifications of orbito-zygomatic and midface fractures. The proposal for the enlargement of ICD classifications is included.

#### O-0908

##### ANATOMICAL REPLICA FOR A NEW ALGORITHM IN DECISIONS FLOW FOR MAXILLOFACIAL TRAUMA.

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The authors present a new approach in craniofacial traumatology based on the use of the anatomical replicas.

A new algorithm in decisions flow is described in the series of ten cases. The procedure starts from an anatomical model obtained from the CT images of the fractured region. This tool allows the surgeon to plan the surgery, to choose the best access routes and to foresee how many and what kinds of synthesis are necessary to obtain a correct stabilization of the fractures.

#### O-0909

##### EARLY MANAGEMENT OF GUNSHOT INJURIES DURING LIBYAN LOCAL WAR

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**Aim:** To assess the treatment of Gunshot injuries to the Soft and skeletal facial structures.

**Patient & methods-** A total of 72 patients who were treated during 1st September 2011 to 20th October 2011 have been included. Medical documentation of the patient was compiled. All maxillofacial gunshot and warfare injuries were treated by an oral and maxillofacial surgeon. Other concomitant bodily injuries were treated by pertinent

consultant specialists. Patients were males ranging in age from 18 to 50 years, with a mean age of 22.5 years. Soft and skeletal facial structures injuries were treated in the first operation except when gross contamination, infection, extensive comminution, or general condition precluded this.

**Results:** 28 patient had soft tissue injuries only and 44 patient had soft and skeletal facial structures injuries. 20 patients required general surgery treatment. 8 patients required neurosurgery treatment. There were 139 bullet different calibres (7.62x39 mm, 9 mm, 12.5mm, and 14.5 mm), and 4 land mine. Of the 97.2% of the patients who had an injury to the underlying maxillofacial bone, all required surgical intervention. Treatment plan of maxillofacial bone injuries varied from debridement and stitching only (13.6%), primary debridement, closed reduction (29.6%), to primary debridement, open reduction and plate osteosynthesis (57.8%). Bone injuries were treated primarily along with closure of the soft tissue injuries. The soft tissue injuries were generally treated by debridement and primary closure.

**Conclusion:** All patients in this series required surgical intervention for treatment of their facial gunshot wounds. Primary treatment of soft and skeletal facial structures at the time of surgical debridement was possible in the majority of our patients. Early operative intervention for repair of the soft and skeletal facial structures leads to satisfactory results. Timing of surgery should be carefully planned allowing reduction of tissue oedema and avoiding development of malunion.

Early management of gunshot wounds results in better psychosocial profile, aesthetics, reduced hospital stay and early return to function.

#### O-0910

##### THE ORAL & MAXILLOFACIAL EARTHQUAKE EXPERIENCE AT CHRISTCHURCH HOSPITAL

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Christchurch was severely affected by a devastating earthquake in 2011. The medical emergency response and the Oral & Maxillofacial Surgery experience during the first few days will be discussed. Maxillofacial trauma treated will be analyzed and evaluated. Strategies to cope with a disaster of this scale will be discussed from a Maxillofacial point of view as well as lessons learned as a result of the earthquake.

#### O-0911

##### RETURN-TO-PLAY GUIDELINES FOLLOWING FACIAL FRACTURES

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Despite bone healing and the management options of facial fractures being well described, there is a lack of evidence-based return-to-play criteria for sportspeople who have sustained these injuries.

This shortage of evidence has resulted in a lack of consensus amongst health professionals. We present a prospective study of sportsmen who have returned to competitive



play 3 weeks after injury or treatment for facial fractures, without complication. The study aims to promote earlier return-to-play and highlight the need for consensus of opinion.

Nineteen male patients were enrolled into this prospective study between 2006 and 2012, sustaining 20 separate fractures. All patients were either professional or semi-professional footballers or rugby union players. All patients' facial fractures were managed using established operative and non-operative methods and all patients followed the same recovery schedule. Following injury or operation, all but two patients were available for selection at 21 days. One patient was unable to play due to the end of the playing season, with another taking retirement for reasons other than injuries sustained. No complications were observed in those patients returning to competitive play.

The risks and benefits of early return-to-play are discussed, along with a review of current clinical opinion on return-to-play in facial fractures. We propose a recovery schedule and 3-week return-to-play framework for patients with similar backgrounds and injuries. Although limiting the framework to this patient group initially, the authors acknowledge that the benefits of prompt return-to-play and physical exercise extend beyond the realm of professional sportspeople.

The authors welcome further input from colleagues, with the goal of generating stronger evidence and consensus in this field.

#### O-0912

##### A CASE OF CRANIO-MAXILLO-FACIAL TRAUMATIC SEQUELAE TREATED WITH FIBULA FREE FLAP AND OZONE THERAPY

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A 43-year old man came to our attention in October 2011 with a left facial defect, involving both hard and soft tissues, caused by ballistic trauma that occurred during the Libyan civil war. In particular, the patient presented with an improper reduction of both left hemimandibular and hemizygomatic bone fractures and intraoral exposure of plates and screws positioned previously in another department. The patient was submitted to surgery consisting in the repositioning of both hemimandibular and hemizygomatic bones and the reconstruction of the oral mucosa. In the following post-operative period, the patient showed once more a plate exposure, including the cutaneous side, and a curettage of the surgical site was performed with the closure of the cutaneous defect and plate removal. After the second surgery did not bring optimal results as fistulas on the cutaneous side were still present, we opted for a Fibula Osteomyocutaneous Free Flap for mandible and cheek reconstruction in order to close the soft tissue defects. The fibula osteoseptocutaneous flap, first performed by Taylor et Al. in 1975, is the standard treatment for primary mandibular reconstruction because of its potential to provide large lengths of straight bone, robust axial blood supply permitting multiple osteotomies, and long pedicle length and good soft tissue lining by means of both muscle and skin grafting. The immediate post-operative

period was free of major complications but after two weeks patient showed two new orofacial fistulas, in the left preauricular region and over the left mandibular border that were immediately treated with a surgical fistulectomy. The sample secretion was positive to *Candida Albicans* and *Escherichia Coli* not responsive to any antibiotic therapy. The patient was submitted to a cycle of 7 Ozone treatments consisting in the irrigation of autologous ozonized blood in the cutaneous and oral exposition sites and 3 autologous blood ozonized transfusions. The patient, finally, showed progressive closure of the fistulas both sides and, moreover, the complete disappearance of the infection with the healing of the tissues.

#### O-0913

##### MANAGING PENETRATING NECK INJURIES – THE KINGS' EXPERIENCE

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**Background:** Kings College Hospital is a busy level 1 trauma centre, based in a culturally diverse area where interpersonal violence and self inflicted injuries are rife. In the maxillofacial directorate we see self inflicted injuries to the neck and those as a result of interpersonal violence which pose a diagnostic and definitive treatment challenge. Current practice dictates a CT angiogram for any penetrating neck injury (PNI) which breaches the platysma. We wish to review the efficacy of this management.

**Methods:** We reviewed the King's College Hospital Emergency department database of all attending major trauma patients from November 2009-2010. All patients coded as assaulted with a knife, accidental knife and self harm involving a knife were reviewed. A standard proforma recorded basic demographic data, diagnosis and subsequent management. The use of any radiological intervention was also recorded.

**Results:** There were 19 self inflicted knife, 137 assaults and 16 accidental knife injuries (n=172). Of these 18 had a penetrating neck injury. 16 of these underwent a CT angiogram which was negative in all cases. 78% of these were managed by the maxillofacial unit.

**Conclusion:** Each case involving a PNI needs careful evaluation and management dependent upon the mechanism of injury. Clearly a PNI caused by assault may yield a vascular injury, whereas a deliberate self harm less likely to be so (although surface area of injury is clearly very different). We would propose that given the high incident of negative CT angiograms in assessing PNI each case be considered on its individual merits after evaluating mechanism and cause of injury.

## Session 10. PREPROSTHETIC SURGERY AND IMPLANTOLOGY I

### O-1001

#### NEW BONE FORMATION AROUND THE APEX OF DENTAL IMPLANTS WITH SINUS MEMBRANE ELEVATION

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**Objective:** The aim of this study was to evaluate the new bone formation around the apex of dental implants inserted via sinus membrane elevation with and without bone grafting.

**Study Design:** A total number of twenty-four dental implants with twenty sinus lift procedures were placed in fourteen patients. Ten sinuses were grafted after sinus membrane elevation and prior to implant insertion. Remaining ten sinuses were not grafted. New bone formation was evaluated postoperatively at 3rd and 6th months with cone-beam computerized tomography.

**Results:** In bone grafted group; 3rd month evaluation revealed new bone formation around the apices of 5 implants however bone resorption was observed in 3 of these implants at 6th month. There was no new bone formation around the apices of implants in non-grafted group at 3rd and 6th months. The difference between grafted and non-grafted groups was statistically insignificant.

**Conclusion:** The results indicated that sinus membrane elevation without bone grafting led no new bone formation around apices of implants.

### O-1002

#### COMPARISON OF NEW BONE DENSITY FOLLOWING SINUS MEMBRANE ELEVATION WITH AND WITHOUT GRAFT MATERIAL USING CONE BEAM CT

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Several clinical and experimental studies have evaluated maxillary sinus elevation surgery using variety of bone graft materials and bone substitutes. Recently, there have been reports of bone formation with the sinus floor elevation technique which involves elevating the maxillary sinus membrane without adjunctive grafting materials.

The aim of this study is to investigate the new bone formation in maxillary sinus after sinus membrane elevation without bone graft and evaluate the density of new bone formation around the dental implants with different maxillary sinus floor elevation technique.

Fourteen patients who need sinus floor augmentation for dental implant treatment in the posterior maxilla were included in this study. In the experimental group, 12 dental implants were placed into 7 patients following maxillary sinus membrane elevation without graft material. In the control group the sinus augmentation was performed with bone graft and 12 dental implants were installed in 7 patients. The evaluation of the new bone formation and density was done by cone beam computerized tomography that taken preoperatively, postoperatively at 1 week, 3 and 6 months.

As a result of this study, after sinus membrane elevation new bone formation was detected in the non-grafted group as in the grafted group. There were no statistical differences between the groups regarding the new bone density in the sinus preoperatively, postoperatively at 1 week and 3 month. The bone density of the new bone after sinus membrane elevation without graft material is higher than the bone in grafted sinus group statistically at 6-month control.

In a conclusion, the new bone formation after the sinus membrane elevation without graft was detected like as sinus membrane elevation with graft material and the density values were higher than the group with graft material. As a result, the maxillary sinus membrane elevation technique without graft material can be preferred in routine clinical application.

### O-1003

#### INTRA-ORAL BONE GRAFTING OF ALVEOLAR DEFECTS USING AUTOGENOUS SCRAPED BONE AND INVIVO BONE REGENERATION TECHNIQUES

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**Introduction:** Intra-oral bone grafting is a common procedure used to reconstruct the alveolar ridge and enable rehabilitation with dental implants. Extensive alveolar bone loss can result from trauma, follow post-ablative surgery for cysts and tumours, or in cases of congenital hypodontia. Such cases provide a challenge as the defects can be of complex morphology and because patients may have limited intra-oral donor sites

The authors describe techniques for achieving intra-oral particulate bone grafting using the safesrape device and a method of using regenerated autogenous bone blocks from third molar sockets following an atraumatic removal technique.

**Cases:** Bone can be harvested intraorally from are the zygomatic buttress, mandibular ramus, body and chin. The alveolar crest can also be used. Clinical examples are used to demonstrate the versatile nature of the safesrape device and the large amount of particulate bone that can be collected and used to reconstruct alveolar defects and for sinus lifts. We also show the atraumatic technique for third molar removal to maximise bone regeneration for subsequent block harvest.

**Conclusion:** Traditionally bone had been retrieved from the iliac crest for the purposes of intra oral bone grafting. An extra-oral donor site has many morbidities and is not always well received by patients.

The authors show intra-oral sites can be donor sites and

using the particulate device bone can be placed in defects. We also highlight an innovative approach to in vivo bone regeneration from healed third molar sockets so blocks of bone can be used in cases where it is required.

#### O-1004

### EIGHT YEARS FOLLOW-UP, FOR VERTICAL AUGMENTATION WITH ALVEOLAR INTERPOSITIONAL BONE GRAFTS IN THE MANDIBULAR AND MAXILLARY REGION: CLINICAL RESULTS

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**Background:** Ridge atrophy is a significant problem when it occurs, since inadequate denture function, as well as poor dental aesthetics, commonly result. Interpositional grafts are one of the possible techniques performed to augment the alveolar ridge and to prepare a sufficient bed for the implant or prosthesis.

The purpose of this study was to evaluate the clinical results of the crestal stability and resorption of alveolar augmentation when an interpositional bone graft is used for dental implant restorations.

**Patients and methods:** In 8 years a total of 74 patients (32 male and 42 woman) who presented with a severely resorbed maxillary and mandibular alveolar process were treated by the sandwich osteotomy technique with an interpositional bone graft harvested from the mandibular ramus and from iliac crest.

The treated cases are: 41 cases of retroforaminal vertical defects of mandible; 8 cases of interforaminal vertical defects of mandible; 5 cases of retroforaminal horizontal defects of mandible; 14 cases of posterior vertical defects of maxilla; 6 cases of anterior vertical defects of maxilla;

**Clinical results:** Follow-up examinations included serial panoramic radiographs and recording of changes in mandibular height, assessed preoperatively, immediately post-operatively, at the time of implant placement (4 to 6 months), and again at after implant placement (mean 26 months). Mean vertical augmentation obtained it was of 5 mm to 11 mm (mean 8mm) and after mean follow-up of 22 months we found a loss of vertical bone height 10% to 27% (mean 16%).

**Conclusion:** From a clinical and radiographic point of view, this procedure appears to be simple, predictable, safe and effective for treating alveolar ridge defects and could be a good alternative to other surgical techniques

#### O-1005

### THE USE OF FREE FAT TISSUE GRAFT TO ENHANCE PRIMARY SOFT TISSUE CLOSURE AND TO IMPROVE RIDGE CONTOUR DURING SOCKET PRESERVATION AT THE EXTRACTION SITE

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**Introduction:** Tooth extraction is followed by ridge contour deformation due to alveolar bone resorption and soft tissue contracture. Socket preservation is necessary to

achieve aesthetic and functional results. In addition to hard tissue volume, sufficient soft tissue architecture is essential. Several techniques have been used to improve soft tissue coverage at the extraction site. This presentation introduces a simple technique utilizing the use of free fat tissue graft (FFG) from the buccal fat pad (BFP) during socket preservation procedure for primary closure and improving ridge contour at the extraction site. **Materials:** 12 patients, 7 females, 5 males, mean age 39 years were treated during the last two years. They underwent 22 tooth extractions and socket preservation with allograft/ xeno-graft bone and primary closure of the extraction site with free fat tissue graft harvested from the BFP. Follow up was done every 2-3 weeks. After 4-6 months, evaluation of the soft and hard tissue volume, biopsy for histological study and implants insertion was performed.

**Results:** It is known from cosmetic surgery that fat tissue survives free transfer well and heals by fibrosis. In all our patients the free fat tissue graft enabled primary closure, survived well, prevented dehiscence of the bone graft at the extraction site and improved the ridge contour. The healing phase was uneventful both in the donor and the recipient sites. The healing steps were: first; after 2-3 weeks the FFG remnants still seen, second; after 4-6 weeks complete epithelialization (immature fibrosis in histology) of the FFG was seen without any dehiscence of the extraction site. Thick soft tissue and adequate bone volume were revealed 4-6 month post socket preservation at the procedure for implants insertion. Histological examinations showed fibrosis healing of the free fat tissue graft. The final outcome is thick soft tissue at the extraction site and thereafter around the dental implants that were inserted at these sites.

**Conclusions:** Free graft of fat tissue from the BFP is an easy procedure that enhances primary closure of extraction site during socket preservation. It improves ridge contour, long term soft tissue thickness at the recipient site due to fibrosis healing.

#### O-1006

### WHEN BONE SUPPORT SHOULD BE PREFERRED OVER MUCOSA SUPPORT. ALGORITHM BASED ON THE ANALYSIS OF 238 GUIDES FOR IMPLANTATION.

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**Topic:** Mucosa supported guides for dental implantation have some advantages. No incisions and periosteum elevation, lower dependence on quality of computer tomography, possibility for automated designing of guides etc. However there are reports about possible significant deflection of drill because of mobility of mucosa.

**Purpose:** To develop an algorithm that will help to decide what kind of support for the guide would be optimal.

**Materials and methods:** We used CBCT iCAT data and Articon Activity optical scanner. Guides were manufactured with Objet Eden 500 and titanium sleeves were pressed in.

We analysed 174 teeth-and-bone supported guides and 64 teeth-and-mucosa supported guides. Lateral force (15N) was applied to 4 points of guides and the deflection of

sleeves was measured. Three groups were chosen: maximum lateral deflection of sleeve lower than 0,5 mm; 0,5-1,0mm and more than 1,0mm.

**Results:** In all 174 cases of teeth-and-bone supported guides lateral deflection was lower than 0,5 mm. 45,3% (29) teeth-and-mucosa supported guides had deflection lower than 0,5mm; 12,5% (8) - 0,5-1,0mm; 42,2% (27) - more than 1,0m

To predict the accuracy of teeth-and-mucosa supported guides we developed the algorithm and the table. Classification of cases there depends on two factors. They relate to the parameters of edentulous area of the jaw where dental implantation is planned. First: the sum of the numbers of the most distal teeth on the left and the right side of the jaw. Second: maximal quantity of absent teeth in a row on the jaw.

**Conclusion:** Deflection of teeth-and-mucosa supported guides should be predicted. We developed the algorithm which can help to decide what kind of support is indicated. Also we recommend the use of mixed support guides that lie on tooth and mucosa where implantation was not planned and on the bone in the zone of drilling.

#### O-1007

### PERI-IMPLANT BONE CHANGES FOLLOWING TOOTH EXTRACTION, IMMEDIATE PLACEMENT AND LOADING OF IMPLANTS IN THE MAXILLA

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**Introduction:** The aim of this prospective clinical study was to clinically and radiographically evaluate peri-implant bone level changes after rehabilitation of the maxilla by placement of six implants in either fresh extraction sites or healed edentulous ridges up till 18 months after implant placement.

**Material and Methods:** Twenty consecutively treated patients with a terminal dentition in the maxilla (11 men, 9 women) received a total of 120 OsseoSpeed® implants. 60 implants were placed in extraction sockets and engaged the palatal and lateral walls of the site. 118 implants were loaded immediately of which 59 were placed in extraction sockets and 59 were placed in healed sites. Within 24 h after surgery, all patients received a chairside-assembled, fibre-reinforced temporary fixed prosthetic reconstruction in occlusion. Six months post-surgery, final screw-retained CoCr (15) or Ti (5) computer numerical control-milled and acrylic-veneered frameworks were placed directly at implant level without interposing abutments. Intraoral radiographs were taken 6 and 18 months after implant placement to measure bone changes around the implants

**Results:** Implant survival rate was 100%. At 6 months the bone level was on average -0.14 mm below the reference point (standard deviation 0.17, range -0.76 to +0.04). At 18 months (12 months with the final fixed bridge) the mean marginal bone level was located on average -0.35 mm below the reference point (standard deviation 0.29,

range -1.20 to +0.02 mm). The marginal bone level was not statistically significantly affected whether implants were placed in healed bone sites or fresh extraction sockets. Furthermore, the use of either CoCr or Ti at the implant level did not affect the marginal bone loss significantly different.

**Discussion:** Within the limits of this prospective clinical trial, the results seem to indicate that immediate placement and occlusal loading of six implants in the edentulous maxilla can be carried out successfully. Whether or not these implants are placed in fresh extraction sockets does not seem to alter the outcome.

**Conclusion:** The present data show a successful 1-year outcome with the final fixed prosthesis of a treatment protocol involving tooth extraction immediately combined with implant placement and loading.

#### O-1008

### MANAGEMENT OF INFLAMMATORY PERIAPICAL LESIONS AROUND DENTAL IMPLANTS (A CLINICAL STUDY)

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**Objectives:** the aim of this clinical patient series was to formulate a methodology for management of periapical lesions around implants (peri-implantitis) and assess its efficacy

**Material and methods:** Eight patients presented with problems after implant insertion in the period between 2007-2011. They presented at the outpatient clinic of Oral and Maxillofacial surgery department, Faculty of Dentistry, Suez Canal University and private practice (5 and 3 cases respectively). Five cases complained of pain, swelling, ooze but with no mobility and three cases were noticed on routine follow-up x-ray before appearance of signs after referral. Five cases were obvious on periapical and panoramic x-rays and 3 were only clear on cone beam CT. Seven cases were approached labially or buccally and 1 case palatally. The lesions were removed by curettage and submitted for pathological examination. The implants and bony surgical beds were cleaned using an ultrasonic tip (NSK Varios tip V-P10) with sterile saline irrigation and decontaminated with tetracycline. Guided bone regeneration was performed using equine bone (Bio-Gen) mixed with tetracycline and absorbable collagen membrane (Biocollagen). CBCT was performed preoperatively, two weeks, and 1 year postoperatively and assessed for bone height and bone density around the implants ends. Clinical parameters were assessed and recorded preoperatively and at 2 weeks, two months, six months, and 1 year postoperatively. These included pain, swelling, implant mobility, and absence of oozing fistulae

**Results:** Histopathological examination revealed 6 cases with non specific granulation tissue with inflammatory cells infiltration and 2 cases with infected cystic epithelium. The healing was satisfactory with absence of oedema and postoperative pain starting 2 weeks postoperatively. Bone fill was excellent and radiodensity was progressing uneventfully with statistical significance. Implant mobility was absent except for 1 implant which showed slight mobility.

*Conclusion:* Surgical approach should be done immediately to save the implants from further bone loss. Peri-implantitis can be managed safely and economically by this approach especially with absence of implant mobility and intactness of parts of the bone plates to secure implant stability.

#### O-1009

### DISTRACTION OSTEOGENESIS BY ENDODISTRACTION – A BIOLOGICAL CONCEPT FOR FULL REGENERATION OF THE ALVEOLAR RIDGE

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Edentulousness paired with severe mandibular bone loss continues to be a challenge for implant dentists. Ridge augmentation with autogenous bone requires major surgery. Distraction osteogenesis (DO), by contrast, regenerates the local bone stock with all of its genetic determinants. It is thus tantamount to targeted bioengineering of the region of interest.

*Results* of the Standard MONO Endo-Distractor in 44 patients treated between mid-2003 and early 2010 are presented. Their mean age was 61 (61 + 8.66) years with a first peak prior to age 50 and the bulk of the patients beyond age 60 years. The sex distribution showed a major imbalance in favour of females (40 females versus 4 males). Targeted distraction (9,2 mm; 4 to 13) of edentulous highly atrophic mandibles was followed by the placement of 4 interforaminal implants and implant-supported prosthodontic rehabilitation. Mono endodistraction is a new approach to DO: Mid-bone placement of an abutment-like distractor; distraction screw in basal cortical bone; negligible tilting (3.38° + 2.33°); sealed against saliva and bacteria; metal removal without surgery. 152 dental implants were placed supporting custom-milled bars with overdentures or fixed screw-down bridges. The mean follow-up time was 3 years

Complications like mandibular fractures or infections were reduced to one quarter of those in a first study treated by the TWIN Endo-Distractor. Major bone regeneration was observed during functional loading even posteriorly. Together with ridge repair, the vestibulum and the aesthetics of the lip and chin were restored. The MINI and MIKRO Endo-Distractor for closing gaps produced promising 1-year results.

#### O-1010

### USE OF TISSUEPATCH SEALANT FILM IN MAXILLOFACIAL, HEAD AND NECK SURGERY

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*Introduction* : Blood loss after major Maxillofacial, Head and Neck Surgery is common and vacuum drains are used to reduce the postoperative risks of haematoma and seroma.

Mechanical methods of internal wound closure such as sutures and clips are considered the gold standard for tissue repair but they may not result in a complete seal. Surgical sealants have been developed to supplement mechanical closure of wounds.

TissuePatch™ (Tissuemed, UK) is a synthetic, self-adhesive, absorbable surgical sealant and barrier which is indicated to seal and reinforce against leakage of air, blood and fluid in neuro, thoracic and general surgery. We have therefore investigated the feasibility of using TissuePatch™ to reduce oozing of blood from Head and Neck Surgery and chylous leak after neck dissection.

*Materials and Methods:* A proforma was designed to collect prospective data on patients' demographic details and each procedure where TissuePatch™ was used.

*Results:* TissuePatch™ was used in 55 thyroid procedures, 12 neck dissection, 8 free tissue transfer donor site, and pectoralis major donor site and encephalocele. Single sided TissuePatch™ were used in majority of cases. We found the TissuePatch™ sealant film conformed well to irregular surfaces of the soft tissue bed and provided adhesive seal to haematological and chylous leak. This was shown by the early resolution of chylous leak and reduction in postoperative blood loss in suction drains, and shortened hospital stay for majority of our patients.

*Discussion:* Many of the commercially available surgical sealants and adhesives are provided as powders with solutions which are activated by various mechanisms. They generate a bond/crosslink with their respective components, resulting in a 'gel or clot' which has cohesive strength. TissuePatch™ is a dry preformed film that does not need preparation. It has an intrinsic mechanical strength and incorporates a bioadhesive polymer, Tissuebond™, that forms strong covalent bonds in the presence of protein-rich tissue surfaces. TissuePatch™ is also biodegradable and safe to use.

*Conclusion:* TissuePatch™ sealant film has been found to be a useful adjunct to ensure effective sealing to the potential sources of blood and chylous leak after major Maxillofacial, Head and Neck surgery.

## Session 11. ORTHOGNATHIC SURGERY III

### O-1101

#### ANGULAR DIFFERENCE BETWEEN MAXILLARY OCCLUSAL PLANE AND MANDIBULAR PLANE AS AN ETIOLOGICAL FACTOR FOR POSTOPERATIVE RELAPSE IN MANDIBULAR PROGNATHISM

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**Introduction:** It is well known that postoperative relapse is more in large mandibular setback movements than in small movements, while it has been reported that intraoperative clockwise rotation of the proximal segments during rigid fixation causes postoperative clockwise rotational change of mandible, which is a major influencing factor for postoperative relapse after mandibular setback surgery. The aim of this study is to evaluate comparatively the effect of those two factors on the relapse after mandibular setback surgery.

**Patients and Methods:** Patients (n=36) who undergone orthognathic surgery for mandibular setback were evaluated, and divided in four groups, Gr. I with more than 12mm setback movements, Gr. II with setback movement between 5mm and 10mm, Gr. A with clockwise rotation of the proximal segment more than 4° and Gr. B with less than 2°. Cephalometric analysis was done before surgery, immediately, 6weeks, 6months and 12months after surgery.

**Result:** While there was no significant difference of the relapse between Gr. I and Gr. II, there was statistically significant difference of the relapse between Gr. A and Gr. B, where the relapse was greater in Gr. A than in Gr. B.

**Conclusion:** This study suggests that the amount of setback movement does not influence the relapse, and intraoperative clockwise rotation of proximal segment is a technically controllable movement, therefore, the postoperative relapse can be minimized by adequate manual positioning of mandibular proximal segment.

### O-1102

#### CHANGE OF CONDYLAR POSITION IN POSTERIOR BENDING OSTEOTOMY TO MINIMIZE CONDYLAR TORQUE IN BSSRO OF FACIAL ASYMMETRY : COMPARISON WITH GRINDING METHOD

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**Purpose:** This study was to evaluate the change of condylar position after BSSRO with posterior bending osteotomy (PBO) to minimize the interferences between proximal and distal segment in facial asymmetry.

**Methods:** PBO was done to minimize major interferences between proximal and distal segment after BSSRO in patients with facial asymmetry (n = 13), while grinding of proximal and distal segment was used in minor interferences

(n = 9). The condylar torque due to inter-segmental interferences was evaluated using preoperative and postoperative CT: (1) condylar position within glenoid fossa by measuring the intra-articular space of condylion, (2) the change of condylar position by calculating the amount of condylar displacement on condylion, lateral and medial pole, and (3) analyzing the change of condylar axis 3-dimensionally using Mimics 13.0 (Materialise NV, Belgium). The comparison between PBO and grinding method and between deviated and non-deviated side were performed and statistically analyzed.

**Results:** The condyles were well-positioned in the glenoid fossa in both groups. The amount of condylar displacement on condylion showed statistically significant difference between deviated and non-deviated sides in grinding method, while it was similar on deviated and non-deviated side with PBO. The condyles on deviated side in grinding method rotated more to the lateral side compared with those of PBO method.

**Conclusion:** If the bony interference is great, PBO is useful to remove bony interference between proximal and distal segment. If the bony interference is little, bone grinding may be effective.

### O-1103

#### ORTHOGNATHIC SURGERY ON JEHOVAH'S WITNESS: WHAT ARE OUR OPTIONS?

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**Introduction:** Jehovah's Witness(JW) comprises a religious group whose beliefs preclude acceptance of blood/blood products which could eliminate any hope for eternal life. Their management presents moral, ethical, legal and medical concerns. Since their association (Watchtower) announced a change of policy (2000) stating it no longer excommunicates members who have received blood transfusions, the exact types of acceptable products varies with individual interpretation.

**Clinical Relevance:** Successful operations in general and cardiothoracic surgery have been performed with good outcome in JW, orthognathic procedures however warrant special considerations as these are non-essential for the continuation of life. Patient must be aware of the magnitude of anticipated surgery and the risk of haemorrhage, morbidity and mortality. Despite studies had demonstrated a low transfusion rate amongst orthognathic patients, early identification of JW will allow adequate preoperative counseling and planning. It is essential to establish a list of acceptable transfusion products and techniques to the specific patient during the treatment planning stage, allowing the surgeon an informed evaluation of the associated risks.

**Recommendations:** Preoperative optimisation of haemoglobin using haematinics along with normalisation of coagulation is essential. An advanced directive stating the refusal of blood products must be signed by the patient to offer medical staff legal protection. Cases should be performed by the most experienced surgeons, anaesthetists and theatre staff. Hypotensive anaesthesia, vasoconstrictors and deliberate hypothermia could be used to reduce blood loss. Unfortunately, intraoperative cell salvage device commonly used by other specialties are not rec-

ommended for intra-oral procedures due to the risk of oral flora contamination.

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**O-1104**

**COMPLICATIONS IN ORTHOGNATHIC SURGERY: A PRESENTATION OF THREE CASES AND A REVIEW OF THE LITERATURE**

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The correction of dental-facial deformities by means of osteotomies of the facial bones is commonly known as orthognathic surgery. The most common surgical techniques employed are the Le Fort I maxillary osteotomy, and sagittal mandibular osteotomy. These techniques are highly standardised and ensure predictable and stable results over time. The surgical complication rate is low, between 1% and 25%, and varies depending on how a complication is defined.

*Objectives:* To present a literature review of the complications reported in corrective osteotomies of dental-facial deformities, and a description of the diagnosis and treatment of three cases.

*Material and method:* Three cases with a complication are presented: two inadequate osteotomies ("bad split") in the sagittal mandibular osteotomy and one maxillary aseptic necrosis after a LeFort 1 maxillary osteotomy.

*Results:* Two alternatives for correcting the mandibular bad split are presented, using bicortical screws and using a reinforced plate with screws threaded to the plate. In the maxillary aseptic necrosis, the clinical signs, the diagnostic tests used, the initial treatment, and finally the sequelae of this case are presented.

*Conclusions:* The surgical correction of dental-facial deformities using orthognathic surgery is a safe treatment with predictable results. Despite the development of new materials and techniques, no surgical procedure is complication free. It is the responsibility of the surgeon to assess the risks of each case, to inform the patient and diagnose and treat the complications with the greatest diligence and efficacy.

**O-1105**

**ANALYSIS OF FACIAL NERVE PALSY AFTER ORTHOGNATHIC SURGERY**

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*Objective:* Facial nerve palsy (FNP) after orthognathic

surgery is rare but serious complication. We investigated the characteristics of patients who developed FNP after orthognathic surgery in our department.

*Patients and Methods:* Orthognathic surgery was performed in 429 patients (Cleft lip and palate patients were excluded) from 2001 to 2010 in our department. Five patients (1.2%; 3 men and 2 women; mean age at surgery, 24 years; age range, 19-27 years) developed FNP after the surgery. The 40-points (Yanagihara grading system) was used, and the following aspects were evaluated; (1); facial asymmetry at rest, (2); forehead wrinkling, (3); light eye closure, (4); strong eye closure, (5); eye closure, (6); alar movement, (7); swelling of the cheek, (8); ability to show the teeth, (9); ability to whistle, and (10); downturn at the corners of the mouth.

*Results:* Surgical procedures were sagittal splitting ramus osteotomy (SSRO) (in 4 patients) and Le Fort 1 and SSRO (in 1 patient). FNP was detected in 5 days (mean) after surgery (range, 1 – 13 days). The mean Yanagihara score was 32 points at the time of onset (range, 10-33), of symptoms of FNP. Two patients showed impairments in all 10 items, 2 patients showed impairments in the temporal, zygomatic, and buccal branches; and 1 patient showed impairments of the buccal and marginal mandibular branches. One patient was treated with steroid hormone and anti-viral drugs, and 2 patients were treated with acupuncture and oral vitamin B12 and Adenosine Triphosphate Disodium Hydrate (ATP) drugs, and 2 patients were treated with oral vitamin B12 and ATP drugs. Four patients recovered completely within 3 months after the surgery, and 1 patient recovered completely 1 year after the surgery.

*Discussion and Conclusion:* FNP possibly occurred because of nerve compression or traction during the bone-splitting step of the SSRO. FNP occurred suddenly after surgery in most patients. However, care should be taken because in some cases, FNP can be difficult to detect owing to remarkable facial swelling. Full recovery can be expected in most cases, but reduction of the anxiety of patients should be considered.

**O-1106**

**INFLUENCE OF SURGICAL EXPERIENCE ON COMPLICATIONS AFTER ORTHOGNATHIC SURGERY IN THE MANDIBLE**

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*Background:* Surgical experience is regarded as an important factor related to the clinical outcome. In contrast to that, only few data are available on that topic in maxillofacial surgery. The aim of this study was to evaluate the influence of surgical experience on the outcome of orthognathic surgery in the mandible.

*Materials and Methods:* In a retrospective study the data of 400 consecutive patients who underwent a mandibular osteotomy (200 also bimaxillary) were included. 186 were operated using the Obwegeser/DalPont technique, 214 according to Hunsuk/Epker. 213 had class II advancement, 177 a class III set-back. Data was recorded for each side of the patient. Bleeding was rated positive, if special in-

traoperative procedures were recorded. Early nerve lesions were rated as present or absent at 2 months post operatively. Surgeons were classified as beginner (40).

*Results:* Bad Splits: Beginner 8.9 %; Intermediate 4.3%; Experienced 5.0% p=0.10

Bleeding: Beginner 4.4 %; Intermediate 3.3%; Experienced 2.7% p=0.62

Delayed wound healing: Beginner 3.9 %; Intermediate 6,1%; Experienced 6,5% p=0.1

Failed osteosynthesis: Beginner 0.6 %; Intermediate 1.1%; Experienced 1.5% p=0.047

Hypoesthesia: Beginner 45.2 %; Intermediate 41.1%; Experienced 33.9% p=0.01

No differences were seen regarding the type of operation or direction of movement, with the exception of more bad splits while using the Obwegeser/DalPont.

*Conclusion:* The differences between the surgeons with different training status were marginal with exception of a lower rate of temporary hypoesthesia in the experienced group. The four eye principle with at least one intermediate surgeon present might have contributed to the stable number of complications within the different experience groups.

#### O-1107

### PIEZOSURGERY: CLINICAL FINDINGS IN ORTHOGNATHIC SURGERY

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*Purpose:* In recent years piezoelectric devices are suggested as an alternative to rotary drilling instruments in oral and maxillofacial surgery. Piezoelectric waves for orthognathic surgery are used only in recent years. The aim of this study is to evaluate the post-operative clinical findings of the use of this ultrasonic saw.

*Patients and Methods:* Sixty patients are included in our study, Le Fort I and bilateral split osteotomies were performed in all the patients. In twenty-five patients osteotomies were performed by piezoelectric device and in the control group, thirty-five patients, the conventional saw and bur were used. The blood loss, the facial swelling, the integrity of the inferior alveolar nerve and the post-operative pain are analyzed. Statistical analysis was performed by using a Paired Samples T Test. The results were expressed as means and standard deviations. P

*Results:* The average blood loss for the group performed by the piezoelectric device was 480±150 versus 720±120 of the control group (P=.001). For the facial swelling was analysed 1200 data and a reduction swelling in the piezosurgery group was observed (P=.0003). Alveolar inferior nerve sensitivity was altered at 30 days in the 5% of the study versus 15% of the control group (P=.003). The pain after surgery of the piezosurgery group was less than the control group (P=.001).

*Conclusion:* We looked at if there is a real benefit for the patients using a piezoelectric device for orthognathic surgery.

Using a piezoelectric device we have observed a reduction of swelling and postoperative pain, improved sensitivity of the inferior alveolar nerve after 30 days and less blood loss during surgery. In conclusion, the piezosurgery is an excellent substitute for conventional osteotomies in orthognathic surgery with less morbidity for the patient.

#### O-1108

### ANTERIOR SEGMENTAL OSTEOTOMY WITH PIEZOELECTRIC DEVICE THROUGH A VERTICAL MUCOSAL INCISION ONLY IN THE PREMOLAR AREA

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We introduce a surgical procedure performed in our department, which involves making only a vertical incision in the buccal mucosa of the premolar area.

*Methods:* A 3-cm mucoperiosteal incision is made from the premolar area in a slightly posterosuperior direction. Any premolar teeth to be extracted are extracted carefully. The buccal cortical bone is removed by osteotomy using a saw-type tip attached to a piezoelectric device (PED). The osteotomy line is elongated in an L-shape toward the pyriform aperture from a position approximately 5 mm superior to the apex of the canine tooth. The region from the alveolar bone to the palatine bone is removed from the side of the removed buccal bone. Because the tip of the PED does not easily cause soft tissue damage, the mucosa of the maxillary sinus and nasal cavity is not easily ruptured even in the event of inadvertent contact with the tip of the PED.

Finally, the bone on the lateral nasal wall is dissected. The bone fragments can be repositioned without dissecting the nasal septum, and are removed in small blocks on the buccal and palatal sides of the alveolar part in the following order: lateral buccal bone in the pyriform aperture; palatal bone; and bone on the lateral nasal wall. Little bleeding is encountered with this method.

*Results and Discussion:* Methods of maxillary anterior alveolar osteotomy include making a horizontal incision on the buccal or palatal mucosa. Our department had previously used a modified Wassmund technique in which a sagittal incision in the palatal mucosa was added to a vertical incision in the left and right premolar buccal gingiva and a vertical midline incision in the superior labial fraenum. Because the present surgical technique preserves blood supply to the bone fragments being repositioned from both the palatal and buccal mucosa, the method is safe and offers favourable outcomes.

However, the use of bone burs and bone saws results in heavy bleeding and precludes preservation of the nasal and maxillary sinus mucosa, and the present technique would thus place a great burden on patients. We have recently obtained very favourable results using a safe and minimally invasive original procedure in which the mucosal incision is limited to only a vertical incision in the premolar area using the PED, while preserving the blood supply.



**O-1109****ANCILLARY SURGICAL TECHNIQUES TO ACCELERATE ORTHODONTIC TREATMENT IN THE MANDIBLE IN PREPARATION FOR ORTHOGNATHIC SURGERY**

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**Object:** Patients with severe hyperdivergent Class III malocclusions have narrower mandibular symphysis and therefore a higher risk of root resorption and periodontal damage secondary to anterior tooth decompensation.

The aim of this study was to describe in the first surgical phase the use of anterior segmental dento alveolar mandibular distraction osteogenesis.

**Materials and methods:** In 9 patients affected by severe dento-skeletal Class III and severe anterior incisal compensation and crowding we performed a complete mandibular subapical osteotomy in general anaesthesia and a tooth born distraction device was positioned. In all cases surgically assisted rapid maxillary expansion was performed simultaneously (SARPE).

The latency period was 3-5 days, the distraction rate was 1 mm per day. We did lateral skull telerradiography at the beginning and at the end of the distraction. After an average period of 60 days of stabilisation the mandibular distractor was removed. We compare the pre-op and post-op lower incisor mandibular angle plane (IMPA) to find the average decompensation.

**Results and discussion:** Incisor decompensation was obtained in all patients

In all patients we obtained a sufficient space to do alignment with no tooth extractions. Average time of orthodontic pre-surgical treatment was 14 months

Mild root resorption and minimal gingival recession was seen in only one of the patients, but far less than what would have been expected after the equivalent tooth movement through orthodontic treatment..

The advantages of this technique are: reduce orthodontic time, avoid tooth extractions, reduce periodontal and root resorption risks and allow complete incisor decompensation.

**O-1110****DECOMPENSATION BY MESIALIZATION OF THE WHOLE LOWER DENTITION IN LOWER SPACING CASES**

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In Class III mandibular prognathic patients, dentoalveolar compensation is typically characterized by linguoversion of anterior teeth in the lower arch. To obtain satisfactory postsurgical results, labioversion, that is, decompensation must be achieved. Labioversion of the lower anterior teeth will increase the initially small IMPA (Incisor Mandibular Plane Angle). But this type of teeth movement is difficult

because of pressure from the lower lip.

If there is no crowding in the lower anterior teeth, labioversion will result in spacing. To close this space, molar mesialization, instead of anterior teeth retraction, is needed. If spacing already existed in the original state, the amount of necessary molar mesialization will increase for the decompensation of the lower anterior teeth. Such teeth movement increases difficulty to achieve with conventional orthodontic mechanics.

Recently, TADs (Temporary anchorage devices) that allow large amounts of molar mesialization possible were developed. But the biomechanics related with TADs is fairly different from conventional mechanics.

Moreover, the recently developed "Surgery First Technique" reduces time for the treatment above. With presurgical orthodontics, labioversion of the anterior teeth takes much time due to pressure from the lower lip. In contrast, in the "Surgery First Technique", it is done after surgery; therefore, it takes less time.

This presentation will discuss the mesialization of the whole lower dentition.

## Session 12. OBSTRUCTIVE SLEEP APNEA

### O-1201

#### ORAL APPLIANCE VERSUS CPAP IN OBSTRUCTIVE SLEEP APNOEA SYNDROME; A TWO-YEAR FOLLOW-UP

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We hypothesized that oral appliance therapy is not inferior to CPAP in treating mild-to-severe OSAS in a two-year follow-up regarding the proportions of successful treatments. In this study we report on the two-year follow up of a cohort (n=103) of a previously conducted randomized controlled trial.

Objective and subjective parameters were assessed after two months, one year and two years of treatment. Treatment was considered "successful" when the apnoea-hypopnoea index (AHI) was < 20 in a patient who had no symptoms while using therapy.

Regarding the percentage of successful treatments, oral appliance therapy was not inferior to CPAP in treating mild-to-severe OSAS in a two-year follow-up. CPAP was still successful in 67.3% of the patients and oral appliance therapy in 52.9% of the patients (p=0.14) after two years of treatment. Significantly more patients (p=0.04) dropped out under oral appliance therapy (47%) compared to CPAP (33%). Both therapies showed substantial improvements in polysomnographic and neurobehavioral outcomes. However, CPAP was more effective in lowering the AHI and showed higher oxygen saturation levels compared to oral appliance therapy (p

### O-1202

#### TREATMENT OF RESPIRATORY DISORDERS AT CHILDREN WITH PIERRE ROBIN SEQUENCE

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Sleep breathing disorders in children with Pierre Robin Sequence is caused by upper airway obstruction due to small mandible and retraction of the floor of oral cavity tissues. In some cases these breathing disorders can be extremely severe and require urgent surgical treatment as threaten the patient's life. In other cases the clinical symptoms can be minimal at time of wakefulness and intensify at night sleep (Obstructive Sleep Apnoea) and lead to serious somatic and psychoneurological disturbances.

Objectives: To evaluate the sleep respiratory disturbances in children with Pierre-Robin sequence with minor clinical symptoms of disease; To assess the influence of surgical treatment using the compression-distraction osteogenesis on sleep breathing.

**Materials and methods:** 14 children aged from 3 to 11 months were investigated. The first group of 7 children had minor clinical symptoms. The function of breathing in sleep in pre-operative period was estimated in this group. In the second group of 7 children respiratory function after surgery was assessed. A sleep study was conducted using the cardiorespiratory monitoring and polysomnography. Surgical treatment using the method of Distraction osteogenesis (DO) of both parts of mandible was performed.

**Results:** The obstructive sleep Apnoea, with domination of the moderate and severe degree where Apnoea/Hypopnea Index (AHI)  $17,45 \pm 14,6$  was registered in 6 children in the first group. The average level of blood saturation was  $97 \pm 0,6\%$ , but were registered episodes of pronounced oxygen desaturation up to  $84 \pm 9\%$

In the second group after the surgical treatment OSA was not registered in 5 (71,4%) children, mild OSA was registered in 1 (14,3%) child and 1 child (14,3%) had severe OSA. At most of children AHI wasn't more than 1,5 episode/hour, the average blood saturation during sleep was  $98,5 \pm 0,3\%$ , the peak value of desaturation was not below 90%. The structure of sleep during polysomnography was characterized the right balance of NREM and REM sleep and no reaction of EEG arousal. A child with severe OSA continued orthodontic treatment.

**Conclusions:** All children with Pierre Robin Sequence require examination of sleep at night independently of the clinical manifestations. Postoperative overnight sleep examination clearly demonstrates the efficiency of the surgical treatment by removal of sleep respiratory disorders in children with Pierre Robin Sequence.

### O-1203

#### OUR EXPERIENCE IN THE MANAGEMENT OF PIERRE ROBIN SEQUENCE

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Pierre Robin Sequence is a defined chain of events of the fetal development leading to an acquired malformation characterized by micrognathia, glossoptosis and upper airway obstruction. Cleft palate, is present in the majority of patients, and is commonly U-shaped. These patients at birth may present mild to severe obstructive sleep apnoea with respiratory distress. Sometimes feeding represents a pathologic issue too mainly due to gastroesophageal reflux.

International literature provides different treatment options. At the present time there are no recognised international guidelines. Recommended protocols include prone positioning, prolonged intubation, tongue-lip adhesion and tracheotomy. Distraction osteogenesis of the mandible has recently been added to the management of PRS.

Our protocol is based upon the following elements: at birth if the micrognathia is relevant and there is airways narrowing we use to schedule the patient for a sleep report and CT scan (low dose) to collect data on Obstructive sleep Apnoea and airway actual volume.

At first there are few rules that we teach the parents such as: side-lying or prone positioning to improve the airways space. Feeding should be fractioned to minimize the effort.

An appliance is made to seal the palate and to reposition the tongue in order to stimulate mandibular protrusion. Sometimes due to the severity of the respiratory distress, orotracheal intubation is needed. When necessary, we perform surgical lengthening of the mandible as soon as possible. Our treatment is based on mandibular external distraction.

The authors present their experience in the management of Pierre Robin Sequence.

#### O-1204

### THREE-DIMENSIONAL ANALYSIS OF AIRWAY SPACE AND OF MANDIBULAR MORPHOLOGY IN PIERRE ROBIN SYNDROME WITH CONE BEAM COMPUTED TOMOGRAPHY: A PILOT STUDY.

*Raphael Olszewski<sup>1,\*</sup>, Timothée Dontaine<sup>1</sup>, DeCooman Sophie<sup>1</sup>, Benedicte Bayet<sup>1</sup>, Thierry Duprez<sup>1</sup>, Hervé Reychler<sup>1</sup>*

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Pierre Robin sequence (PRS) consists of retromicrognathia, glossoptosis, sleep Apnoea and can also be associated with cleft palate. Controversies still exist about diagnosis, management, and the mandibular catch-up growth in PRS patients.

The aim of our study was to evaluate for the first time in three dimensions (3D) the airway space and mandibular morphology in PRS comparatively to a non syndromic control group patients in a pre-orthodontic treatment period of time. We analyzed 9 PRS patients (mean age: 7 years old) which had cleft palate surgery in the first week of life performed by the same surgeon with the same technique. Cone beam computed tomography (CBCT) (I-CAT, with 0.3 mm slice thickness reconstruction) was performed for PRS patients after local ethical committee approval. The control group consisted of 15 patients (mean age: 10 years old) for whom a CBCT was already performed for other reasons. 3D Slicer software (SPL, Harvard Medical School, USA) was used for the semi-automatic segmentation of the airway space for both groups.

Two independent observers made semi-automatic segmentations twice, for each patient with one week time between the two series of measurements. Airways volume (in mm<sup>3</sup>) was automatically measured by the software. We also developed a 3D cephalometric analysis with Maxilim software (Medicim, Mechelen, Belgium) to evaluate a 3D mandibular morphology. It consisted of 20 landmarks, 4 planes, and 23 measurements. Two independent observers made 3D cephalometric analysis twice for each patient, with one week time between the two series of measurements.

There was no statistical difference for intra- and inter-observer measurements between PRS and control group for the airway space volume.

#### O-1205

### AN ORTHODONTIC-ORTHOGNATHIC CONCEPTUAL APPROACH TO OSAS SURGERY: OUR EXPERIENCE AND RESULTS

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In 1983 Powell and coauthors described the first mandibular advancement to treat OSAS and subsequently they advocated simultaneous maxillary and mandibular advancement (MMA) in an attempt to improve results. This surgical approach has been shown repeatedly to be a highly effective therapy for OSAS (long-term success in 90-100% of cases), not only in patients with maxillo-mandibular deficiency, but also in OSAS patients without dysmorphic anatomy with the same positive outcomes.

A lot of caucasian OSAS patients have maxillo-mandibular discrepancy, especially mandibular retrusion. In these patients asymmetry of maxillo-mandibular complex is not rare and they often present with an Angle class 2 occlusion. Nevertheless the irregular teeth occlusion with loss of contacts between the teeth could compromise the occlusal stability after surgery. The aesthetic appearance of a patient, who exhibits normal craniofacial skeletal morphology, will get worse after surgery, with a biprotruded profile. The planning of the surgery must be focused on the enlargement of the upper airways, but the surgeon has also to consider the aesthetic result, aiming to the lower degree of deterioration. Concerning the efforts to minimize the aesthetic impairment, pre surgical orthodontic treatment and, subsequently, orthognathic surgery may improve the aesthetic and functional treatment results. The Authors describe their approach to OSAS presenting a 40 patient series. Maxillo-mandibular advancement as described in literature concern the forward reposition of maxillo-mandibular complex preserving the personal dental occlusion. According to this approach a second class deep bite short face OSAS patient will become, after surgery, a second class deep bite short face in forward position. Using the continuous positive airway pressure (CPAP) support during presurgical orthodontic preparation we can spend time to normalize dental arches form and compensation in order to obtain the best skeletal position with a good dental occlusion. Also eumorphic patients may benefit from presurgical orthodontic treatment, the orthodontist may plan the best occlusion according with the maxillo-mandibular advancement. It entail a more stable dental occlusion which itself fights against the deterioration trend of the surgical result. Pre-surgical orthodontic treatment qualifies orthognathic surgery even in OSAS patients.

**O-1206****IMPROVEMENT OF OBSTRUCTIVE SLEEP APNOEA SYNDROME AFTER MIDFACE AND MONOBLOC DISTRACTION OSTEOGENESIS IN CHILDREN WITH SYNDROMIC CRANIOSYNOSTOSIS**

*Marta Redondo Alamillos<sup>1,\*</sup>, Ingrid Trujillo Ramos<sup>2</sup>, Ana Isabel Romance García<sup>1</sup>, Igancio García Recuero<sup>1</sup>, María Isabel Falguera Uceda<sup>1</sup>, Carmen Luna Paredes<sup>1</sup>, Gregorio Sánchez Aniceto<sup>1</sup>*

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**Introduction:** Obstructive sleep Apnoea (OSA) is the most common type of breathing sleep disorder associated to syndromic craniosynostosis, and is characterized by recurrent episodes of upper airway collapse during sleep with a reduction in blood oxygen saturation, sleep arousals and raise of intracranial pressure. If it is not diagnosed early and sufficiently treated, it may result in cardiorespiratory and neurodevelopment consequences. Almost 50% of patients with Crouzon, Apert or Pfeiffer syndrome develop OSA due to midface and mandible hypoplasia, mainly during the first 6 years of life. According to its severity, treatment options consist of adenotonsillectomies, continuous positive airway pressure, midface advancement, mandible distraction osteogenesis or temporary tracheostomy. The aim of this paper is to show our outcomes after monobloc and midface distraction osteogenesis procedures, changing the upper airway space and hence improving OSA syndrome associated to these patients.

**Patients and methods:** We present a retrospective study of 32 patients with syndromic craniofacial synostosis operated in our Craniofacial Surgery Unit between 2002 and 2011, (16 patients with Crouzon syndrome, 12 with Apert syndrome and 5 with Pfeiffer syndrome), all of them with severe midface hypoplasia and OSA detected by polysomnography, who underwent midface advance by Monobloc or Le Fort III osteotomies and distraction osteogenesis.

**Results:** Midface advancement with distraction osteogenesis had a good respiratory outcome in the short term in all patients measured by postoperative polysomnography. However, in 5 out of 32 children, there was an OSA syndrome relapse in the long term, that needed complementary procedures like adenoidectomy, CPAP or mandible distraction techniques. In 4 of the 6 patients with previous tracheostomy, this could be removed after surgery and in the last two the tracheostomy was preserved occluded in order to plan further surgeries during the next year.

**Conclusions:** In conclusion, monobloc and midface distraction osteogenesis are useful and long term stable procedures, with low morbidity rate for the treatment of obstructive sleep Apnoea in children with syndromic craniosynostosis. Nevertheless, accurate diagnosis and multidisciplinary management and treatment are essential to improve the respiratory condition of these patients.

**O-1207****ONDINE'S SYNDROME : PROPOSAL OF A PROTOCOL**

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Onndine's Syndrome, or Congenital Central Hypoventilation Syndrome (CCHS), is a rare disorder distinguished by an abnormal ventilatory response to hypoxia and hypercapnia, due to a failure in the autonomic control of breathing.

So far, CCHS may be considered as a chronic disease, since no drug was effective in stimulating respiratory function; therefore, positive pressure ventilatory support, with nasal mask or tracheostomy, represent the only possible treatments for CCHS affected children.

Our workgroup was involved with paediatricians and neonatologists, who manage a significant number of children affected with this syndrome in our country, because some of these patients show a marked hypoplasia of the midface, mostly those treated by nasal mask.

Current literature does not give good information concerning facial growth in CCHS patients, who in some cases develop a severe class III dento-facial deformity, so that orthognathic surgery is necessary. On the other hand, some less severe cases may be treated by orthopaedic and orthodontic approach.

From these observations arises the necessity to increase the frequency and standardization of follow up in CCHS affected children, in order to collect data concerning their facial growth and possibly to detect the aetiology of their dysmorphism.

Our purpose is to create a systematic dental and orthodontic follow up protocol, based on the collection of standardized photographic and lateral cephalometric records, in order to obtain facial growth reference values in CCHS patients and to establish an appropriate treatment supported by a correct scientific approach.

**O-1208****MAXILLO-MANDIBULAR ADVANCEMENT FOR ADULT OBSTRUCTIVE SLEEP APNOEA SYNDROME: INDICATIONS, TECHNIQUES AND RESULTS**

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**Introduction** Continuous positive airway pressure therapy (CPAP) is the first line treatment for patients with Obstructive Sleep Apnoea Syndrome (OSAS). An alternative approach to CPAP is the upper airway surgery. Different surgical approaches have been proposed in the literature: tracheostomy, uvulopalatopharyngoplasty, hyoid suspension, partial glossectomy, lingual suspension, tongue base resection, genioglossus advancement and maxillo-mandibular advancement (MMA). MMA is currently the most effective surgical treatment for the management of OSAS in adults. In this work we report the long term results obtained after MMA in a group of adult patients affected by OSAS.

A group of 16 patients were studied before surgery, at six months after surgery and at long term follow up. Analysis included: upper airway endoscopy during Mueller's manoeuvre, lateral cephalometry, polysomnography and Epworth Sleepiness Scale (ESS). The results of OSAS

surgical treatment were divided into "surgical success" and "surgical cure". Surgical success is defined as an AHI < 20 events/hour and a > 50% reduction in AHI after surgical procedure. Surgical cure is defined as an AHI < 5 events/hour after surgical procedure.

**Results:** For the cephalometric skeletal measurements (SNA and SNB) no statistically significant changes ( $p > 0,001$ ) were noted. These data confirmed the long-term skeletal stability. The posterior airway space (PAS) was increased in length from 3,73 mm (DS 2,1 mm), preoperatively, to 9,7mm (DS 2,7 mm) ( $p < 0,001$ ), postoperatively. At follow-up all patients had AHI < 20 events/hour with a "surgical success" rate of 100%. The surgical cure rate was 37,5%, with 6 patients affected by AHI < 5 events/h. The ESS score had a statistically significant reduction ( $12.93 \pm 1.69$  vs.  $2.56 \pm 1.99$ ) ( $p < 0,001$ ),

**Conclusion:** OSAS is a chronic disease, so the treatment goal is control of symptoms and control of OSAS related risks by reducing the severity of the disorder. Surgical success and long term stability of outcomes confirm the efficacy and safety of MMA for treatment of OSAS.

#### O-1209

##### **SURGICAL TREATMENT OF OBSTRUCTIVE SLEEP APNOEA.**

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**Introduction:** Sleep Apnoea Syndrome is characterized by repeated collapse of the upper airway related to excessive snoring, morning fatigue and witnessed Apnoeas.

OSAHS affects approximately 2 to 5% of the population, frequently presented in ages of 40 to 60 years, with major prevalence in males with 25% and females with 10%.

It has been shown to be associated to obesity, retrognathia, hypothyroidism, nasal obstruction, diabetes and cardiovascular diseases.

Its diagnosis is mainly based in the correct location of the collapse of the airway using polysomnography, nasofibroscopy and image studies (CT, MR) to determine its severity and complexity.

The treatment can be non-surgical, CPAP (continuous positive airway pressure) still being considered to be the gold standard, and the surgical treatment with different techniques to improve the compliance.

**Objective:** Evaluate the surgical treatment results, taking as parameters the sleep Apnoea episode reduction by polysomnography, increased the airway surface and daytime sleepiness, with a follow-up time of 6 months.

**Patients and method:** An assessment is made to 3 patients previously diagnosed with OSHAS that did not tolerate treatment with CPAP. Cephalometric studies and imaging studies are performed and appropriate surgical planning and treatment performed, thus making a bimaxillary advancement, uvulopalatopharyngoplasty and rhinoseptoplasty to the 3 patients.

**Results:** An assessment made by polysomnography using Apnoea and hypopnea index (AHI), demonstrating a significant improvement along with increase of the upper airway, evidenced by imaging studies. Meanwhile, an evaluation of the symptoms of, and apnoeic episodes during the hours of sleep are performed and followed for six months.

#### O-1210

##### **SOFT TISSUE CHANGES AFTER MAXILLOMANDIBULAR ADVANCEMENT IN OSAS PATIENTS: A THREE-DIMENSIONAL STUDY.**

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**Introduction:** Quantifying soft tissue changes after orthognathic surgery is increasingly important in surgical planning, but little is actually known about the changes in facial appearance after maxillomandibular advancement (MMA) in patients with Obstructive Sleep Apnea Syndrome (OSAS). In the current study, we investigated soft tissues in OSAS patients before and after MMA.

**Patients and Methods:** Ten patients with severe OSAS, who underwent MMA, were considered. Age, RDI, ODI and cephalometric data were examined. In addition, facial surface data were acquired using a three-dimensional (3D) laser scanner before (T0) and one year (T1) after surgery. Scan data at T0 and T1 were pooled by electronic surface averaging to obtain the mean pre and post-treatment facial model. A virtual optimal face (V) was constructed by averaging the scans of 40 healthy adult men. Different linear measurements and shell-to-shell deviation were then calculated for comparison of the mean T0 and T1 models. The mean post-surgical face was also compared with V.

**Results:** Ten males (age range 33 to 60 years) were studied. The mean RDI improved from  $74.08 \pm 34.49$  to  $10.34 \pm 7.2/h$ ; the mean ODI improved from  $59.5 \pm 25.34$  % to  $9.11 \pm 8.05$  %. The mean maxillo-mandibular advancement was 10.3 mm. Measurements at T0 and T1 documented that the major post surgical changes were in the lower area of the face. The comparison of facial surface at T0 and T1 showed an overall increase of the sagittal projection of the cheeks, lips and of the chin. After treatment, the distance between alr (right alar crest point) and all (left alar crest point) increased. The comparison of the mean T1 model and V only demonstrated a transversal increase of the post-treatment facial model at the cross section through ch; sagittal measurements showed no significant differences.

**Conclusion:** MMA is a highly effective treatment for OSAS. Despite significant maxillomandibular advancement, our evaluations of 3D laser scanning showed that surgery in OSAS patients can detect great post-treatment changes on soft tissues, without an impairment of the facial appearance.

**O-1211****LE FORT I/II/III DISTRACTION OSTEOGENESIS USING TRANSPALATAL APPROACH FOR SYNDROMIC CRANIOSYNOSTOSIS**

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Midface distraction osteogenesis (DOG) for syndromic craniosynostosis has become a standard of care. There have been many reports regarding Le Fort III DOG. But Le Fort III alone has its limitations, so we have developed combined Le Fort II and/or I/III DOG using transpalatal approach. Between 1996 and 2011, we have performed 27 Le Fort III and/or II distraction osteogenesis using transpalatal approach; twenty-two Le Fort III, 3 Le Fort II and 2 Le Fort III/II advancement, comprising 13 Crouzon, 10 Apert, 2 Pfeiffer syndrome and 2 others. Our transpalatal approach is as follows.

We remove the palatine bone and peel off the lateral wall of the nasal cavity to expose the posterior margin of the inferior conchal base. Then we fenestrate the inferior nasal meatus, and make osteotomy of the posterior wall of the maxillary sinus and pterygomaxillary disjunction

*Results:* Using this new type of transpalatal approach, we performed pterygomaxillary disjunction and osteotomy of the medial and posterior wall of maxillary sinus under direct vision. Proptosis was lessened and facial proportions were significantly improved in all patients. No major complications attributable to our original methods have been encountered.

*Discussion:* Transpalatal approach is advantageous because it can preserve maxillary molar tooth germ, which is of paramount importance in young patients.

Le Fort II DOG is indicated for the cases with maxillary hypoplasia and short nose deformity who have no or slight exophthalmos. In addition, Le Fort II DOG can be performed together with Le Fort III when there is a big difference between (i) the distraction vector of orbital rim for improving exophthalmos and (ii) that of occlusal plane for improving anterior cross bite and/or open bite. When there is a big difference between (ii) and (iii) the distraction vector for improving the nasal deformity of short nose or saddle nose, Le Fort I DOG can be performed together. *Conclusions:* the Transpalatal approach is safe and beneficial in the treatment of syndromic craniosynostosis. Each patient has its own characteristics, so we have to work on the treatment on case-by-case basis by combining proper osteotomies rather than single osteotomy.

**O-1212****DOES HELMET THERAPY INFLUENCE THE EAR-SHIFT IN POSITIONAL PLAGIOCEPHALY?**

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*Introduction:* Helmet therapy is widely accepted in the treatment of severe positional plagiocephaly. The im-

provement of cranial asymmetry under therapy is evident but parents are also concerned about the ear-shift. Our study investigated the influence of helmet therapy on the position of the ears and analyzed the reliability of clinical observations regarding cranial asymmetry and ear-shift.

*Material and Methods:* 3D-stereophotogrammetry of 80 infants with severe positional plagiocephaly was performed before and after helmet therapy. The cranial vault asymmetry index (CVAI) and ear-shift were measured and statistically compared. The correlation between the change of CVAI and ear-shift was investigated. Three surgeons visually evaluated the treatment results on 3D-images independently with a standard questionnaire. The results were compared with the 3D-measurements.

*Results:* 60 infants showed a relevant initial ear-shift. Under therapy the shift was improved significantly by a mean of 29.8% ( $p < 0.0001$ ). We found no strong linear correlation between the changes of the CVAI and the ear-shift. Analysis of the questionnaire revealed a good correlation between the clinical impression and 3D-measurements for the head asymmetry, while observations regarding changes in the ear-shift were not reliable.

*Conclusion:* Helmet treatment significantly improves an initial malposition of the external ear in infants with positional plagiocephaly. A severe ear-shift can be associated with a moderate CVAI and vice versa. In contrast to the CVAI small changes of the ear-shift cannot be evaluated reliably by clinical investigation.

## Session 13. CLEFT SURGERY I.

### O-1301

#### LONG TERM MANDIBULAR EFFECTS OF MAXILLARY DISTRACTION OSTEOGENESIS IN CLEFT LIP AND PALATE

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**Objective:** Maxillary distraction osteogenesis (DO) is a reliable treatment of severe maxillary deficiency in cleft lip and palate (CLP). The objective was to analyze its long-term effect on the mandible.

**Methods:** This is a retrospective study of 28 CLP operated for maxillary DO using the Polley and Figueroa technique, of which 24 were followed for more than 4 years. Pre-operative (T0), 6-12 months postoperative (T1), and ≥4 years postoperative (T2) cephalometric radiographs were evaluated. The classical Steiner cephalometric analysis was used to assess the treatment stability, and a Procrustes analysis was performed to assess local changes in the shape of the mandible.

**Results:** At T0, the mean age was of 15.4±4.1 years. The SNA increased at T1 and T2 (P

**Conclusion:** Maxillary DO in CLP has no significant effect on the shape and rotation of the mandible. The maxillary advancement remains stable after 1 year.

### O-1302

#### LONG-TERM FOLLOW-UP OF PATIENTS WITH UCLP/BCLP REGARDING SKELETAL RELATIONSHIP

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**Introduction:** Severe growth disturbance of the maxilla in patients with clefts of lip, alveolus and palate can require orthognathic surgery in adulthood. The aim of this study was to explore the number of patients with clefts in our clinic who needed orthognathic correction and to compare these numbers with international data.

**Patients and methods:** 35 patients with complete UCLP/BCLP (syndromes were excluded) borne between 1983 and 1991 were reviewed after treatment at the Department of Oral and Maxillofacial Surgery in Salzburg, Austria according to the following uniform protocol: Presurgical passive orthopaedics ("Hotz"-plate), lip repair at six months, soft-palate repair at 18 months, hard-palate repair at 5-6 years and bone-grafting at 9-10 years followed by orthodontic treatment.

In this follow-up all patients underwent the following evaluations: cephalometric analysis and dental cast analysis /clinical assessment (Goslon Yardstick) at an age of

5,10,15 and 20 years.

**Results:** The results are demonstrated in detail. In 4 patients orthognathic surgery had to be performed, so the osteotomy-rate in this follow-up was only 11,4 percent. In literature frequency of maxillary advancement in patients with complete UCLP/BCLP is reported at an average of 20-25% (with a minimum of 6% and a maximum of 70%).

### O-1303

#### MAXILLARY ADVANCEMENT BY TOOTH -BORNE DISTRACTOR IN CLEFT PALATE PATIENTS WHO SUFFERING FROM SEVERE NASAL SPEECH

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**Purposes:** Recently, distraction osteogenesis (DO) has opened a new perspectives for management of severe maxillofacial deformities . The main advantages of DO compared with traditional methods of craniofacial reconstruction are the ability to generate new bone and a reduced morbidity rate. Velopharyngeal insufficiency is a common finding in cleft palate patients which is challenging for maxillofacial surgeons to improve or eliminate. Most cleft patients will show speech side effect after Le Fort I surgery and it seems in patients with severe nasal speech this status might be worsened by Le Fort I, therefore we suggested maintaining the velopharyngeal area intact. The aim of this article is to report a clinical study on four cases by using hyrax application for maxillary advancement in cleft lip and palate patients.

**Materials and methods:** Four young cleft lip and palate boys with maxillary deficiency who suffered from severe nasal speech were selected. First a space created between first and second molar by orthodontist, then a modified Le Fort I osteotomy was done and a Hyrax application was mounted. After an interval period they were instructed to turn the screws twice per day. The device was activated regularly to achieve maximum advancement

**Results:** The preliminary results showed that there was an increase in SNA angle and patients hypernasality was comprehensively improved.

**Conclusion :** Within the limitation of this clinical study the results showed that it is helpful to maintain the velopharyngeal area intact in cases with severe hypernasality problem, but further investigation is required.

### O-1304

#### MAXILLARY DISTRACTION OSTEOGENESIS IN CLEFT LIP AND PALATE PATIENTS

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Maxillary retrognathia in cleft lip and palate patients (CLP) is a frequent finding and often requires surgical

treatment for normalization of the facial proportions. The tendency of relapse is increased in CLP patients due to scarring of the soft tissue envelope. Distraction osteogenesis (DO) has been shown to minimize the relapse tendency.

**Aim:** To evaluate the skeletal stability of DO in 13 CLP patients with a follow-up of more than one year (1-5y).

**Material and Methods:** 13 consecutive CLP patients were planned for maxillary DO by use of a standard treatment protocol: 1) orthodontic treatment, cephalometric planning, 2) surgical simulation and preformation of internal distraction devices on 3D models, 3) surgery with insertion of devices with use of guiding splints, 4) distraction 0.5 -1 mm/day starting 5-7 days after surgery, 5) 3 months consolidation with use of wafer and interarch elastics, 6) removal of distraction devices. The position and stability of the maxilla was evaluated clinically and by cephalometry on serial identical lateral cephalograms.

**Results:** The planned length of distraction was obtained in all cases (mean advancement 9.5mm). At the latest follow-up (mean 34 months) no significant changes of the position of the maxilla was measured. All patients maintained a neutral occlusion and no patients needed additional orthognathic surgery. Only few adverse reactions were observed and the treatment was well tolerated by the patients.

**Conclusion:** DO in CLP patients is a predictable and safe method for advancing the maxilla. A stable position and few complications were found.

#### O-1305

### 3D STEREOPHOTOGAMMETRIC ANALYSIS OF LIP AND NASAL SYMMETRY AFTER PRIMARY CHEILOSEPTOPLASTY IN COMPLETE UNILATERAL CLEFT LIP REPAIR

*Bram van Loon<sup>1,\*</sup>, Srinivas Reddy<sup>2</sup>, Niels van Heerbeek<sup>1</sup>, Koen Ingels<sup>1</sup>, Thomas Maal<sup>1</sup>, Wilfred Borstlap<sup>1</sup>, Rajgopal Reddy<sup>2</sup>, Anne-Marie Kuijpers-Jagtman<sup>1</sup>, Stefaan Berge<sup>1</sup>*  
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**Objectives:** The aim of this study was to assess the outcome of lip and nasal symmetry with the help of 3D stereophotogrammetry in a group of patients with complete unilateral cleft lip and palate (CUCLP) after complete cleft lip correction in combination with a primary septoplasty using the Afroze incision and to compare these data with a group of healthy control subjects.

**Materials and Methods:** In this prospective study forty-four patients with operated non-syndromic CUCLP were included. The control group consisted of 44 volunteers without cleft defects of approximately the same age and sex. Primary septoplasty was performed in conjunction with the cleft lip (CL) repair using the Afroze incision. 3D facial images were acquired using 3D stereophotogrammetry. After a 3D cephalometric analysis of the lip and nose was performed in both groups, linear and volumetric data were acquired. Lip and nose symmetry were calculated and compared using Student's t-tests as well as the Chi square test.

**Results:** For all measurements (nostril sagittal length, nostril transversal length, vertical philtrum length, horizontal philtrum length and volume) the control group was

up to 36% closer to perfect symmetry compared to the CUCLP group after primary surgery. This difference was statistically significant ( $P < 0.05$ ).

**Conclusion:** After primary cheiloseptoplasty according to the Afroze technique in patients with CUCLP, asymmetry in the nose and lip area still exists as compared to non-cleft controls. Although non-cleft individuals also show some degree of asymmetry the results of this study stress the difficulty in obtaining near normal symmetrical relations.

#### O-1306

### SAGITTAL MAXILLARY GROWTH IN UNILATERAL CLEFT LIP AND PALATE PATIENTS FOLLOWING FUNCTIONAL SURGERY: A COHORT STUDY

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The aim of the study was to compare the sagittal maxillary growth between unilateral cleft lip and palate patients operated under functional criterion at the age of 6 months in mixed and permanent dentition. Delaire's Architectural and Structural craniofacial analysis in conventional lateral radiographs of all the patients with an age range of 7-12 years and in the same group of patients eight years later was performed, determining the sagittal maxillary growth by the anterior maxillary pillar angle (C1/F1). These measurements were analyzed using the T-test with a 99.5 % significance. The real and expected value of the anterior maxillary pillar angle was determined in all cases, which indicates the maxillary development in the sagittal sense. By comparing the results statistically, no significant differences were found in the mean values obtained. In conclusion, the maxillary sagittal growth expected in unilateral cleft lip and palate patients operated at the age of 6 months under functional criterion is maintained over the years. The results indicate that it is possible to avoid or greatly reduce the sagittal underdevelopment of the mid face when a functional surgery technique is used.

#### O-1307

### EFFECT OF TENSOR VELI PALATINI PRESERVATION OR TRANSECTION IN CLEFT PALATE REPAIR ON THE EUSTACHIAN TUBE FUNCTION

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**Introduction:** The function of the Eustachian tube is still not completely understood. However, its opening mechanism is mainly determined by the Musculus tensor veli palatini. In soft palate repair according to Kriens the tendon is regularly transected or the pterygoid hamulus fractured. Both methods may impair Eustachian tube function.

**Patients and Methods:** In a retrospective review 45 infants



underwent cleft palate repair according to the modification of Summerlad at the age of 7.2 months ( $\pm 72$  days) with or without tensor tendon transection. 38 infants were treated with tensor tendon transection (group 1), 7 infants without (group 2). There were 23 isolated cleft palate children in group 1, 5 children in group 2. All other patients suffered from cleft lip and palate. All children had audiometry pre- and post-operatively (mean 148 days post-operatively)

**Results:** In group 1 (with tendon transection) 27 infants suffered from middle ear effusion preoperatively, at the time of the postoperative control audiometry still 6 infants. This represents a reduction of the incidence from 71% to 16%. In group 2 (without tendon transection) 3 infants had an effusion preoperatively, at the time of the control audiometry none. This represents an incidence of 43% preoperatively and 0% postoperatively. At the time of the control audiometry in group 1 20 children (52%) needed myringotubes, in group 2 only 2 children (28%).

**Discussion:** In 2010 Flores et al. reported a significantly improved function of the middle ear in cleft children after preservation of the tensor veli palatini. These positive results prompted us to operate more conservative and to preserve the tendon as well. Our results also indicate that this method may influence middle ear function positively.

#### O-1308

##### INCIDENCE OF RESIDUAL ORONASAL FISTULAS: A 20 YEAR EXPERIENCE

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**Objective:** The purpose of our study was to determine the incidence and the most frequent anatomical locations of residual oronasal fistulas in children with different types of clefts who were treated at the University Department of Maxillofacial and Oral Surgery in Ljubljana.

**Design:** The study involved a retrospective analysis of 857 consecutive cleft patients born between 1984 and 2003.

**Results:** After primary surgical repair, 33 out of 857 (3.9%) children had residual oronasal fistulas. The incidence of clinically significant fistulas that required surgical repair was 17 out of 857 (2.0%). In UCLP, BCLP and CP children, the incidence of palatal fistulas was 23 out of 644 (3.6%), while those with clinically significant palatal fistulas was 12 out of 644 (1.9%). Oronasal fistulas were most frequently found in children with BCLP or 9 out of 88 (10.2%), followed by UCLP or 12 out of 215 (5.6%) and CP children at 12 out of 341 (3.5%). No fistulas were found in CL±A children. In 10 cases (30.3%), the oronasal fistula remained in the alveolar ridge, in 11 cases (33.3%) in the anterior part of the hard palate, and in 11 cases (33.3%) at the junction of the hard and soft palates. In one case (3%), the records were lost.

**Conclusion:** The low incidence of oronasal fistulas is the result of a surgical technique and tensionless suturing, followed by a two-layer closure, two-stage palate repair in BCLP and UCLP patients and preoperative orthopaedics in UCLP cases.

**Keywords :** oronasal fistula, palatal fistula, cleft palate

#### O-1309

##### SIMULTANEOUS THREE LAYER CLOSURE OF THE VESTIBULONASAL FISTULA , CHELOPLASTY AND RHINOPLASTY IN CLEFT LIP NOSE DEFORMITY PATIENTS

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**Aim :** The aim of this work is to study the possibility of one stage correction of the deformed lip and the deformed nose together with three layer closure of the associated vestibulonasal fistula in cleft lip nose deformity patients.

**Patients:** This is a prospective study of 40 patients who had cleft lip nose deformity and associated vestibulonasal fistula . 22 were males and 18 were females. Their mean age at the time of surgical intervention was 10 years. One stage surgical correction of the deformities was done.

**Results:** The aesthetics markedly improved in all patients . There were no serious complications of the skin or the mucosal flaps. All the fistulae sites healed properly . The deformed cartilage gained its symmetry. Partial loss of the bone graft from a partial dehiscence in the buccal mucoperiosteal flaps occurred in three patients without affecting the final stability of closure and without recurrence of the fistula .The bone defect completely ossified by the end of the sixth postoperative month. The overall results were stable and most patients were satisfied.

**Conclusion:** Cleft lip nose deformity patients who have associated vestibulonasal fistula should be surgically corrected all in one act without a need to postpone any.

**Keywords:** Cleft lip nose deformity - Oronasal fistula

#### O-1310

##### TWO STAGE PALATOPLASTY USING A MODIFIED FURLOW PROCEDURE

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**Objective:** To evaluate speech outcome, reduce the width of cleft palate, eliminate fistula formation and evaluate maxillary growth, after two-stage palatal repair using a buccal myomucosal flap (BMF) in combination with our modification of Furlow palatoplasty (MFP) in wide palatal clefts.

**Patients and Method:** In a prospective, successive cohort study, 40 nonsyndromic patients with wide cleft palate were operated between March 2001 and June 2006 by a single surgeon. Ten patients in the first cohort underwent an MFP (control group). In thirty patients in the second cohort a unilateral BMF was used to achieve a tension-free closure of the oral layer of the soft palate in combination with MFP (study group). The hard palate was closed in both groups in two layers one year after soft palate reconstruction.

**Result:** Speech quality score based on the Bzoch test was superior in the study group. Hypernasality was significantly reduced in the study group, and nasometry showed significantly significant improvement. Overall fistula formation was 0 %. At the time of hard palate reconstruction palatal cleft width was significantly reduced. Relative short-term follow up of maxillary growth was excellent.

Except for a single partial wound dehiscence in one case, there were no postoperative haematomas, infections, or episodes of airway obstruction.

*Conclusion:* This technique is particularly encouraging, because of better speech outcome, absence of raw surfaces on the soft palate, no fistula formation, a good maxillary growth, and a low postoperative complication rate. Further follow-up is necessary to determine the long-term effects on facial development.

#### O-1311

##### REVERSE FORK FLAP FOR BILATERAL CLEFT LIP RECONSTRUCTION

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*Introduction :* Lip reconstruction of bilateral cleft lip is generally difficult, and many bilateral cleft lip patients undergo multiple lip repair operations before treatment completion. We have developed a “reverse fork flap” for secondary bilateral cleft lip repair. *Objectives:* The purpose of this paper is to present our newly developed technique and discuss its efficacy for the treatment of bilateral cleft lip. *Materials and Methods:* Between April 2004 and December 2011, a reverse fork flap was applied to three cases; one case was secondary case of bilateral cleft lip and the other two were Binderoid cleft lip and palate who underwent one stage repair of cleft lip and palate and secondary revision of lip/nose using a reverse fork flap at our department before school age. The fork flap is designed reversely to the conventional fork flap and cleft lip and external nose repair is performed using three V-Y advancements with elongation of columella. *Results:* Postoperative course of all the cases is satisfactory without any complications. *Conclusion:* This method is indicated for bilateral cleft lip deformity, and it can also be applied to unilateral cleft lip with large alar nasal width and shallow philtrum. The advantages of this method are (1) little relapse (2) simultaneous philtrumplasty is feasible, which was performed separately using lambda Abbe flap before (3) advancement of white lip is possible by V-Y advancement and (4) nasolabial junction can be adjusted naturally. On the other hand a disadvantage is that there may be some cases in which this method cannot be indicated due to the primary surgical method. It is suggested that our reverse fork flap is effective in secondary repair of bilateral cleft lip deformity.

#### O-1312

##### TRANSORAL ROBOTIC SURGERY IN CLEFT PALATE RECONSTRUCTION

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Reconstructing of the palatal cleft is very demanding when it comes to the precise dissection of the palatal muscles, their reorientation and repair. This is not only technically difficult, but is also ergonomically challenging for the surgeon. To overcome these challenges the da Vinci Surgical System was used. Although robots have been around

for many years, their use in medical field has increased only in the last few years. Although there have been some reports in the literature on transoral robotic surgeries (TORS), to our knowledge there are no reports on robotic surgery in cleft patients. Our clinical experience in the use of da Vinci surgical system in the reconstruction of hard and soft palate are discussed in this presentation. Based on our experience, the following advantages can be mentioned. It allows the surgeon a true 3-dimensional endoscopic vision of the surgical field with accurate depth perception. It enhances the limited visualization of the 2-dimensional and line-of-sight microscope which improves the quality of micro-dissection. The degree of motion (flexion, extension, supination, pronation) is more than that of the human hand during open surgery. However there is a big learning curve due to the absence of tactical stimulus that has to be compensated by the visual perception. Furthermore, the high cost of acquisition, maintenance, and its size are among the drawbacks of the robotic system. This is just a preliminary report, and the procedure needs to be performed widely to prove its safety and efficacy.

## Session 14. SURGICAL HEAD AND NECK ONCOLOGY II

### O-1401

#### CLINICAL AND MOLECULAR CORRELATION IN YOUNG PATIENTS WITH ORAL SQUAMOUS CELL CARCINOMA

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**Background:** The aim of this study was to compare the biomolecular profiles and risk factors of young and old patients with oral squamous cell carcinoma. Particular attention is posed on p16INK4A and Human papilloma virus (HPV) infection as possible prognostic markers.

**Methods:** A series of 119 patients with oral squamous cell carcinoma was divided into two main groups: group 1 comprised patients younger than 45 years (21 cases) while group 2 consisted in patients older than 45 years (98 cases). For each group we analyzed risk factors (alcohol and smoke), p16INK4a and HPV positivity. Immunohistochemical staining was performed for p16INK4a and polymerase chain reaction (PCR) for HPV detecting.

**Results:** In group one, 7 (33%) patients were without risk factors, and among them 3 (42%) overexpressed p16INK4a whereas HPV positivity was observed in 5 (71%). The remaining 14 (66%) patients of group 1 with risk factors overexpressed p16INK4a only in 2 cases (14%) while were HPV positive in 7 cases (50%). The group two regardless of risk factors overexpressed p16INK4a in 21% and were HPV positive in 65% of cases.

**Conclusions:** p16INK4a overexpression and HPV positivity were observed in our cohort of young patients with no risk factors in contrast with old patients and young patients with risk factors who hypoexpressed p16INK4a despite a high rate of HPV infection, demonstrating biomolecular difference between tumours in young and old patient. Based on this finding, p16INK4a expression status could represent a prognostic factor while HPV positivity seems useless. Additional work is needed to advance our understanding of the aetiology of p16INK4a expression in these patients. We hope that additional studies may continue to define unique populations of patients and lead to individualized therapies to maximize tumour control and improve patient outcomes.

### O-1402

#### AETIOLOGICAL AND CLINICAL INVESTIGATION AMONG YOUNG ORAL CANCER PATIENTS IN HUNGARY.

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**Background:** The ratio of young oral cancer patients among the total number of treated tumour patients is still increasing. These patients have a poor prognosis.

**Material and methods:** Etiological, clinical, and survival data of 105 young (age45) oral cancer patients were compared.

**Results:** The most common etiological factors (smoking, alcohol) do not play a significant role in the aetiopathogenesis of squamous cell oral carcinomas in young patients.

**Conclusion:** Further investigations (HPV, p53) are needed for understanding the causes and course of the disease in this patient group.

### O-1403

#### IS INTERVENTIONAL EMBOLIZATION SUITABLE FOR INCREASING POSTOPERATIVE QUALITY OF LIFE OF HNSCC PATIENTS?

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Endovascular tumour embolization as an adjunctive therapy for head and neck cancers (HNSCC) is evolving and has become an important part of the tools available for their treatment. There is an increasing number of head and neck diseases which are suitable for a treatment with interventional embolization. Careful study of tumour vascular anatomy and adhering to general principles of intra-arterial therapy can prove this approach to be effective and safe. Various embolic materials are available and can be suited for a given tumour and its vascular supply. By this technique lesions can be devascularized which are otherwise very dangerous due to their intense vascular supply. Formerly embolization had only been performed in rare palliative cases for treatment of bleeding complications. Embolization for preoperative conditioning of a hypervascularized HNSCC is a new approach which in our clinic is nowadays used as a standard procedure. By using an individual concept with combination of different embolic materials for every tumour of the study (n=21) primary unresectable tumours became resectable in toto. Beside HNSCC also carcinosarcomas and angiofibromas did respond to this approach. Goal of this preliminary study was to optimize this method and to analyse tumour entities which will benefit from this treatment concept. Our data show that intra-arterial embolisation is both useful and safe in elective and emergency settings. After embolization all tumours were resectable without any bleeding complication. Besides shortening of total operation time and inpatient hospital stay significantly less blood transfusions were necessary.

This new approach of tumour conditioning made inoperable HNSCC resectable and led to a better quality of life of the patients.

**O-1404****FUNCTIONAL OUTCOME AND QOL FOLLOWING RESECTION OF TUMOURS OF THE TONGUE AND REHABILITATION WITHOUT PRIMARY RECONSTRUCTION**

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**Objective:** Retrospective study to analyze the Quality of life (QOL) and functional outcome of patients with T1-T3 Tongue cancers, who have undergone ablative surgery without local or free flap reconstruction.

**Patients and Methods:** All patients with squamous cell carcinoma of the oral tongue who underwent surgery as the primary modality of treatment between 1999 - 2012 were identified. A sub cohort of patients who had ablative surgery with no primary reconstruction were then included in this study group. 42 patients met the selection criteria of the study. Data was obtained from the clinical coding system, review of clinical notes and pathology reports. An attempt was made to evaluate the total volume of tissue resected thereby giving an insight to the residual defect.

**Results:** Follow up ranged from 6 months to 10 years. In this follow-up period 27 patients (64.3%) were found to be disease free, 7 (16.6%) patients had recurrence and 8 (19.1%) patients were deceased. According to the TNM staging system 22 patients had T1, 14 patients had T2 lesions and 6 patients had T3 tumours. The mean values of the defects were 29.97mm transversely, 19.5mm antero posteriorly and 11.82 mm in depth. Volumetric analysis was performed based on these measurements. QOL survey showed - 78.57% felt there was no change in speech, swallowing was not effected in 66.67%, chewing was not a problem in 76.20%, taste had not altered in 66.67% of patients. Significant deficiency in QOL was noted following resections of T3 tumours. However T1 and T2 resections showed good functional outcome despite the lack of any primary reconstruction. The overall QOL had increased greatly but did not reach the pretreatment level.

**Conclusion:** This study shows that free tissue transfer is not mandatory in the reconstruction of T1 and T2 tongue tumours. We provide a volumetric quantification to indicate the requirements of reconstruction of the tongue.

**O-1405****QUALITY OF LIFE AND FUNCTIONAL OUTCOMES: THE STANDARD OUTCOME MEASURES IN THE COMPREHENSIVE ASSESSMENT OF ORAL CANCER SURGICAL AND RADIOTHERAPY TREATMENT.**

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**Objectives:** Surgical treatment for cancer of the oral cavity can result in dramatic aesthetic and functional sequelae partially avoidable by reconstructive techniques.

**Aim** of this study is to evaluate the quality of life (QL) in patients treated for cancers involving the oral cavity, with different therapeutic modalities.

**Materials and methods:** The study design consisted of a prospective evaluation of pre- and post-operative quality of life at 6 months to assess variations during follow-up using the EORTC QLQ C30 and EORTC QLQ H&N35 questionnaires. Between September 2010 and April 2012, 30 patients (20 male and 10 female, mean age 59.47 years, range 33-80) with different location and TNM stage oral cancer were treated by tumour resection and/or neck dissection and different reconstruction modalities (direct closure in 3 patients, local flap in 1 patient, regional flap in 2 patients, free flap in 22 patients and combination of flaps in 2 patients). Preoperative tracheotomy was made in 25 patients. In 25 patients the treatment was supplemented with radiotherapy. All the pre- and post-operative (6 months) scores of the questionnaires were evaluated. Statistical analysis was performed in SPSS® statistical software 15.0, using a Wilcoxon non-parametric test. An absolute change of 10 or more points corresponds to a clinically important effect on a functional scale or symptom scale (significant differences were assumed when  $p < 0.05$ ).

**Results:** In the first six months after surgical treatment, there was a temporary significant deterioration ( $p < 0.05$ ).

**Conclusion:** This study gives an insight into the various issues experienced by patients after treatment of oral cancer and helps identify concerns to assist with future rehabilitation needs. Quality of life and functional outcomes should become standard outcome measures in the comprehensive assessment of oral cancer therapy.

**O-1406****SURGERY FOR MALIGNANT TUMOURS OF ORAL CAVITY AND LOWER LIP IN ELDERLY PATIENTS**

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In Poland, as in other European countries, the number of elderly people is growing rapidly. Also, higher incidence of head and neck malignancies in this group of patients is observed.

**Aim:** To present problems arising in the effective treatment of oral cavity and lower lip malignant tumours in elderly patients with regard to geriatric physiology and specific co-morbidities.

**Material and methods:** A retrospective study of 392 patients (264 males, 128 females, aged from 60 to 96 years) with oral malignant lesions treated in our Department in the last 15 years, was conducted. Type, location, clinical stage of tumours, methods of treatment, co-morbidities and their influence on the outcome of treatment were analysed.

**Results:** Although the mean age of patients was 72.6 years, 125 (31.9%) of them were over-75s. Squamous cell carcinoma was diagnosed in 376 cases (95.9%). The most common site of the tumour was lower lip in 135 patients, followed by floor of the mouth in 50, tongue in 37, buccal mucosa in 30. On admission 132 patients (33.7%) presented T4 tumours. Excision or removal of the tumour with underlying bone was performed in 208 and 184 cases respectively, 184 patients underwent comprehensive neck

dissection and/or selective neck dissection (mainly supra-omohyoid) was performed in 198 cases. Co-morbidities included ischaemic heart disease in 134 patients, hypertension in 202, diabetes mellitus in 74 and required preoperative modified treatment for 7.4 days of additional hospitalization, on average. Postoperative cardiovascular complications occurred in 10 cases whereas respiratory insufficiency in 6 patients, 8 patients developed secondary anaemia and hypoalbuminaemia. Local complications were observed in 14% of patients.

**Conclusions:**

1. Age is not a contraindication for radical head and neck tumour surgery.
2. Elderly patients require careful preoperative assessment and treatment of co-morbidities in order to decrease the risk of surgery.
3. Shortening of hospitalization and continuous family support as prevention of cognitive impairment, as well as achieved postoperative quality of life are relevant in oncologic head and neck surgery for elderly patients.

**O-1407**

**THE ROLE OF MAXILLARY RESECTION IN MAXILLARY PATHOLOGY**

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**Background:** The term maxillectomy is used currently to describe a variety of surgical approaches performed to treat a broad spectrum of Neoplastic tumours involving the upper jaw (Spiro et al 1997). In the past, malignant tumours of the upper jaw were seldom accompanied by neck dissection and only few data exist in the literature regarding the management of lymph nodes in maxillary malignant tumours.

**Aim:** The aim of the present study is to present our experience in the variety of maxillary disease, requiring surgical intervention with emphasis regarding neck dissections performed in Squamous Cell Carcinoma (SCC) of the maxilla.

**Materials and methods.** A retrospective analysis of 66 maxillectomies were reviewed and recorded between the years 2000 and 2009. Each patient's data sheet was reviewed; epidemiology analysis was performed and recorded for age, gender, histopathological diagnosis, and size of tumour. The SCC group, neck dissection and loco-regional lymph nodes involvement were analyzed.

**Results:** The average age for all patients was 54 years (range 5-84 years). The majority of the patients underwent maxillectomy suffered from malignant tumours (39, 59%) compared to non-malignant diseases (27, 41%), the Carcinoma group accounted for 42% of all cases. Male/female ratio was almost equal (1.6:1); the overall mortality rate was 23%, two groups showed a higher mortality rate: SCC group showed a 41% mortality rate, a higher mortality rate was due to mucormycosis of the upper jaw (80%). Seventeen patients who suffered from SCC received neck dissection; of this group 6 (24%) were identified with local-regional lymph node metastases.

**Discussion:** A global and accurate classification is needed to describe the surgical procedure that will be carried out.

In our department we adapted the Spiro et al 1997 classification, this classification to our understanding is easy to remember and informative enough to describe what part of the maxilla was removed. High percentage of the SCC patients (24%) had cervical metastases. These results strongly support the need for a routine elective neck dissection for the treatment of maxillary SCC, even if the clinical examination is negative.

**O-1408**

**A REVIEW OF THYROID AND PARATHYROID SURGERY OVER A NINE YEAR PERIOD.**

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**Introduction:** Thyroid and parathyroid diseases are common and surgical treatment is often the treatment of choice. Increasingly, this specialist surgery is offered by Oral, Maxillofacial, Head and Neck Surgeons, and Otolaryngologists. We undertook an audit of thyroid and parathyroid surgery, and present the demographics and experience of one designated thyroid and parathyroid surgeon (LC) in North East London and the Mercy Ships in West Africa.

**Methods:** A retrospective evaluation of 539 procedures over a nine year period was carried out.

**Results:** The male to female ratio was 1:4 with a mean age of range 48.8years. Over a third was hemithyroidectomy (167), followed by total (93) and retrosternal (67) thyroidectomy. Other surgery includes 38 isthmusectomy, 36 subtotal, 19 completion and 12 minimally invasive video-assisted thyroidectomy as well as 47 parathyroidectomy, 28 neck dissections, 16 thyroglossal cysts, 6 thymectomy and 10 other surgery. Patient demographics, means of referral, symptoms and investigations prior to treatment were reviewed and correlated to co-morbidities, histology and post-operative complications. Our complication rates compared favourably with the International Standard: permanent voice changes were 0.74% (IS = 0.5%), temporary voice changes 6.5% (5%), hypocalcaemia 7.4% (15.5%) and sero-haematoma 0.56% (8.7%).

**Conclusion:** Continual audit and self-assessment is necessary for all surgeons to maintain high standards of patient care. With the increasing incidence of thyroid and parathyroid disorders due to the availability of high resolution ultrasound scan and serum calcium check, there is an increasing workload and demand for thyroid and parathyroid surgery among Oral, Maxillofacial, Head and Neck Surgeons.

**O-1409**

**ORAL AND MAXILLOFACIAL MALIGNANT TUMOURS & TUMOUR LIKE LESIONS IN CHILDREN**

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**Introduction:** Cancer is the second leading cause of child-

hood mortality, fortunately with the low incidence of 1.3:10.000. Malignant tumours in children are mainly of mesenchymal origin and 2-5% out of them occur in the head and neck.

*Aim:* To present the epidemiology, histology, treatment and outcome of malignant orofacial tumours and tumour like lesions in children.

*Patients and Methods:* Medical records of all patients with orofacial malignancies treated at the Department of Oral & Maxillofacial Surgery at the "A. & P. Kyriakou" Athens Children's Hospital between 01.01.2000 and 31.12.2011 were reviewed. Data recorded included age, gender, site, histology, therapeutic approach and outcome. Patients were recalled for examination in the beginning of 2012.

In all cases open biopsies or FNA were performed. Depending on the type of malignancy and according to relevant protocols, treatment applied included radical surgical approach, chemotherapy and radiotherapy.

*Results:* Twenty one children with malignancies, 11 boys and 10 girls, 14 days to 15 years old were included in the study. They represented the 9.9% of the 211 of patients with tumours treated the same period.

Malignancies were mainly rhabdomyosarcomas (6/21 or 28.6%), followed by Ewing- Sarcomas, tumours caused by Langerhans cell disease, and lymphomas (3 cases from each type or 14.3% each).

14/21 patients were operated on; in 5/14 lesion resection without any adjuvant treatment was applied, in 9/14 combined treatment with radical surgical resection, pre- and post-operative chemotherapy. Additional radiotherapy was applied in 3 cases. Three patients with lymphomas following diagnosis were treated with chemotherapy only. From the remaining 4 patients, 3 started chemotherapy and in one no treatment was applied.

Regarding the outcome, 16 out of 21 patients are nowadays disease free (however in 5/16 cases follow-up is less than 5 years), 1 is still under chemotherapy and 4 (19.1%) succumbed to malignant neoplasms, either prior to any therapeutic intervention or during chemotherapy.

*Conclusions:* The small number of cases does not allow safe conclusions. More multi-centre studies should be organized. However in our patients multimodality therapy contributed to increased survival rates.

#### O-1410

##### HEAD AND NECK SARCOMAS: A 12 YEAR RETROSPECTIVE REVIEW OF 39 CASES

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*Introduction:* Sarcomas are rare tumours accounting for around 1% of all malignancies. Of these, 20% arise from bone with the remainder from soft tissues. Sarcomas in the head and neck region make up approximately 15% of all sarcomas, with the most common being rhabdomyosarcoma in children and osteosarcoma and angiosarcoma in adults.

There are approximately 3200 cases of sarcoma (all sites) per year in the UK. Most are sporadic, but some may be related to genetic mutations, environmental exposures (but

independent of smoking and alcohol, unlike squamous cell carcinoma) and certain medical conditions.

In the UK, sarcomas are treated in subspecialised units with access to specialised sarcoma multidisciplinary teams (MDT). The National Institute for Health and Clinical Evidence (NICE) recommend that each MDT should see at least 100 new cases per year (soft tissue) and, if dealing with bone sarcomas an additional 50 bone cases per year. There are currently around 14 sarcoma MDTs nationwide, including one based in Birmingham.

*Aims:* To review the type of sarcomas, site of origin, mode and stage at presentation, treatment modalities and prognosis of this relatively rare group of head and neck tumours.

*Materials and Methods:* A retrospective review of the sarcoma database, the general pathology database, the head and neck database and a review of case notes.

*Results:* 39 patients with Head and Neck Sarcomas were discussed at the Birmingham MDT over a 12 year period (2000-2011).

*Conclusions:* Large published case series of head and neck sarcomas are rare. We report our experience in this group of patients, and discuss the importance of radical resections and the use of neoadjuvant chemotherapy in their management.

#### O-1411

##### ULCERATION OF THE PALATE: A CASE REPORT OF A RAPIDLY INCREASING, PAINFUL ULCERATION OF THE PALATE, PROVEN TO BE A B-CALL LYMPHOMA

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A case of a 37 year old Caucasian female referred to an Oral Surgery Department regarding a 5mm diameter ulcerated swelling in the hard palate located in the midline is reported. Following an inconclusive biopsy report the swelling rapidly increased in size so that it extended to the soft palate and had become painful. The patient then developed night sweats, was struggling to maintain an oral intake and had palpable lymphadenopathy on the right side.

An urgent CT scan of the head, neck and thorax was ordered and the patient was admitted for further biopsies under general anaesthetic. The results of the biopsy were reported as a high grade large, diffuse B-cell Lymphoma and fluorescent in-situ hybridization confirmed the presence of EBV-encoded nuclear RNAs within the lymphoblasts. The CT scan showed a 2x1.5x1cm lesion over the right hard palate which extended into the nasal cavity.

The patient's condition deteriorated and was readmitted for an emergency laparotomy following acute left sided abdominal pain, fever and increasing weight loss. This revealed a perforation of the splenic flexure of the large colon and on biopsy the presence of diffuse large B-cell lymphoma, with similar characteristics to the oral lesion was diagnosed.

Diffuse large B-cell lymphoma is highly aggressive and should be considered in the differential diagnosis of the

hard palate as it can cause systemic symptoms which will result in a poor prognosis.

#### O-1412

### COMPLICATIONS AFTER TEMPORARY MEDIAN OSTEOTOMY OF THE MANDIBLE IN IRRADIATED PATIENTS

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Since 1995 a temporary median osteotomy of the mandible was carried out in 46 patients in order to improve the surgical access for the treatment of oral or oropharyngeal cancer. 44 patients received radiotherapy perioperatively.

The purpose of the retrospective study was to find a correlation between complications and surgical techniques used for the temporary mandibular split. 39 patients were included.

Osteotomies were performed in two different ways: In 29 patients the osteotomy line was angulated and in 10 patients it was straight down in the sagittal plane. Osteosynthesis was done in various ways with anchor screws, in rare instances miniplates were added.

Radiotherapy started usually 4 weeks after surgery with a mean duration of 6-7 weeks and an average dose of 70 Gy, one patient had additional intraoperative radiation.

Complications were chiefly seen in patients with straight osteotomy lines and osteosynthesis with less than 3 anchor screws and/or monocortical anchorage. 9 patients developed instability in the osteotomy line, and 5 of these ended up with an infected radioosteonecrosis. All 9 patients were surgically explored and stabilized with rigid plates (chiefly functionally dynamic bridging plates). In one patient a vascularized bone transfer was performed. No instability was found in 27 patients with an angulated osteotomy line and osteosynthesis with 3 bicortical anchor screws towards the inferior border of the mandible.

This technique, therefore, appears to be superior for temporary median mandibular osteotomy.

Correct performance of the osteotomy and stable fixation will help to avoid serious complications even in irradiated bone.

#### O-1413

### SUDDEN INCREASE IN THE INCIDENCE OF OSTEORADIONECROSIS: WHAT IS CAUSING THIS?

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*Introduction:* Osteoradionecrosis (ORN) of the jaws is a serious and uncommon complication of radiation therapy to the head and neck. We found a sudden increase in the number of patients presenting with established ORN over the past year.

*Aim:* To assess the number of patients who develop ORN following radiation therapy for tumours of the head and neck and how this is managed.

*Materials and methods:* We retrospectively analysed patients treated with radiation therapy to the head and neck over a two year period. Variables included age, sex, comorbidities, site and stage of tumour, treatment modalities, radiation dose and fields, use of adjuvant or neo-adjuvant chemotherapy, incidence of ORN, hyperbaric oxygen treatment and management of ORN.

*Results:* In our cohort of patients who received radiation therapy to the head and neck it was noted that over the last 12 months we had a nine fold increase in the number of patients with ORN as compared to the previous year. Majority of our cases with ORN were initially treated with chemoradiotherapy for tongue base tumours. All cases of ORN were involving the mandible and definitive treatment was by means of local debridement or segmental resection.

*Conclusion:* As we are aware this is a complex condition and we are concerned if a combination of neo-adjuvant chemotherapy and higher fractions of radiation therapy are causing this sudden increase in incidence of ORN.

## Session 15. CRANIO-MAXILLO-FACIAL TRAUMATOLOGY II

### O-1501

#### INTRAARTICULAR CONDYLE FRACTURES - TO OPERATE OR NOT TO OPERATE

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**Introduction:** In the past, intraarticular fractures of the TMJ were generally considered a contraindication for surgical treatment and were treated conservatively. These patients often developed limited mouth opening with deviation to the injured side and chronic pain. Recently, an increasing amount of reports and papers presented the benefits of surgical treatment in this type of fractures.

**Patients and methods:** For the past 7 years, patients with displaced intraarticular fractures have been treated surgically at our institution. The inverted hockey stick preauricular approach is used and will be described in detail. The fractured condylar head is reduced and fixed with two lag screws or combining a microplate and a lag screw. If the disc and/or the joint capsule are ruptured, they can be repaired in the procedure, and the intraarticular haematoma is removed. Patients are placed on a soft diet for 6 weeks and are encouraged to start mouth opening exercises on the first day post op.

**Results:** The outcomes of surgical treatment are excellent and will be presented in detail.

**Discussion:** The benefits of surgical treatment are many. Perfect reduction and stable fixation enable immediate joint movement and physiotherapy. The joint can be cleared of haematoma, preventing the development of intraarticular fibrosis, which is often observed in conservatively treated joints. Lateral pterygoid muscle function is restored and the result is mouth opening with no deviation. Overall, the patients as well as the surgeons are extremely satisfied with the treatment result.

### O-1502

#### CONDYLAR AND SUBCONDYLAR FRACTURES TREATMENT – OPEN OR NOT OPEN? A RETROSPECTIVE STUDY.

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**Introduction:** It is surprising how such a “small bone” can generate so much discussion. Condylar fractures are considered one of the most controversial fractures in the face regarding treatment difficulty. Choosing the best treatment is the goal of every maxillofacial surgeon. The question “Open or not open” still stimulates more debate than any other area of maxillofacial trauma.

The goal of this study is to try to answer this question comparing the results of open and close reduction, as

objectively as possible.

**Patients and methods:** 95 patients of both sexes with condylar or subcondylar fractures were submitted to surgical treatment in Hospital São João between 2008 and 2011. After eliminating those who could not or did not want to participate, the sample was divided in two groups: open reduction with osteosynthesis and close reduction. Functional alterations were evaluated through a synthetic questionnaire to estimate the impairment, functional limitation, discomfort, disability and handicap after surgery. Maximum mouth opening, lateral and protrusive movements were noted, occlusion and mouth opening were also documented with photos and videos. All patients have a postoperative orthopantomography or CT scan. Postoperative scars were also assessed and postoperative and intraoperative complications were annotated. Statistical analysis employed t-Student, Fisher’s Exact, and Pearson Chi-Square tests, using SPSS (Statistical Package for the Social Sciences).

**Results:** Statistically significant differences were observed between the open and close reduction groups concerning difficulties in mouth opening, wakening pain, dental occlusion before accident compared to actual and comparison of global performance before the accident and after surgery. In fact, concerning global performance, only patients treated with open surgery admitted having a full recovery to their previous status. No statistically significant differences were found in mouth opening comparing both groups. 85.7% of patients that undergone close reduction said that they hated or didn’t like intermaxillary fixation and 100% of patients that undergone open reduction refer that the surgical scar is barely visible or acceptable.

**Conclusion:** The results of open reduction of condylar or subcondylar process fractures are better when compared to the results of close reduction, in particular the impact on daily performance and in life quality.

### O-1503

#### EVALUATION OF THE AESTHETIC AND FUNCTIONAL COMPLICATIONS ASSOCIATED WITH DIFFERENT APPROACHES FOR CONDYLAR MANDIBULAR FRACTURES.

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**Introduction:** The treatment of the condylar fractures is controversial, either surgical or orthopaedic depend on which is most predictable, based on clinical and anatomical characteristics of each case. If we selected a surgical treatment, the extraoral approaches, however, result in risk of serious complications, especially those involving the facial nerve. The pre and postauricular, transparotid, retromandibular and transoral are selected depending in type of fracture and degree of displacement of the condyle.

**Objective:** The aim of this study is to evaluate the association between type of the approaches with aesthetic and functional complications for condylar mandibular fractures in Carlos Van Buren Hospital.

**Methodology:** A cross-sectional study was performed from January to March 2012. Clinical records of patients since January 1999 to December 2011 admitted with condylar fractures were review. Social demographics characteristics were registered. The approaches were evaluated depend-



ing on neurological disorders and aesthetics scars with regular clinical evaluation and imaging results. On data base was created for analysis statistical software STATA 10.

**Results:** Of 108 patients (142 condyles) with condylar fractures only forty one patients (fifty one condyles) were treated surgically. The greater percent were men (65%). The most usual approach is the preauricular, followed by endaural and retromandibular. The most prevalent complication was temporal damage to the facial nerve and secondary scars. **Results** are shown as well as trends of open treatment.

**Conclusion:** The surgical treatment of these fractures remains controversial because of different complications that are described. In our experience neither the facial palsy nor the scar are permanent complications for our patients, and are classified as temporal or short-term complication. The experience of these 13 years is guide us to a surgical management of these fractures.

Conflict of interest: None declared.

**O-1504**  
**OUR EXPERIENCE IN SURGICAL TREATMENT OF EXTRACAPSULAR MANDIBULAR CONDYLAR FRACTURE, SKIN SCAR AND PATIENT SATISFACTION.**

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The proportion of condylar fractures among all mandibular fractures is between 17.5% and 52%. One of the most frequent causes is the road accident, accidental falls and personal violence. Between 2003 and 2011, 88 patients were observed for mandibular condylar fractures. 40 (45,5%) were treated surgically, and 48 (54,5%) conservatively.

According Lindahl classification, we used a preauricular approach in cases of condylar neck fractures and a retromandibular approach in cases of subcondylar fractures.

Three different types of internal rigid fixation have been used: single plate, double plate and trapezoidal plate.

All 40 patients were submitted to clinical and radiological follow-up at 3, 6 months and 1 and 3 years, 25 patients came in for examination, after receiving the invitation, an evaluation form on clinical, radiologic and aesthetic results was used, and therefore constitute the object of our work. The clinical parameters are taken into account were: perception of recovery of the pre-trauma occlusion; facial nerve functionality according to "Facial nerve grading system" by House and Brackmann; assessment of the post-operative skin scar with the "Vancouver Scar Scale" by Baryza MJ; post-operative symptomatology by Helkimo; temporomandibular joint (TMJ) functionality by the use of the Research Diagnostic Criteria for Temporomandibular Disorders (RDC/TMD).

We also evaluated through a post-operative orthopantomogram and a Computer Tomography of the mandible the cor-

rect anatomical restoration of the fracture site and the presence of complication such as the fracture of the plate. In addition a degree of patient satisfaction about the treatment performed and the presence of post-operative complications like Frey syndrome, paralysis of facial nerve, infection and salivary fistula were evaluated.

We found that 2 of our patients reported temporary weakness of the facial nerve and no patient had permanent facial nerve palsy. All patients had a complete recovery of temporomandibular joint functionality and a pre trauma occlusion, and only 2 patients complained of temporomandibular joint-related symptoms. All 25 patients were completely satisfied with skin scar appearance.

From these results we can confirm that surgical treatment of mandibular condylar fractures is mandatory in cases of mandibular extracapsular condylar fractures.

**O-1505**  
**A NEW NON-ENDOSCOPIC INTRAORAL APPROACH FOR REDUCTION AND RIGID FIXATION OF SUBCONDYLAR FRACTURE OF THE MANDIBLE**

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Endoscopically assisted transoral open reduction and internal fixation of condylar and subcondylar mandible fractures is becoming a popular technique due to safety and good surgical results. One of the problems still associated with this approach is the prolonged operation time and limited direct vision. We developed a new surgical technique and a modified set to enable direct non-endoscopic reduction of subcondylar fractures and rigid fixation with special miniplates.

The surgical set consists of special rasparatories for reduction procedures according to the degree of dislocation. An angled retractor allows direct inspection of the operation field and to control reduction results. A special type of miniplate is used for fixation considering the biomechanical features of the subcondylar region and its bone quality.

**Results** are shown via several clinical cases and the technique is explained by cadaver dissection and model operation. Operation time ranged from 90 to 145 minutes.

Correct anatomic reduction of the condylar segments at centric occlusion followed by immediate functional recovery was achieved in all patients.

Surgical treatment of subcondylar fractures of the mandible can be achieved with an intraoral approach without endoscopic assistance, offering reliable clinical results and safe and minimally invasive surgery.

**O-1506**  
**RESULTS AFTER TREATMENT OF CONDYLAR NECK FRACTURES THROUGH THE RETROMANDIBULAR APPROACH**

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**Introduction:** There are considerable controversies in the treatment of condylar fractures (conservative vs. surgical treatment) concerning fracture localisation, surgical approach, age of the patient etc. According to Eckelt et al. (2006) operative treatment is indicated in moderately displaced fractures when axis deviation is between 10-40 degrees and the ascending ramus is shortened more than 2mm. The aim of this study was to analyze the retromandibular approach for the treatment of condylar neck fractures and the surgical treatment outcome.

**Material and Methods:** 26 patients (7 female, 19 male) with 36 condylar neck fractures were surgically treated via the retromandibular approach from March 2006 - December 2008. 16 patients had unilateral fractures, 10 had bilateral fractures. A clinical and radiological analysis (according to Eckelt et al. 2006) was performed. The follow-up ranged from 12-35 months.

**Results:** In all 36 fractures correct repositioning and stable osteosynthesis were achieved. The average operation time was 81 minutes. The median deviation of the condylar axis was improved from 17,8 degrees preoperatively to 5 degrees postoperatively, the vertical shortening of the ramus from 8.3mm to 1.7mm. Average mouth opening was 40mm after 12 months, average laterotrusion/protrusion 6mm. No occlusal disturbances, no postoperative infections, no salivary fistulas were observed. 3 patients had temporary weakness of the facial nerve, 1 patient painless clicking of the TMJ, 1 patient showed condylolysis, 2 plate fractures were noted.

**Discussion and Conclusions:** The retromandibular approach is technically easy and leads directly to the condylar neck. Control of repositioning and stable osteosynthesis are easily achieved in low and medium-height condylar neck fractures through this approach. The functional results of fracture treatment are good and comparable to the literature, the aesthetic impairment by the extraoral scar is minor. In conclusion the retromandibular approach is a safe technique for surgical treatment of low and medium-height condylar neck fractures.

#### O-1507

##### LACK OF POSTERIOR OCCLUSAL STABILITY IN ORIF OF CONDYLAR FRACTURES

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Open reduction and internal fixation is commonly considered as the primary treatment for dislocated condylar fractures, however it can be complicated by a fracture of the osteosynthesis material and secondary condylar deformation.

**Patients and methods :** We have operated in our department over the last 4 years more than 70 patients with dislocated condylar fractures by ORIF (open reduction and internal fixation), with 4 (5%) fractures of the osteosynthesis material, who presented simultaneous secondary anterior rotation and shortening of the mandibular ramus height. We note two patients with a fracture of the osteosynthesis material and a major displacement of the con-

dyle due to posterior ipsilateral edentulism and absence of posterior stable occlusion. Vertical osteotomies and costal grafts were used for condylar reconstruction in these patients. We note one fracture of the titanium plate with a minor displacement of the condyle in a partially edentulous patient with an ipsilateral malocclusion, which was treated by extraction of the dilapidated teeth and dental prosthetic rehabilitation to restore a stable dental occlusion. However, we observed one fracture of the osteosynthesis material in a young patient with an adequate pre-traumatic dental occlusion, which was not treated due to normal functional clinical parameters.

**Results :** The two operated patients with an absence of a posterior stable occlusion presented after reconstruction with costal graft a good functional outcome with an acceptable mouth opening (30 mm), despite minor post-operative complications (temporary facial palsy, salivary fistula and slight deviation of the mouth opening).

Conservative treatment by extractions and prosthetic rehabilitation of the patient with a minor displacement of the condyle resulted in an excellent functional outcome (40mm mouth opening).

**Conclusion :** Fracture of osteosynthesis material with or without condylar displacement as a result of ipsilateral posterior malocclusion is a rare complication of ORIF of condylar dislocated fractures, however it has a major clinical impact and demands in some cases a challenging surgical reconstruction. We therefore underline the importance of immediate occlusion rehabilitation in all cases of posterior malocclusion after primary ORIF surgery.

#### O-1508

##### GLENOID FOSSA FRACTURE AND DISLOCATION OF THE MANDIBULAR CONDYLE INTO THE MIDDLE CRANIAL FOSSA: REPORT OF A CASE AND REVIEW OF THE LITERATURE

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An 8-year girl with a brain tumour and a severe cognitive disability suffered a dislocation of the right mandibular condyle into the middle cranial fossa and a subcondylar fracture on the left side, following a fall. The diagnosis was clinical combined with a CT scan.

The condyle was relocated into the glenoid fossa via a closed technique (manipulative reduction) followed by intermaxillary fixation for five days.

After a two month follow-up the patient presented with good mouth opening, no deviation of the mandible and could occlude her teeth.

The authors reviewed the literature emphasizing the rarity of the situation and the available therapeutic choices.

#### O-1509

##### COMPARED TREATMENT OF MANDIBULAR ANGLE FRACTURES: ONE MINIPLATE VERSUS TWO MINIPLATES

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**Objectives:** Determine the differences in complication rates in the treatment of mandibular angle fractures with one miniplate plate following the principles of “ideal lines of osteosynthesis” described by Champy, compared to two miniplates.

**Material and Methods:** We performed a retrospective study to analyze the results in the treatment of mandibular angle fractures with one and two miniplates in our hospital from January 2000 to May 2011. Data included degree of fracture displacement, if wisdom tooth was present in the line of fracture and if it was removed, time taken until treatment, type of surgical approach and postoperative complications. Patients with associated mandibular or facial fractures were excluded, as were those with local or systemic pathology that could interfere with bone healing. Patients with a follow-up of less than six weeks were also excluded. For the statistical analysis we used the Fisher Exact Test.

**Results:** 32 patients met the inclusion criteria, with a mean follow-up of 5,6 months. Osteosynthesis with one miniplate was performed in 40,6% of the cases (n=13) and in 59,4% (n=19) with two miniplates. The overall complication rate was 21,9% (n=7), 15,6% (n=5) minor and 6,3% (n=2) mayor complications. Patients treated with two miniplates had 26,3% (n=5) complications, and those with one miniplate had 15,4% (n=2) complications (p=0,671). The complication rates when comparing fracture displacement, presence of wisdom tooth and time until treatment were similar. We observed more complications when intraoral approach was combined with transoral (28% (n=7), compared to no complications with single intraoral approach, p=0,3). All the cases with two miniplates were done with a combined intraoral and transoral approach, while 53,9% (n=7) of those with one miniplate were done with an intraoral approach (p=0,001), this being the only variable with a significant non-homogeneous distribution between the two groups.

**Conclusion:** For isolated mandibular angle fractures osteosynthesis with one miniplate gave a smaller complication rate (with less serious complications) than two miniplates, together with increased complications when performing an intraoral combined with transoral approach. This could be because an intraoral approach and osteosynthesis with one miniplate requires a reduced soft tissue and periosteal dissection with reduced bone devascularization.

#### O-1510 RESULTS IN TREATMENT OF ATROPHIC EDENTULOUS MANDIBLE FRACTURES WITH THE FUNCTIONALLY DYNAMIC BRIDGING PLATE (FDBP)

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**Objectives:** Originally the functionally dynamic bridging plate (FDBP) was developed for reconstruction after mandibular resection. Since 1993 it was successfully used for treatment of fractures of the atrophic mandible as well. The FDBP consists of two four hole plate-sections connected by a quadrangular (3x3 mm) bar. The special de-

sign allows bicortical screw placement in areas with adequate bone - keeping a safe distance to the fracture site and the channel of the inferior alveolar nerve.

**Materials and Methods:** From 1994 – 2009 28 patients with fractures of atrophic mandibles have been treated with this plate. Mandibular height was in all patients less than 15 mm. 21 patients with 27 fractures were included in the retrospective study.

**Results:** Bony union was achieved in all 21 patients. 1 plate had to be exchanged because of partial screw loosening. No plate fracture or exposure of osteosynthesis material was seen. All patients who wore prostheses before the accident were able to do so after treatment. There was no need of hardware removal. No surgical nerve lesion occurred. Sensation of the lower lip had improved in the majority of patients at late review.

**Discussion:** Osteosynthesis with miniplates does not afford primary stability especially in highly atrophic mandibles and runs the risk of delayed healing or fibrous union as well as nerve lesions.

Conventional reconstruction plates are oversized in relation to the atrophic mandible and therefore often causing problems with soft tissue coverage and prosthetic rehabilitation.

Fixation of fractures of the atrophic mandible with the functionally dynamic bridging plate appears to be a safe surgical procedure which guarantees bony healing and early masticatory rehabilitation.

#### O-1511 THE INCIDENCE AND PATTERNS OF MANDIBULAR FRACTURES IN CHILDREN

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**Background:** Mandibular fractures are seen in subjects of all ages, but are generally less frequent in children than in adults and less data are available in the literature regarding management.

**Objectives:** To evaluate the patterns of mandibular fractures in children presenting to the maxillofacial department at a London trauma centre between June 2005 and May 2010. To analyse the management of these cases, compare our data with that previously published and to devise local treatment guidelines.

**Design:** Paediatric patients presenting with mandibular fractures were identified using the departmental database and clinic letters.

**Results:** 143 children were identified, representing 11% of a total of 1,261 patients with mandibular fractures. The age ranged from 3 to 17 years, with an increase in incidence with increased age. Fractures were more prevalent in males than females (88% vs. 12%). The male preponderance was most striking in the older age groups (2.4:1 under 12's; 6.4:1, 16-17 years).

Aetiology of the injury varied with age. Falls were responsible for 47% of fractures in children under 12. Interpersonal violence accounted for 86% of fractures in older children. The site of the fractures also varied with age, with ramus fractures more common in younger than older children. Other injuries were also more common in

younger patients.

Fractures were usually treated by open reduction and internal fixation with titanium mini plates regardless of the age of the patient. However, plates were more often removed in younger patients (67% of under 12's; 4% in 16-17 year olds).

*Conclusion:* The incidence and aetiology of mandibular fracture in children vary according to age. Patterns of mandibular fracture in older children are similar to those reported in adult subjects. There is a lower incidence of mandibular fractures in young children; however this group presents particular challenges. In our cohort the majority of these patients were treated with open reduction and internal fixation and did well with this approach.

#### O-1512

### FIXATION OF FRACTURES IN THE MAXILLOFACIAL AREA OF CHILDREN WITH BIODEGRADABLE OSTEOSYNTETIC MATERIALS

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There are several indications concerning the incidence of injuries in the maxillofacial area of children.

They range from 1 to 14.7% within children younger than 16 years of age and 0.87 to 1% within children younger than five years.

When establishing the therapeutic plan, we need to consider several aspects: age of the patient, with respect to growth rate and maturity of the child, anatomical considerations on the optimization of form and function, complexity of the injury, dislocation, fragmentation, location, time elapsed since injury, associated injuries, the ideal type of anaesthesia, duration of intervention and access to closed versus open.

Conservative approach is a legitimate method of treating maxillofacial fractures in the skeleton of patients with evolving facial - jaw system. In case of adverse and serious dislocation of fragments, surgical repositioning and fixation is essential. Current research progress of biodegradable materials, has moved their use into areas, where previously only conventional titanium osteosynthetic plates and screws were used. This includes the area of maxillofacial traumatology, orthognathic surgery and craniofacial surgery.

Despite the fact that our set is small and short-track, our first experience with the use of bioresorbable materials in maxillofacial traumatology within children, was assessed as favourable.

Stability and strength of the osteofixative material in this set, was highly satisfactory. We did not observe any tissue intolerance, growth failure or failure of occlusion. Benefits of resorbable osteofixative materials in general and specially the benefits for children include long-term stability, shortening the immobilization time and elimination of osteofixative material removing process.

Science and research project 2007/49 – MN- 02

Indication criteria and optimal therapeutic methods in

treatment of children with fractures in the maxillofacial region by use of biodegradable osteosynthesis materials and comparison to standard methods BOS MFS

#### O-1513

### OUTCOMES FOLLOWING MANIPULATION UNDER ANAESTHETIC OF THE NOSE – EXPERIENCE FROM A MAJOR LONDON TRAUMA CENTRE

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*Introduction.* Nasal fractures are one of the most common facial fractures. As a major London trauma centre the unit regularly manages a high proportion of such patients. First line treatment is for the patient to undergo a manipulation under anaesthetic. Subsequently patients may have to undergo a more formal septorhinoplasty to correct any functional or cosmetic deficit.

We aimed to assess the outcomes for patients that underwent MUA nose at our unit and the pre-operative and post-operative factors associated with a successful outcome.

*Method.* A retrospective database of patients treated with MUA for nasal fracture was collected containing patient demographics, cause of fracture, time to presentation, time to operation, peri and post-operative management, requirement for subsequent septorhinoplasty and reason for formal correction.

*Results.* 89 patients underwent a manipulation under anaesthetic over a 1 year period. 70 male and 19 female patients were treated with an average age of 26 (range 14-69). 56% of fractures were secondary to direct assault. Average time to presentation was 1.39 days with the subsequent average time to MUA of 14.3 days. The majority of the procedures were performed by Post-CCT level surgeons. Nasal packs inserted for 24 hours post-operatively and an extranasal splint was advised for at least 10 days. 12% of the patients required subsequent septorhinoplasty.

*Discussion:* Septorhinoplasty following MUA nose was equal between men and women. It was more prevalent post assault and due to a residual deformity rather than functional deficit in the majority of patients, and appeared higher in patients who did not wear their splint for the allotted time. Increased time to presentation or time to surgery did not correlate with a worse outcome.

*Conclusion:* Peri- and post-operative management are more important than pre-operative factors in influencing outcome following MUA nose. Residual nasal deformity is more likely to cause a patient to seek a subsequent corrective septorhinoplasty.

## Session 16. CLEFT SURGERY II

### O-1601

#### TREATMENT QUALITY ANALYSIS OF CLEFT PATIENTS RECEIVED ON THE BASIS OF QUESTIONNAIRE EVALUATION

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\*, Nataliya Medko<sup>1</sup>  
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**Introduction:** The problem of the effectiveness of improving treatments of patients with congenital cleft lip and palate is very substantial.

The following tasks were set up during the survey:

1. Patients themselves should evaluate the quality of their treatment using a questionnaire.
2. Patients themselves should evaluate their speech quality.
3. On the basis of questioning results and results of speech therapy survey the comparative evaluation of speech quality should be conducted.

**Materials and Methods:** 40 patients with congenital cleft lip and palate at age from 15 till 18 treated at University Hospital were asked to complete the questionnaire. 48% of patients were continuing treatment initiated at other hospitals to eliminate the postoperative deformities. The questionnaire included 47 questions. In addition to the questionnaire a speech quality survey was conducted for 34 patients.

**Results:** 100% of the patients evaluated the result of rehabilitation as good performance. At present, orthodontic care would receive 50% of respondents, although 86% of patients previously had orthodontic treatment. Only 36% of patients believe that the orthodontic care not needed.

Need for orthopaedic treatment was indicated by 29% of respondents. Orthopaedic treatment was received earlier by 36% of patients and was not received in 64% of cases.

Overall, 54% of respondents believe that they need further treatment: correcting operations, orthodontic treatment and prosthetics.

The presence of scars on upper lip, the deformation of nose and speech problems have an effect on psycho-emotional conditions of patients, which often leads to insecurity, exclusion in society and lower self-esteem. The surprising fact was that 71% of patients responded positively on the question about self assuredness.

Comparative evaluation of speech quality using results of questioning and results of speech therapy survey were following: excellent 29%, good 21%, satisfactory 43% and poor 7%. In comparison with the conclusion of a speech therapist: excellent 9%, good 44%, satisfactory 35%, poor 12%.

Questionnaire data shows that there no significant differences between evaluations made by patients and evaluations made by the speech therapist.

**Conclusion:** Analysis of survey data of the treatment quality makes it possible to create patient-physician feedback, which is a very valuable factor in improving treat-

ment quality for this group of patients.

### O-1602

#### POSTOPERATIVE MORBIDITY AFTER RECONSTRUCTION OF ALVEOLAR BONE DEFECTS WITH CHIN BONE TRANSPLANTS IN CLEFT PATIENTS – 111 CONSECUTIVE PATIENTS.

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**Aim:** The aim of this study was to assess the objective and subjective morbidity after reconstruction of alveolar bone defects with chin bone transplants in young cleft lip and palate (CLP) patients. **Material and methods:** In the period 2000-2011 134 patients with CLP born between 1995 and 1999 had a reconstruction of an alveolar defect at the Department of Oral and Maxillofacial Surgery, Aarhus University Hospital, Denmark. The inclusion criteria for this study were patients with a unilateral or bilateral CLP, which was reconstructed with a mandibular, symphyseal bone graft. Post-surgical complications were documented in the records as encountered. All patients were mailed a questionnaire used in former studies of complications in relation to reconstruction of alveolar defects in cleft patients (Booij, 2005). After the first deadline had passed, non-respondents received a second questionnaire by mail. The questionnaire contained multiple choice questions concerning perioperative and postoperative pain, as well as its severity and duration. Moreover, the questionnaire focused on sensory disturbances of skin and oral mucosa, contour changes of the chin, perception of scarring, and the general level of satisfaction and general acceptance of the surgical procedure and outcome. **Results:** 111 patients were included in the study. The mean age at surgery was 11.6 years (range 3.5-15.3 years). 90 patients had a unilateral CLP, 21 patients had a bilateral CLP. The duration of hospitalization was short, the outcome was good and with few complications mainly short-term sensory disturbances and bleeding. A high general, subjective satisfaction was obtained (VAS 8.52/10) **Conclusion:** Reconstruction of alveolar bone defects with chin bone transplants in young CLP patients is a safe procedure, and few complications are encountered by this minimal invasive surgical technique.

### O-1603

#### SECONDARY BONE GRAFTING IN CHILDREN WITH BILATERAL CLEFT LIP AND PALATE. A REPORT OF 46 CONSECUTIVE CASES USING A TECHNIQUE OF PREMAXILLARY OSTEOTOMY WITH GUIDED TISSUE REGENERATION.

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**Objective:** Patients with cleft lip and palate usually undergo secondary alveolar bone grafting in the mixed dentition phase between the ages of 8 and 11. The purpose of surgery is to restore dental arch form, facilitate eruption of teeth, close oro-nasal fistulae and restore bony anatomy. Initial results using a technique of bilateral alveolar bone grafting with guided tissue regeneration and premaxillary

osteotomy were previously described in 15 patients (Scott et al. 2005). *Results* using this technique are now reported in a cohort of 46 consecutive patients. The efficacy of this technique in safely achieving the objectives is demonstrated.

*Materials & Methods:* All bilateral cleft lip and palate (BCLP) patients undergoing surgery between 2000 and 2012 in a single specialist cleft unit were retrospectively identified. A standardised surgical approach was used and performed by a single operator (TF). The clefts were exposed, the premaxillae osteotomised and secured in an appropriate position pre-determined in conjunction with a cleft orthodontist. The soft tissues of the nasal floor and palate were repaired primarily. Bone was harvested from the iliac crest and placed bilaterally to reconstruct the defects. The bone grafts were covered by a collagen membrane (Bio-Gide) for guided tissue regeneration. The premaxillae were stabilised with arch bars and acrylic occlusal wafers. Medical records and radiographs were used to assess the outcomes of surgery. Patients were followed up for a minimum of six months.

*Results:* 46 patients underwent bilateral alveolar bone grafting with premaxillary osteotomy in the period studied. Bone grafting was highly successful and no premaxillae were devitalised. Detailed results will be presented and long-term outcomes illustrated.

*Conclusion:* This technique in BCLP patients undergoing secondary alveolar bone grafting is a safe procedure. It allows restoration of the dental arch; facilitates eruption of the teeth in the cleft and closes oro-nasal fistulae. It restores the bone architecture of the maxilla and provides a symmetrical platform for subsequent maxillary osteotomy or rhinoplasty when needed.

#### O-1604

### EVALUATION OF TREATMENT PROTOCOLS IN SECONDARY OSTEOPLASTY, FOLLOWING 12-YEAR EXPERIENCE IN DENTOALVEOLAR CLEFT PATIENTS.

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Secondary osteoplasty in cleft patients, usually accompanied by the presence of a residual oronasal fistula, is most often performed at the age of 8-12 years.

*Aim* of the study was to evaluate the long term results of secondary osteoplasties in cleft patients.

*Material and methods:* All young patients with clefts treated by the same surgical team at the OMFS Department of a Children's Hospital in Athens, from 2000 to 2011, were included in the study. Patients were divided in 3 groups according to the year they were operated on for the osteoplasty and they were evaluated regarding the total number of operations required in each case for the satisfactory repair of the defect and the fistula closure.

*Results:* 61 maxillary cleft patients, 36 boys and 25 girls with a mean age of 11.8 years at the time of operation, were included in the study; 13 had a bilateral bone defect thus raising the total cleft sites treated to 74. Sixteen patients were included in the 1st group (2000-2003), 21 in the 2nd (2004-2007) and 24 in the 3rd (2008-2011). Revi-

sion operations with additional grafting were 3/16 or 18.7% in the first 4 years, 2/21 or 9.5% in the second time period and 1/24 or 4.2% in the last time period. Bone defect was repaired in all cases and the same applied for fistulas. In 4 cases of bilateral cleft revision operations for soft tissue ameliorations were also performed. Pre- and post operative orthodontics was mandate for teeth alignment.

*Conclusions:* A gradual reduction of the number of revision osteoplasties was registered during the 12 years studied. This is attributed to the accumulation of expertise as well as to the introduction and repetitive application of the following: elevation of large extended buccal and palatal mucoperiosteal flaps in order to cover the graft without any tension, careful surgical preparation and water tight suturing of the nasal side of the fistula, harvesting of adequate bone from the iliac crest and grafting of the recipient site with a standardized technique.

#### O-1605

### ALVEOLAR BONE FORMATION IN PATIENTS WITH UNILATERAL CLEFT LIP AND PALATE AFTER EARLY SECONDARY GINGIVO-ALVEOLO-PLASTY: LONG TERM CT EVALUATION

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*Background:* The Milan surgical protocol includes the use of an Early Secondary Gingivo-Alveolo-Plasty (ESGAP) together with hard palate closure at 18-36 months, to avoid later bone grafting. The goal of this study was to evaluate three dimensionally long-term the quality of the alveolar cleft ossification after ESGAP executed with the Milan surgical approach (Brusati 2000). *Material and methods:* The samples consisted of CT Dental scans of 37 UCLP in permanent dentition. Alveolar bridging was assessed using a modified 3D Bergland's scoring system. Average age at the time of assessment was 15 ±2,0. Alveolar width was measured at three levels on the CT scans. No absolute measurements were used, but ratios of the affected versus the non affected side. Both on the DS and on the axial dental scan cuts, four levels were selected in order to evaluate alveolar thickness. A high nasal level, corresponding to the healthy nasal floor, a gingival enamel dentinal junction level and one at the mid distance between these two points when the axial and DS measurement ratios did not coincide an average of the two ratios was used-. Ossification, measured from the palatal to the vestibular cortical bone was classified as: IDEAL 100-80% thickness, GOOD 80-50% (>5 mm) thickness, MOD-EST >50% (<4mm) thickness, INSUFFICIENT, no bridging. Nasal area ossification was given by the authors four different qualitative scores, as visible on the coronal cuts. IDEAL: flat nasal floor, symmetrical in UCLP. GOOD: slightly notched nasal floor, asymmetrical in UCLP. MODERATE: notched nasal floor, asymmetrical in UCLP. Type IV INSUFFICIENT: severely notched nasal floor, severely asymmetrical in UCLP. *Results:* ESGAP seems to allow for adequate ossification both in the alveolar and the nasal region with a thickness between 100-80% in over 60% of the sample. Inadequate ossification (failure) was found in 0,5% of the sample. *Conclusions:* 3D evaluation allows for further adequate information on alveolar thickness, evaluation of bone availability for implant placement and, retrospectively, suggestions for

orthodontic protocols.

#### O-1606

### INTEREST OF CALVARIAL PERIOSTEAL GRAFT ON THE SECOND STAGE OF HARD PALATE CLOSURE IN CLEFT SURGERY

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**Objective:** Surgical correction of cleft palate has essentially the functional objective of achieving optimum results in the development of speech, hearing, dental arch formation and facial growth. An early two-stage palatoplasty protocol has been a recent trend in an attempt to obtain optimal maxillary growth without compromising adequate speech development. The rational decrease of the cleft width is stabilized within one year after soft palate surgery. This suggests that the residual cleft on hard palate will be smallest at one year following soft palate surgery. But in some cases, the width of the residual cleft on the hard palate is over 12mm at two years-old. The development of integrated speech starts at approximately at this age. This is the dilemma because we know that early mobilization of the mucoperiosteum interferes with facial growth at the long term. because of this, in cases of large residual hard palate cleft at age 2, we use a calvarial periosteal graft.

**Material and methods:** This is a retrospective study over five years (2007-2012) of 40 patients having a residual cleft of the hard palate at age 2 more than 12 mm wide and who had a calvarial periosteal graft. We analyse the outcome of the airtightness of the hard palate, the speech quality and the growth of the midface.

**Results:** A low rate of oronasal fistulae and a good speech outcomes were obtained. On a systematic cephalometric analysis on 15 patients (after age 10), there was no evidence of retromaxillia.

**Conclusion:** Despite advances in the understanding of the deformity, the timing and technique of surgical repair remain subjects of many controversies and debates. The use of calvarial periosteal graft on the second stage of hard palate closure may be a solution for large residual clefts without compromising adequate speech development in respect of the facial growth.

#### O-1607

### ALVEOLAR CLEFTS REPAIR USING HUMAN MESENCHYMAL BONE MARROW STEM CELLS

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Cleft lip and palate (CLP) affects the alveolar bone in the great majority of cases, and the reconstruction of this defect still represents a challenge. Recently tissue engineering has become available as a regenerative treatment for bone defects; however, little has been reported on the application of tissue engineering for regeneration of cleft

defect tissues. Mesenchymal-derived stem cells have been applied to different kinds of bone substitute and compared in different animal models, but their use in human critical defects remained unclear. The aim of the following study is to evaluate the clinical and radiographic features of the bone healing after osteoplasty of the alveolus and palate using mesenchymal bone marrow stem cells harvested from the iliac crest. From January 2011 to February 2012, at the Department of Cranio-Maxillo-Facial Surgery, Meyer Pediatric Hospital, Florence, Italy, nine patients (age 9-14) affected by UCLP were submitted to primary (1) and secondary osteoplasty (8). In particular, patients were treated using stem cells harvested from the iliac crest and bone chips. Pre and post-surgical assessment consisted in performing cone-beam TC (CBTC) at T0 (before surgery), T1 (1 month after surgery) and T2 (3 months after surgery). According to the Abyholm classification patients were assigned to 4 groups (indices I-IV) with indices I and II being rated as a success. None of the patients had post-operative major complications and were dismissed from the hospital 1 or 2 days after surgery. At 1 and 3 months follow-up, a satisfactory healing of the dental arch and hard palate was observed with good functional and radiological results with no signs of morbidity at the donor site. Osteoplasty of the alveolus and palate is an effective technique in the treatment of CLP in order to re-establish a normal dental arch and a satisfactory masticatory function and its efficacy might be greater with the use of stem cells. Stem cell and bone graft offers highly effective radiographic and clinical unification of the dental arch with low donor site morbidity. A larger sample and long-term follow-up is needed to confirm the results as well as our preliminary study.

#### O-1608

### COMBINATION OF CHEILOPLASTY AND PALATAL OBTURATOR IN A PRETERM INFANT WITH CLEFT LIP AND PALATE: A SOLUTION TO NON INVASIVE VENTILATION.

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**Introduction :** Preterm infants are widely treated with non invasive ventilation (NIV) by continuous positive airway pressure that is likely to provide less technical complications than naso-tracheal intubation. This process becomes difficult or impossible in cases of cleft lip and palate, because of the many air leaks occurring through the cleft defect. The authors report the case of a premature infant in whom a combination of cheiloplasty and a palatal plate allowed nasal ventilation with the Infant Flow ® system without complications or difficulties.

**Clinical Case :** Elouan was born at 29 weeks of gestation with a complete unilateral right cleft. He was intubated at 15 minutes after birth because of acute respiratory distress. At day 10, an attempt at extubation was performed, and the non invasive Infant Flow ® system supported by a mask covering whole the mouth and nose was applied. Elouan was reintubated the next day because of excessive air leakage through the cleft. To avoid long-term intubation (necessary because of the lack of appropriate interfaces) with its risks and complications, and after a multidisciplinary

nary discussion, a cheiloplasty was performed at Day 17. The postoperative outcomes were good. Extubation was performed on day 6 post-operatively at the same time as the removal of the nostril retainer. Non-invasive ventilation was possible in combination with a rigid palatal plate to minimize leakage through the cleft palate.

*Discussion* : The NIV in a very premature infant with cleft lip and palate is not possible with the equipment normally used because of excessive leakage of air through the cleft lip and palate. The literature is almost nonexistent on the subject. To use usual nasal prongs, cheiloplasty was performed in this newborn who was already intubated. The postoperative period was uneventful. Associated with a palatal obturator plate, the NIV was effective without the need for reintubation. The aesthetic result is fine, with a good quality scar. Finally, the endonasal extensions of the nasal mask were effective for the moulding of nose and nostrils, probably because of the malleability of cartilage which is specific of the neonatal period.

#### O-1609

### SINGLE STAGE PRIMARY LIP, ALVEOLAR & NASAL REPAIR IN BCLP WITHOUT PRESURGICAL ORTHOPAEDICS

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The surgical management of bilateral cleft nasal deformity remains a functional & aesthetic dilemma for the surgeon. A number of techniques have been developed to reposition the lower lateral cartilage domes at the time of lip repair & recruit columellar skin from nasal tip skin instead of prolabium. These techniques were either two-stage approaches, techniques that require nasal tip incisions, or techniques that dissect the nasal tip cartilages in retrograde fashion. Each of them had their own drawbacks. The development of presurgical orthopaedic naso-alveolar molding facilitated & improved upon the surgical outcome. Unfortunately, in the developing countries, presurgical orthopaedics is not widely available for all BCLP patients.

Trott described one-stage open rhinoplasty at the time of lip repair. The prolabial flap is carried on the distal end of the columellar skin. Although the prolabial blood supply was claimed by opponents to be precarious, this approach allows the best possible exposure to the displaced dome cartilages even in the asymmetric forms of bilateral clefts and avoids scars at both the nasal tip & lip-columella junction.

Primary alveolocheiloplasty has been our standard of care. In this study, we report successful combination of primary open rhinocheiloplasty & alveoloplasty between three & six months of age in 19 consecutive patients suffering bilateral complete cleft lip & palate followed up to three & half years. Nasal tip projection, nasal width, columellar length, and nasolabial angles of these patients postoperatively were comparable to age matched controls. Elimination of alveolar defects & anterior palatal fistulae was achieved. Technical tips to ensure adequate blood supply of the prolabial flap & premaxilla through this approach will be presented.

Despite the lack of presurgical orthopaedics, a well-

implemented primary lip, alveolar & nasal repair is cost effective in limiting the number of surgical interventions & combining the advantages of both rhinocheiloplasty & alveoloplasty. It stabilizes the alveolar segments and eliminates the occurrence of anterior palatal & alveolar fistulae by providing a two-layer closure. Furthermore, this approach provides optimally oriented nasal tip anatomy while reducing the social stigma of the bilateral cleft lip nose appearance early during the child's growth.

#### O-1610

### THE SHAPE OF THE NOSE AFTER TENNISON-RANDALL CLEFT LIP REPAIR AND PRIMARY RHINOPLASTY – A PROSPECTIVE STUDY OVER 4 YEARS

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*Introduction*: The real challenge of cleft lip repair is the reconstruction of a harmonic nasal shape. Frequently, there remain residual and typical deformities of the nose after the primary closure. The aim of the present study was to evaluate with prospective longitudinal photo documentation the nasal form after cleft lip repair in the technique of Tension-Randall with primary rhinoplasty.

*Patients and methods*: Standardized photos of 31 children with unilateral cleft lip and alveolus and 46 children with unilateral cleft lip and palate were taken preoperatively and at the age of 4 years. From the frontal view 10 proportions of anthropometric distances (cleft – non-cleft) and from the submental and lateral view respectively 1 proportion were calculated. The angles of the nostrils were measured on the cleft and non-cleft side. Data for healthy children from Farkas served as reference values.

*Results*: Preoperatively the insertion point of the alar base was significantly lateralized, which was shown in an increased proportion of the distance to the nasal tip (sbal-prn) and the subnasal point (sbal – sn). At the age of 4 years alar base was positioned almost symmetrically in the transversal (sbal-sn) and vertical (sbal-ch) dimension. The same applied to the distance nasal tip – alar base (prn-sbal). By the technique described the angle of the nostrils could be increased by 2° (cleft lip alveolus) and 14° (cleft lip and palate). However, it remained significantly flattened on the cleft side (38°) compared to the non-cleft side (cleft lip and alveolus 49°, cleft lip and palate 48°). The nostril diagonal (sbal-col) was also shortened on the cleft side. In the area of the nasal curvature (al) the noses appeared broadened compared to the reference values. The nasolabial angle and the angle of the nasal tip were within the normal range.

*Conclusion*: In summary, the technique of primary rhinoplasty yields a good contour of the alar wing and nasal tip in cleft patients. Nevertheless, there remain deformities, especially of the cleft nostrils.

#### O-1611

### USE OF NASOALVEOLAR MOULDING IN EARLY CLEFT MANAGEMENT



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Our aim was to describe the early management protocol of cleft lip, alveolus and palate, and its rationale, as used in the Cleft Centre at the 1st Department of Pediatrics and at the Department of Pedodontics and Orthodontics at the Semmelweis University Budapest.

The non-surgical and surgical procedures started with lip taping and nasoalveolar moulding as soon as the Cleft Team saw the patient. Lip closure was performed at an age of 6-8 weeks and definitive one-stage lip closure was performed according to the segment management, but before the age of 6 months.

With this treatment sequence, arch management was satisfactory and at the time of the definitive lip closure the position of the maxillary segments did not interfere with adequate surgical repair and gave appropriate nasal support.

Even if tedious and not necessary for all cleft patients, this treatment sequence can address the difficult situation when treating unilateral cleft patients with large gap or bilateral cleft patients with an excessively protruding premaxilla. We believe this protocol can be a useful tool in the cleft surgeon's armamentarium.

#### O-1612

#### EFFECTS OF NASOLALVEOLAR MOLDING IN PATIENTS WITH UCLAP - RESULTS OF A PROSPECTIVE INTERDISCIPLINARY TRIAL

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*Purpose:* NAM is well known in patients having UCLAP to increase aesthetic and functional results. In contrast the effects of NAM on dentoalveolar relations, breathing, and speech are not well known. Long-term comparisons are necessary to find out additional advantages of NAM.

*Methods:* In a prospective study 38 patients (UCLAP) from 3 cleft centres were observed from birth up to 5 years of age. In one third of patients (I) NAM was carried out from birth up to lip surgery using a dynamic appliance combined with a presurgical plate for dentoalveolar development. In the second third (II) a presurgical plate was used only. In this centre patients underwent postoperative NAM using a static appliance for 3 months. In another third of patients (III) nothing was done. In centre I (surgery: Pfeifer) and centre II (surgery: Millard) lip closure was performed within 6 months, in centre III (surgery: Pfeifer) within 3 months of age. In all patients outcome were examined using standardized minimum records from birth up to 5 years of age: Orthodontists have compared bimaxillary dental casts (transversal/sagittal) using a PC guided software, surgeons have compared standardized photographs using a rating score and speech pathologists have compared patients in voice (A-I probe, tonometry) and primary dysfunctions (lip posture, tongue rest posi-

tion, swallowing). Finally statistical evaluations were done.

*Results:* Surgical observations revealed significant differences of results when comparing patients from 3 centres: Preoperative NAM has influenced wideness of cupid's bow and philtrum as well as position of ala on the cleft side. Orthodontists: In all patients of centres I and II NAM had no negative effects on dentoalveolar relations. Preoperative and postoperative NAM have shown no negative influence on the position of the premaxilla. Speech pathologists have observed significant differences: Cleft patients without NAM (III) had significantly more orofacial dysfunctions like mouth breathing and nonphysiological tongue position than the other.

*Conclusions:* Preoperative NAM has significant effects on aesthetic results of white lip and nose. This may be influenced by surgical techniques. NAM has no negative influence on dentoalveolar development. NAM has positive effects on primary and secondary functions of the orofacial system.

## Session 17. ORBITAL TRAUMA

### O-1701

#### ORBITAL FRACTURE MAPPING BASED ON REFORMATTED CT IMAGING - THE COVENTRY SYSTEM

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Orbital and orbito-zygomatic fractures are a common effect of facial trauma.

The anatomical description of fracture patterns based on reformatted computerised tomography (CT) images is generally employed in practice frequently with quantifying descriptive terms such as un-displaced, minimally / moderately / severely displaced, and rotated. There is hardly any practical fracture mapping methods based on simple and objective measurements.

We present a straightforward method using the tools of the Digital Imaging and Communications in Medicine (DICOM) viewer of the Picture Archiving and Communication System (PACS) network commonly employed by most hospitals:

- The maximum extent of an orbital or orbito-malar fracture is expressed as the time on a clock face using the coronal CT views
- Sagittal plane fracture measurements of the orbital floor, medial wall and roof are performed and recorded using the format of a bank account sort code.
- In orbito-malar fractures, the "lateral wall discrepancy" is measured in the axial plane while the "fronto-zygomatic gap" is measured in both the coronal and axial planes.

In conjunction with other anatomical and functional parameters such measurements can be input into a specific research database leading to a more accurate patient stratification.

We also present the results of our attempt to validate this method through statistical analysis of inter-observer measurement replication using a random sample of 10 CT scans of isolated orbital or orbito-malar fractures and a group of maxillofacial surgeons and radiologists of varying levels of orbital trauma expertise.

### O-1702

#### INTEREST OF NAVIGATION IN COMPLEX ORBITAL FRACTURE

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Reconstruction of complex orbital fracture or after orbital tumour removal is a challenging procedure in order to obtain correct symmetry. Navigation allows preoperative planning with mirroring, which is particularly useful in this condition. We report our experience in 30 patients with navigated reconstruction of orbital wall using titanium mesh.

A preoperative and postoperative CT scans assess the orbital volumes to evaluate the symmetry of the recon-

struction. Although good results on orbital walls are achieved, we noticed some cases of persistent enophthalmos in secondary traumatic situations (this can be due to orbital fat atrophy due to traumatism).

Navigation is time-consuming but the benefits in orbital reconstruction appear significant in achieving symmetry and the surgeons' comfort.

### O-1703

#### COMPUTER-ASSISTED PLANNING AND INTRAOPERATIVE NAVIGATION FOR POST-TRAUMATIC ENOPHTHALMOS.

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*Aim:* Post-traumatic enophthalmos after inaccurate restoration of orbital anatomy may be a sequella of orbital fractures. The preoperative computer-assisted planning with virtual correction has been combined with intraoperative navigation in an attempt to more accurately reconstruct the bony orbital walls. The purpose of this presentation is to show our experience with computer planning, virtual selection and checking of a previously contoured titanium orbital mesh, and intraoperative navigation in patients with orbital wall fractures.

*Material and methods:* Four patients with post-traumatic enophthalmos were included in this study. The imaging and planning platform used in this study was iPlan (Brainlab). Virtual correction was made using the uninjured side by creating a mirror image that was superimposed on the traumatized side and using the image of a contoured titanium orbital mesh.

Intraoperative navigation was used to assess the accuracy of the restored walls and the computer planning models were used intraoperatively as a virtual template to navigate the preplanned bony contours. All patients were reconstructed with a previously contoured titanium orbital mesh that was previously selected in size by the preoperatively computer planning.

All patients received a postoperative CT scan, and the preoperative and postoperative images were compared.

*Results:* Follow-up examinations revealed that the degree of enophthalmos decreased to less than 2 mm in all the patients. Anatomic restoration of orbital contours was obtained in all the patients according to the comparison of preoperative and postoperative CT scans. Accuracy was proved by comparing postoperative CT and the computed virtually planned reconstruction.

*Conclusions:* Preoperative computer modelling and intraoperative navigation is a useful guide and provides an accurate reconstruction of orbital fractures.

### O-1704

#### OUTCOMES OF ORBITAL FRACTURE REPAIR USING A PREFORMED 3D ORBITAL PLATE

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We present a retrospective study of orbital blow out fractures using preformed 3 dimensional orbital plates (MatrixMIDFACE, Synthes) and discuss the learning points gleaned along the way.

25 patients (20 males and 5 females) treated at our unit

between April 2009 and November 2011 with an isolated orbital floor, medial orbital wall or combination orbital floor and medial wall fracture.

All patients underwent a pre operative CT scan and orthoptic or ophthalmology assessment prior to surgery. The time from injury to surgery was on average 10 days. The fractures were approached via either a transconjunctival or infra orbital approach. Post operative assessment of effective plate position was based on clinical signs and radiographs, (PA orbits and Lateral Cephalogram) or CT scans. Follow up was for on average 10 months. Three patients had to undergo repeat surgery to reposition the orbital plate as a result of incorrect medial lateral positioning or posterior edge of the plate. However all patients had acceptable globe position and function. In conclusion the placement of 3 dimensional orbital plates is very technique sensitive if the aim is to get precise position. We present our analysis of the return to theatre and discuss reasons as to how this can be avoided.

#### O-1705

### ORBITAL FLOOR RECONSTRUCTION CONSIDERING ORBITAL FLOOR SLOPE

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Orbital floor fractures are among the more challenging injuries faced by plastic surgeons. Enophthalmos is defined as backward, usually downward, displacement of the globe into the bony orbit. We describe reconstruction of the orbital floor slope in orbital floor fractures that prevents postoperative complications, especially post-traumatic enophthalmos. Thirty-three patients with orbital floor fractures were treated using reconstruction of the orbital floor slope between April 2009 and July 2010. The patients ranged in age from 12 to 54 years. There were 31 males and two females. All patients were operated on using a transconjunctival approach under general anaesthesia. The orbital floor was reconstructed with poly-L-lactide, D-lactide sheets in all cases. Preoperatively, 23 patients (69%) had enophthalmos and 12 patients (36%) had symptomatic diplopia. The enophthalmos was corrected in 20 patients (86%) and the diplopia resolved in ten (83%). Extrinsic ocular movement was impaired preoperatively in one patient (3%), but resolved after surgery. No patient had impaired visual acuity pre- or postoperatively. The results suggest that orbital floor reconstruction considering the orbital floor slope is a safe, reliable method with fewer complications that is more effective at preventing post-traumatic enophthalmos.

#### O-1706

### ORBITAL FLOOR RECONSTRUCTION WITH NIKELID TITANIUM TISSUE

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**Objectives:** The use of nikelid titanium tissue allows reconstruction of orbital walls due to its superelasticity. We present the evolution of the nikelid titanium materials in orbital floor reconstruction over the past decade.

**Material and Method:** A total of 45 patients underwent

orbital floor reconstruction from 2009 to 2011. All the patients were treated with a standard protocol – if the orbital floor fracture was diagnosed on CT the subciliary incision was done and the reconstruction was performed using nikelid titanium tissue. Nikelid titanium tissue consists of nikelid titanium porous fibers 60-80 nanometers in diameters braided in one layer with pore diameter from 150 to 250 nm. If a comminuted inferior orbital rim fracture was diagnosed, the nikelid titanium tissue was placed overlapping the defect to reduce further palpability.

**Results:** 45 patients were treated using this technique from 2009 to 2011. On the postoperative CT the implant was in a good position in all cases. Clinical evaluation showed no complication due to infection, implant migration or functional disorder of visual organ over the period from 3 months to 3 years follow up.

The use of nikelid titanium tissue for orbital floor reconstruction has been shown to be safe and effective. Nikelid titanium tissue is easy to handle, manipulate and trim to a desired shape, is delicately inserted and does not need to be anchored. The accurate anatomical reproduction of orbital floor contours is achieved due to superelasticity of nikelid titanium. This generally leads to reduced operation time, and improve in functional and esthetic outcomes in orbital floor fractures.

**Summary:** we present the evolution of the nikelid titanium materials in orbital floor reconstruction over the past decade. Nikelid titanium tissue can be used in orbital floor reconstruction.

#### O-1707

### JUST HOW CLOSE IS THE OPTIC NERVE USING PREFABRICATED TITANIUM MESH IN ORBITAL FLOOR RECONSTRUCTION?

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The advent of commercially available prefabricated titanium orbital mesh (Synthes Matrix 0.4mm) based on average CT data for both medial and orbital floor fracture reconstruction has translated into the routine use of these reconstructive materials in orbital fracture reconstruction. The orbital process of the palatine bone is the critical landmark in the deep orbit that should be identified during dissection for accurate placement of these reconstructive materials. The concern in using prefabricated orbital mesh is malpositioning of the material or impingement of the optic nerve with reduction or loss of visual acuity. This paper provides a series of 45 cases using postoperative CT data to measure the average distance of the posterior aspect of the prefabricated reconstructive mesh to the optic canal along with the accuracy of the reconstruction.

The results demonstrated that the posterior aspect of the prefabricated titanium orbital mesh on average was 6.4mm anterior to the optic canal and that the anatomical reconstruction was accurate if the material was placed on the orbital process of the palatine bone. Therefore our conclusion was that the use of prefabricated titanium orbital

mesh is a safe and reliable technique with accurate anatomical reconstruction of orbital fractures.

#### O-1708

### SECONDARY RECONSTRUCTION OF POSTTRAUMATIC ENOPHTHALMOS WITH PERIORBITAL OSTEOTOMIES AND GRAFTING

Alvaro García-Rozado<sup>1,\*</sup>, Ramón Luaces<sup>1</sup>, Nicolás Carral<sup>1</sup>, Vanessa Chávez<sup>1</sup>, José Luis López-Cedrún<sup>1</sup>  
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**Introduction.** Posttraumatic enophthalmos is a challenging deformity for oral and maxillofacial surgeons. The vast majority of those deformities have an associated osseous periorbital defect that requires surgical correction.

**Aims.** To present our experience in surgical reconstruction of these defects for the last four years. To analyze the strategies used to prevent periorbital deformities and to correct late post traumatic enophthalmos.

**Material and methods.** Eleven cases of posttraumatic periorbital deformities were secondarily reconstructed in our Department during the last four years. In 9 cases, repositioning osteotomies were undertaken to achieve a improvement of the orbital framework. In all 11 cases, no bone grafts were used to reconstruct orbital walls, or to provide forward globe projection, or to fill osteotomy gaps.

**Results.** Patient satisfaction was achieved in 10 of 11 cases, although pretraumatic anatomy was not restored. Among the pitfalls encountered, functional sequelae were observed in 6 cases emphasizing 3 cases of lacrimal system impairment, fibrous ectropion in 1 case, or diplopia in 3 cases.

**Discussion.** Different therapeutic strategies have been described for periorbital and intraorbital deformities. All of them are based mainly upon repositioning osteotomies and bone grafting procedures. Particular attention should also be paid to soft tissue alterations. Indication criteria to perform osteotomies or orbitotomy designs are not clear at all.

**Conclusions.** Late secondary posttraumatic periorbital deformities, including residual enophthalmos, should be managed surgically as soon as possible. Patients must be aware that the pretraumatic condition may be impossible to reach, and some kind of sequelae can be expected. Patient satisfaction is high and reconstructive surgery is recommended and worthy in majority of cases.

#### O-1709

### FRACTURES OF THE ORBITAL FLOOR - THE SINUS ENDOTHESES EXPERIENCE

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Displaced fractures of the orbital floor may sometimes be a challenge for reconstruction. More than five hundred patients with isolated fractures and combined fractures of the orbital floor were treated with the sinus endothesis between 1986 and 2011. The sinus endothesis is a device

which keeps the orbital floor fragments in anatomical position after repositioning and which is removed through the nose after 3 to 5 weeks.

The aim of our retrospective study was to explore long term complication rates after surgery.

In a randomized selection 124 patients were reviewed after a mean period of 8.85 years. They were asked to complete a standardized questionnaire, were clinically examined by an ophthalmologist, an orthoptist and a maxillofacial surgeon. In addition a cranio-exentric x-ray image was made at the time of review. The recoveries of sensation in the infraorbital region, of pain in the traumatized area and of diplopia were recorded. The time between insertion and removal of the endothesis was evaluated (mean 21,8 days).

A large number of patients (58%) showed no deficiency of the sensibility in the infraorbital area. Most patients (69%) did not have any pain. 68% of the patients had no diplopia at all. Persistence of diplopia in extended field of vision was found in 27% of the patients. One patient had double vision in the primary field. The results show that the use of a sinus endothesis in displaced fractures of the orbital floor provides anatomical reconstruction without leaving foreign material in the orbit.

#### O-1710

### ROLE OF ANTERO-LATERAL WALL OF THE MAXILLARY SINUS IN THE RECONSTRUCTION OF ORBITAL FLOOR FRACTURES.

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The orbit occupies a prominent position on the facial skeleton and is an important structure both in terms of function and aesthetics. Orbital fractures can be classified into pure (isolated) and impure (complex) fractures. Isolated fractures account for 4% to 16% and complex fractures account around 30% to 55% of all facial fractures. Different surgical approaches and materials have been employed for the reconstruction of orbital floor fractures. This paper will highlight our experience in using antero-lateral wall of the maxillary sinus for orbital floor fractures.

**Material and Method:** Nineteen patients with facial trauma involving orbital floor fractures were treated with antero-lateral wall of the Maxillary sinus. Twelve were male and seven were female with ages ranging from 13 to 62 years. Fifteen were pure and four were impure orbital fractures. Diagnosis was made by history, clinical examinations and CT scans. CT scans were used to measure the orbital floor defects. Defects not more than 10mm transversely and 25mm antero-posteriorly were included in the study.

**Results:** All patients had acceptable cosmetic and aesthetic outcome. Two had persistent diplopia in the extreme upward gaze. Four had transient paraesthesia over the distribution of infra-orbital nerve which resolved in three to eight weeks. Two had an acute phase of sinusitis which was treated with antibiotics.

**Conclusion:** Orbital floor fractures can be treated in a variety of ways. Use of the antero-lateral wall of the maxillary sinus in orbital floor defects of medium size is a

useful autogenous material available to Maxillofacial Surgeons.

#### O-1711

### TREATMENT OF ORBITAL FLOOR FRACTURES UNDER LOCAL ANAESTHESIA: OUR EXPERIENCE

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Orbital floor fractures are a common result of facial trauma. Exophthalmos and diplopia, resulting from extraocular dysfunction or entrapment, and infraorbital hypoesthesia may occur. In the literature many reports exist about different approaches and techniques for treatment of this kind of fractures, but few reports exist about use of local anaesthesia with conscious sedation for their treatment. This study aimed at evaluating extraoral infraorbital nerve block with conscious sedation for orbital floor fractures treatment. This study comprised 34 patients submitted for pure orbital floor fractures at Department of Maxillofacial Trauma and Surgery at Careggi University Hospital of Florence in Italy between November 2011 and April 2012. Mean age was 42.38 yrs (range from 16 to 77). In all cases fractures were evaluated preoperatively with CT scans. Indications for surgery were: diplopia in 17 patients, enophthalmos in 4, orbital floor defect (greater than 50%) in the other cases (13). All patients were premedicated with midazolam iv. After conscious sedation with intravenous remifentanyl, the infraorbital nerve was blocked with 4 ml of chirocaine 5%; then local infiltration of lower lid was performed with bupivacaine with adrenaline 1: 200.000. The following parameters were evaluated: blockage effectiveness, onset, surgical approach, anaesthesia during time, need for general anaesthesia and complications.

33 blocks were effective, the time required to obtain anaesthesia was from 3 to 11 minutes and none of the 33 patients reported any discomfort or pain during blockage and surgery. In 1 case local anaesthesia was insufficient and general anaesthesia needed. In 32 patients we used a subciliary approach and in 2 patients a transconjunctival one. Medpor was used in all cases for orbital floor reconstruction. Before closing the wound all patients were tested for extraocular muscle movement which was normal in all cases. Intraoperative evaluation of diplopia was not always reliable. Mean duration of surgery was 28 minutes from incision to suture. No patients had complications.

In conclusion, the treatment of orbital floor fractures is possible under local anaesthesia (infraorbital nerve block) and conscious sedation. With this surgical technique the main advantages are the short surgical time and direct control of extraocular muscle movements.

#### O-1712

### BONE FORMING COMPOSITES FOR ORBITAL FLOOR RECONSTRUCTION: A FEASIBILITY STUDY IN SHEEP

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**Introduction:** In the treatment of orbital floor fractures, ideally bone is regenerated. The alloplastic materials currently used for orbital floor reconstruction do not lead to the regeneration of bone. Our objective was to make polymeric materials based on poly(trimethylene carbonate) (PTMC) osteoinductive, and to evaluate their suitability for use in orbital floor reconstruction.

**Materials and Methods:** Osteoinductive biphasic calcium phosphate (BCP) particles were introduced into a polymeric PTMC matrix. Composite sheets (PTMC/BCP) containing 50 wt% BCP particles were prepared. In addition laminates with poly(D,L-lactide) (PDLLA) were prepared by compression moulding PDLLA films onto the composite sheets (PTMC/BCP-PDLLA). After sterilization by gamma irradiation, the sheets were used to reconstruct surgically-created orbital floor defects in sheep. Ten full-grown female Texel sheep were operated on and divided into 2 groups: follow-up was respectively 3 and 9 months. Critical size defects were created in both orbital floors and reconstructed with the composite materials. Intramuscular implantations served as controls to demonstrate osteoinductive properties.

Orbital floor reconstruction was assessed by Cone Beam Computer Tomography (CBCT) at three different time periods: 1 week preoperatively (control), 1 week postoperatively and at time of termination. Bone formation was histologically evaluated both qualitatively and quantitatively.

**Results:** The prepared (laminated) composite sheets showed excellent handling properties during the surgical procedure and were easily cut and shaped into the desired shapes. Analysis of the CBCT scans showed that the composite sheets and the laminated composite sheets performed well in orbital floor reconstruction. Only minimal deformation of the implanted orbital sheets was observed after three and nine months. Qualitative and quantitative histological evaluation revealed that bone formation was present in the composite materials at the site of the reconstructed orbital floors as well as in the intramuscular located samples.

**Conclusion:** From the data obtained it can be concluded that the composite sheets and the laminated composite sheets exert osteoinductive properties and are very well suited for use in the bone-regenerating reconstruction of critical size orbital floor defects in sheep. Handling and shapeability were shown to be excellent. The (laminated) composite sheets seem promising for use as orbital floor reconstruction materials in humans.

**O-1713****CORRECTION OF ORBITAL FLOOR ADHESIONS WITH HUMAN AMNIOTIC MEMBRANE**

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**Introduction:** Diplopia caused by postoperative or post-traumatic adhesions is a common complication after orbital floor repair. Corrective surgery includes removal of the fibrotic tissue and secondary implantation of anti-adhesive biomaterials. The current study investigated the use of allogenic human amniotic membrane as anti-adhesive material for secondary orbital floor repair.

**Patients and methods:** The study included eight patients (mean age 37 years, all male) with deficient ocular movement after orbital floor fracture. Five patients had been previously operated upon, whereas three had not been treated surgically. To be included in the study, time from trauma had to be at least four months, and MRI scans had to indicate the presence of cicatricial tissue at the fracture location. Patients were treated with surgical adhesiolysis and insertion of allogenic human amniotic membrane laminated on Polyglactin 910/polydioxanone foil functioning as carrier material. During three months follow-up time, the patients were examined ophthalmologically, especially for diplopia or limited ocular bulb movement.

**Results:** Disorders of ocular bulb motility disappeared completely in five patients. Two patients showed improved motility and a reduction of objective and subjective symptoms. One patient showed no improvement.

**Conclusion:** Allogenic human amniotic membrane has anti-adhesive effects when used in secondary reconstructions of orbital floor fractures.

floor fractures (five patients) were reconstructed with preformed three-dimensional (3-D) orbital meshes. All patients were treated by one surgeon. Pre-postoperative CT scans, aesthetic and ophthalmological results and complications were recorded. Patients were followed up for 6 months or more.

**Results:** All of the patients had satisfactory recovery in terms of ocular function and globe position. None of the patients experienced ophthalmic complications related to the transcaruncular-transconjunctival approach or developed enophthalmos or diplopia. Immediate postoperative CT scans showed anatomically correct orbital wall reconstruction as the mesh were placed with the correct orientation and angulation, except one hinged towards the ethmoid. The posterior ledge of the fracture was not reached in 4 cases. The most common complaint expressed by patients included irritative tearing and swelling that resolved within 48 hours.

**Conclusion:** In severe medial orbital wall fractures the use of titanium meshes placed using a combined transcaruncular-transconjunctival approach achieves satisfactory orbital reconstruction in terms of function and shape. The use of an endoscope allows better visualization of the posterior part of the fracture site. In addition endoscopically assisted procedures are very helpful for teaching purposes.

**O-1714****ENDOSCOPICALLY ASSISTED VS TRADITIONAL REPAIR OF MEDIAL ORBITAL WALL FRACTURES WITH TITANIUM MESH PLATES USING A TRANSCARUNCULAR- TRANSCONJUNCTIVAL APPROACH: CT SCAN EVALUATION.**

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**Introduction:** The use of titanium orbital mesh plates, placed using combined transcaruncular-transconjunctival approach for the reconstruction of severe medial orbital wall fractures, results in the optimal repair of the orbital walls and allows to restore the preoperative bony orbital volume and shape. The aim of the present study was to evaluate the efficacy of this technique and the success rate of placing the mesh either using the traditional free hand approach or endoscopically.

**Patients and Methods:** The present study includes ten patients (age range 22 to 74 years) who underwent surgery for severe medial orbital wall fractures from 2010 to 2011 at the Division of Maxillofacial Surgery, University of Turin, Turin, Italy. Eight patients were treated using free hand placement of the orbital titanium mesh plates; in two patients a mesh was placed by endoscopy. Isolated medial orbital wall fractures (five patients) were reconstructed with radial orbital meshes. Combined medial wall/orbital

## Session 18. PREPROSTHETIC SURGERY AND IMPLANTOLOGY II

### O-1801

#### TREATMENT PLANNING BASED ON BIOMECHANICAL REQUIREMENTS

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**Background:** Biomechanical aspects play a major role for the success of implant treatment and the general principles of bone remodelling are well known. Even if the individual bone geometry around a dental implant is given by 3D planning tools the biomechanical requirements were usually not considered in the implant positioning process. The position of the implant is still defined by general rules and the experience of the surgeon.

**Aim:** The aim of this study is to show the biomechanical impact of different implant positions in a 3D patient individual bone environment and to suggest a procedure considering biomechanical requirements during implant treatment planning.

**Methods:** The bone geometry from a CT-scan before implant placement is transferred to a segmentation tool. In the segmentation tool the implants were placed in accordance to the implant positions given from the surgery. This is achieved by another CT-scan containing the implants. The geometry of the implants in the segmentation is taken from a CAD system to make sure that the exact geometry of the implant is used. A finite element model is created out of the bone segmentation and the placed implants. The occlusion forces are applied to the finite element model and the bone stresses and strains are calculated. To show the influence of the implant position to the bone reaction the coordinates of the implant are varied and subsequent finite element calculations are carried out. A comparison of all varied positions is done and the optimal implant position is determined.

**Results:** The 3D geometry of the patient individual bone given from CT-scans differs from the idealized geometry usually used for finite element calculations. As a result of that the position of the implants has a significant influence to the bone strains. With the variation of the implant position an optimal placement of the implant can be carried out and used in the treatment planning process.

**Conclusions and clinical implications:** The implant position has a major impact to the biomechanical response of the bone. The described procedure for implant placement considering the biomechanical requirements of the bone tissue can be used during the implant treatment planning process to achieve an optimal clinical result of the bone

remodelling process.

### O-1802

#### BACKWARD PLANNING CONCEPT IN TREATMENT PROCEDURES WITH OSSEOINTEGRATED IMPLANTS IN 3D SOFTWARE.

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The main objective of our study was to improve the functional and aesthetic results of patients treated with different pathologies in whom osseointegrated implants are indicated with the aid of 3D software and CAD\CAM technologies.

**Materials and method.** During 2007-2012 167 osseointegrated implants were placed in 34 patients, 21 men and 13 women. 23 patients with tooth loss, 9 patients who underwent earlier fibula microsurgical mandible reconstruction, 2 patients with primary and secondary ear loss.

The planning stages were:

1. Computer tomography and optical scanning of the interest region.
2. Virtual reconstruction of the requested anatomical formations using different concepts. Mirroring and symmetrisation of the contralateral side, or software accommodation of the "virtual donor" model.
3. Virtual anatomical alignment of the osseointegrated implants according to earlier designed anatomical formations and prosthetic constructions, with computer design of the intrasurgical templates.
4. Patients with ear loss at the prosthetic stage underwent facial optical scanning for virtual cast design for the silicon prosthesis (intrinsic coloration) to create superior anatomical shape.

The planning concept is based on "backward planning" - all the virtual engineering calculations were performed based on the future prosthetic construction, according to anatomical, functional and aesthetic considerations. All surgeries were performed with the aid of CAD\CAM surgical templates. At the stage of auricular prosthesis manufacture CAD\CAM produced cast was used.

**Results.** During follow up period (up to 5 years), after final prosthesis installation, optical scanning and computer tomography performed to determine planning accuracy of the implant placement and facial prosthesis correspondence. Medium vector deviation of implant position was 0,51mm, angulation 5,12 deg. systemic guide appliance vector deviation 0,3mm. No implants were lost during follow up period. We consider the virtual backward planning concept with intrasurgical guides manufacture is superior to a conventional planning approach for its accuracy and planning capabilities.

**Summary:** The approach described permitted us to get higher predictability of treatment results at patients with osseointegrated implants, indicated for anatomical, functional and aesthetic rehabilitation. Virtual intervention planning allowed all involved specialists to collaborate instantly, to get conformity at the presurgical stage, thus eliminating discordance on the postsurgical stage.

**O-1803****USING A MINIATURIZED NAVIGATION SYSTEM FOR DENTAL IMPLANTOLOGY**

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Using systems for intraoperative navigation to transfer preoperative planning data into the OR environment became a standard procedure in modern CMF surgery. The typical setup with stereo-camera system and the use of marker-shields could hinder the planned surgery, especially for smaller surgical areas e.g. dentoalveolar surgery or dental implantology due to the "line-of-sight" problem.

In this work we present a miniaturized navigational system that was developed as a prototype system in a scientific transfer project among researchers from a university hospital, a university for applied science and an industrial partner. The system consists out of a stereoscopic camera system that can be mounted directly on a surgical instrument (e.g. burr, hand-piece etc.). The rigid bodies are miniaturized ceramic optical markers (18 x 18 mm). In this setup the navigational instruments can be directly brought into the sterile field. The system provides a theoretical resolution of 4µm.

The system was tested in laboratory and cadaver studies for navigational guidance in dental implantology: the bony cavities for dental implants were virtually planned in plastic anatomical models and human cadaver jaws based on CBCT and CT scans. The planning data were transferred into the navigation system in .stl file format, and then the system was used to control position, angulation and depth of the implant site preparation. In this setup we could achieve a constant accuracy in the submillimetric range.

The presented prototype system is especially developed for intraoral applications and it allows overcoming ergonomic problems that currently hinder a routine application of navigational technology in the field of dental implantology and dentoalveolar surgery.

**O-1804****A GRAFTLESS SOLUTION FOR PATIENTS WITH COMPLETE ATROPHY OF THE ALVEOLAR RIDGE OF THE MANDIBLE - PERSONNALISABLE POLYMER IMPLANTS IN A PILOT STUDY**

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In the edentulous and partly edentulous mandible implant procedures to fix a complete bridge are often impossible because of lack of bone substance. Patient treatment acceptance for nerve dislocation and bone grafts is low when all the disadvantages of the procedures are explained and understood. The purpose of this study was to evaluate a protocol for immediate function (within 2 hours) of standard crestal and basal implants in the material PEEK (poly-ether-ether-ketone) supporting a fixed prosthesis in the completely edentulous mandible.

This clinical study concerns two cases of complete atrophy of the alveolar ridge of the mandible treated with integration of 4 PEEK- implants and immediate loading. After the 40th day we fabricated a new fixed PEEK meso-structure which was the base of ceramic teeth arch .

The patients were followed for at least 12 months and up to 60 months. No crestal bone and no basal implant was lost in the controlled period.

The patients could have been candidates for extended bone grafts for the frontal and lateral parts of their mandible in combination with dislocation of their inferior alveolar nerves, which would normally to be performed in hospital conditions under general anesthesia. They should have more than 1 operation wound and more than one region with tissue scarring. There is no report in literature about immediate prosthetic rehabilitation in such cases after bone grafting.

With our concept, the new PEEK material and the new crestal and basal implant design, these patients benefited from a less invasive procedure (1 surgical procedure and no grafting), the best use of the individual anatomical situation , the incorporation of osteoconductive material and immediate rehabilitation.

Increase in patient's immediate functional ability and reduction of morbidity following the surgical procedure render this procedure a viable treatment option.

**Keywords:** atrophied mandible, edentulous mandible, PEEK implants

**O-1805****ALTERNATIVES IN THE TREATMENT OF THE POSTERIOR ATROPHIC JAWS: RETROSPECTIVE STUDY OF A SERIES OF CASES AND REVIEW OF THE LITERATURE.**

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**Introduction:** In the edentulous patients we can observe as the alveolar bone has suffered a great reabsorption, managing to disappear even and to come to the basal of the bone. There are difficulties for dental implant use in posterior mandible when there is little bone height for implant placement.

Mandibular nerve (MN) lateralization is one of the options when placing implants in an atrophied mandible, where no sufficiently long fixtures can be placed without encroaching on the MN. Use of short fixtures, onlay bone grafting to increase ridge height, and positioning of implants alongside and not into the nerve canal are other options. Moving the MN laterally from its canal can be performed using nerve lateralization or nerve transposition techniques. An advantage of MN lateralization is the ability to place longer fixtures without grafting, and its limiting factor is the risk of nerve damage. Lower degrees of nerve deficiency occur with this method compared with nerve transposition.

The aim is to study the different therapeutics attitudes in the surgical rehabilitation of the atrophic lower jaw, analyzing a group of patients and realizing a bibliographical review of the problem.

**Material and methods:** a group of patients is analyzed by



pertaining to the jaw atrophy in the posterior sector. They were treated in the main by means of lateralization of the inferior alveolar nerve (LNDI), associated with other technologies. A small group of patients were treated about different form, using someone of the following techniques: short implants, apposition grafts, bony distraction or alveolar corticotomy.

We try to discuss LNDI's technique opposite to other alternatives treatments. In addition, the literature published up to the moment is checked.

**Results:** The most used technique was the transposition of the inferior alveolar nerve in our group of patients, with satisfactory long-term results. There exist good results published in the literature of the different techniques in the rehabilitation of the atrophic jaw.

**Conclusions:** We have several alternatives for the reconstruction of the posterior sector of the atrophic mandible. Though every technique has advantages and disadvantages, it is necessary to select every treatment depending on the type or magnitude of the fault that every patient presents.

#### O-1806

### RETROGNATHIA AND COMPLETE EDENTULISM SOLVED BY DENTAL IMPLANT PLACEMENT, SIMULTANEOUS ORTHOGNATHIC SURGERY AND IMMEDIATE CHARGE PROSTHESIS IN A SINGLE SURGERY

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**Introduction:** Dental implants allow a predictable treatment for partial and total edentulism. There are certain characteristics that our patients need to meet to obtain proper aesthetics and function. We will not be able to achieve neither good occlusion nor beauty if there is not an adequate relation between mandibular and maxillary bone. Therefore, fixing severe bone discrepancies becomes extremely valuable for most patients.

**Material and Method:** We present the case of a 55 year old patient, suffering Angle class II malocclusion, partial edentulism and severe dental phobia (abnormal fear or dread of visiting the dentist for preventive care or therapy and unwarranted anxiety over dental procedures). She claimed halitosis, inferior incisors crowding and tooth mobility. The patient rejected any surgery under local anaesthesia.

Under general anaesthesia, all the remaining teeth were extracted, six dental implants were placed on the maxillary bone and another six dental implants were placed on the mandibular bone. Impressions with polyether of both, maxilla and mandible were taken in order to make upper and lower temporary prosthesis. Obwegesser bilateral sagittal split mandibular osteotomies were performed in order to advance the mandibular bone. Finally, temporary dental prostheses were secured in both maxilla and mandible.

**Results:** All the surgical treatment was performed under a single general anaesthetic. Maxillo-mandibular sagittal

relation was re-established to a mesocephalic pattern and halitosis disappeared.

**Conclusion:** Dental implant placement, simultaneous orthognathic surgery and immediate charge prosthesis performed in a single surgery is a valuable solution to retrognathia and complete edentulism.

#### O-1807

### VALIDATION OF IMPLANT PLACEMENT IN THE EDENTULOUS MAXILLA AFTER AUGMENTATION USING A MUCOSA SUPPORTED SURGICAL TEMPLATE

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**Aim:** The aim of this prospective study is to evaluate the accuracy of dental implants which are virtually planned using a CBCT scan and placed in vivo using a mucosal supported stereolithographic surgical template in a clinically relevant manner.

**Material and Methods:** A total of 174 Brånemark System® implants were installed in the maxilla of 29 consecutive fully edentulous patients using a stereolithographic surgical template that was virtually planned using the NobelGuide™ System (Nobel Biocare, Göteborg, Sweden) on a cone beam computed tomography (CBCT) scan. In all patients six implants were installed four to seven months after a sinus augmentation and cortical plating. Post-operatively a CBCT was taken and matched with the pre-operative CBCT using voxel based matching. The virtual implant position was validated against the placed implants using NobelGuide™ Validation software (Version 2.0.0.4, Medicim NV, Mechelen, Belgium). Implant positions were validated by computing the deviations of the tip and the shoulder point, angulation and depth difference between the planned and placed implant in both the bucco-lingual and mesio-distal direction. Calculations were performed using MATLAB® (R2007b, The MathWorks, Inc., Natick, MA, United States) and statistics using SAS (v9.2 SAS Institute, Vancouver, Canada).

**Results:** Preliminary result show for the implant tip a mean deviation of 0.84mm ± 0.81 SD was seen in the mesio-distal direction and 0.92mm ± 0.68 SD in the bucco-lingual direction. For the implant shoulder a mean deviation of 0.65mm ± 0.71 SD in mesio-distal direction and 0.52mm ± 0.78 SD in bucco-lingual direction. Implant angulation showed a mean deviation of 1.98° ± 1.03 SD in mesio-distal direction and 2.32° ± 0.98 SD in bucco-lingual direction. Implant depth showed a mean deviation of -0.75mm ± 0.23 SD in mesio-distal direction and -0.65mm ± 0.28 SD in bucco-lingual direction. Of all implants 68% was placed more buccal than planned and 8.8% of all implants was placed too deep. For bucco-lingual deviation statistically significant differences were seen for the implant tip and shoulder deviations.

*Summary:* This study demonstrates the accuracy of implanting in the edentulous maxilla after sinus lift and cortical plate augmentation using a mucosa supported surgical template.

**O-1808****PRIMARY IMPLANT STABILITY AFTER EXPERIMENTAL MAXILLARY SINUS AUGMENTATION WITH AUTOGENOUS MESENCHYMAL STEM CELLS**

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**Objectives:** In an experimental sinus floor augmentation setting in New Zealand White Rabbits the effect of stem cell transplantation on primary implant stability has been biomechanically evaluated and compared to conventional augmentation procedures in rabbits.

**Material and methods:** Six weeks after experimental sinus floor augmentation with a synthetic bone substitute (HA/TCP), autogenous bone transplantation or adult mesenchymal stems cells (MSC) on an adequate carrier (collagen fleece), the primary stability of implants inserted in the edentulous part of the distal maxilla was examined. For the biomechanical evaluation of primary implant stability a special protocol of insertion torque measurement (Osseocare™), chairside used methods (Periotest™ and Osstell™) and Laser scanning Doppler vibrometer as a reference method under laboratory conditions has been developed. Finally axial extraction forces have been determined via pull-out force testing.

**Results:** The autogenous bone transplant for sinus floor augmentation lead to the best results in primary implant stability in all evaluated qualities. MSCs clearly enhanced the primary stability compared to the mock-augmented control sinus and revealed comparable primary mechanical properties to the bone substitute. The developed biomechanic evaluation protocol proved suitable for the determination of primary implant stability

**Discussion:** The experimental maxillary sinus floor augmentation with precultured osteoblast precursor cells from autogenic stems cells clearly enhanced primary stability of implants compared to the unaugmented sinus and lead to comparable primary mechanical properties to bone substitutes in rabbits. In comparison to the autogenous bone graft stability enhancement by stem cell transplantation declined but is associated with a reduced harvesting morbidity.

**O-1809****MAXILLARY SINUS LIFT WITH HYDROXYAPATITE: A SAFE TECHNIQUE WITH PREDICTABLE OUTCOMES IN PATIENTS WITH SEVERE MAXILLARY ATROPHY.**

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**Introduction:** Maxillary sinus lift is a preprosthetic surgical technique that aims to increase height in the posterior and lateral area of the atrophic maxilla. The gold standard material is the autograft, but there are other options such as allografts, xenografts and alloplastic materials.

Other techniques for achieving an increased height of the maxilla are: Split bone graft, interposition sandwich after a LeFort osteotomy and onlay grafts.

**Materials and methods:** The purpose of this communication is to present a retrospective analysis of 34 consecutive sinus lift that were rehabilitated with dental implants. We have taken into account sex, age, comorbidities, and height before and after elevation, the time between sinus elevation, implant placement and loading of the prosthesis, complications during surgery and loss of implants. We filled the sinus with compacted hydroxyapatite. Then we use a resorbable membrane to isolate the area.

**Results:** The results are: 34 patients underwent surgery, 37 sinus lifts performed, 75% in female patients. The average age was 54 years. The 14.7% of patients were smokers. During the sinus lift, 3 Schneider membranes were perforated. In one of these patients one implant was lost during the period of osseointegration. There were no cases of postoperative infections or orosinus communications. The average height of the maxillary bone was 3.1 mm and the mean post-treatment height was 14 mm. 82 implants were placed (13.4% immediate), 71 implants could be used for prosthetic rehabilitation, and 6 are in integration period (93.4% success). The 5 implants were lost during the osseointegration period. The average loading time was 143 days from the placement of implants. The mean follow-up was 903 days (range 31 to 2413).

**Conclusions:** In our experience, maxillary sinus lift with bovine hydroxyapatite is a safe surgical technique for the prosthetic rehabilitation in patients with a severe maxillary atrophy.

**O-1810****OUTCOME OF THE REHABILITATION OF ATROPHIC POSTERIOR MAXILLA WITH THE SINUS LIFT TECHNIQUE AND DIFFERENT FILLING MATERIALS IN 144 PATIENTS**

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**Introduction:** Atrophic posterior maxilla rehabilitation is a challenge for maxillofacial surgeon in partial or totally edentulous patients. Teeth loss leads to a decrease in both alveolar process height and width. This, together with the increased pneumatization of maxillary sinuses, limits the

quantity and quality of bone necessary for implant placement.

Different techniques have been described for rehabilitation of atrophic maxilla. Sinus lift is the most frequent procedure for bone height augmentation in posterior sectors, because of its simplicity, predictability and excellent results, widely supported by the literature, with success rates between 61 and 100%. The surgical technique was first described by Tatum in 1986; he used autologous iliac crest for elevation of the sinus floor. Since that, different materials have been used, as autologous bone from different sites, cadaver bone or synthetic bone substitutes. Apart from the material used, there are some other controversies, for example the simultaneous versus delayed implant placement.

**Material and methods:** 144 patients, 86 women and 58 men, were included in this retrospective study, operated from January 2004 to December 2011 by the same surgeon. In total, 163 sinus lift were performed. Implants were placed simultaneously or in a second stage depending on the quantity of the remanent bone. Different augmentation materials were used: autologous bone, demineralized freeze-dried bone from cadaver, bovine bone mineral or synthetic bone substitutes. Several predictor variables were evaluated: smoking habit, comorbidity, filling material used, simultaneous versus delayed implant placement, perforation of the Schneider membrane and infectious or inflammatory complications. We tried to find some kind of association between these variables and the failure of implants.

**Results:** The implant success rate was higher than in other series and similar to that we can observe in implantology without grafts. We did not observe any statistically significant association between Schneider membrane perforation, smoking habit or the material used for sinus floor elevation and the failure of implants.

**Conclusion:** According to our series, sinus lift is a predictable, safe and reliable procedure for atrophic posterior maxilla rehabilitation. Our implant success rate was comparable or even higher than others in the literature.

#### **O-1811** **IMPLANT SURVIVAL RATE IN MICROVASCULAR TRANSPLANTS**

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**Background:** For the reconstruction in MKG surgery microvascular transplants represent an important aspect to social, working and aesthetic functions for patients after a tumour or trauma. This study compares three different microvascular transplants.

**Material and method:** Between 2001 and 2008 patients received a microvascular transplant from pelvis (7), Fibula (4) or Femur (7) and treated with implants. All of them were compared and evaluated. Out of 16 patients with 75 implants only one had an implant loss of 4%. We achieved a healing rate of 96%.

**Summary:** Microvascular transplants can be used success-

fully to reconstruct the alveolar ridge. The transplant can be adjusted individually in order to carry out an implant with a strong supply.

#### **O-1812** **COMPUTER ASSISTED IMPLANT SURGERY IN FREE FLAPS RECONSTRUCTED PATIENTS, TWO YEARS FOLLOW-UP RESULTS OF A PROSPECTIVE CLINICAL STUDY.**

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**Aim:** The aim of this prospective clinical study is to present the assets of implant restorations performed according to a computer-assisted surgical protocol in patients reconstructed with free-flaps after oncologic resections or gunshot trauma.

**Material and methods:** A group of 10 consecutive patients has been treated. Implant supported prosthetic restoration was performed according to a modified NobelGuide protocol (Procera Software; Nobel Biocare, Gothenburg Sweden). Computer assisted, flapless dental implant placement was based on accurate prosthetic and aesthetic analysis. Classical NobelGuide protocol had to be modified due to the necessity to adapt the technique in these reconstructed patients. A total of 56 fixtures were installed (Replace Tapered Groovy, Nobel Biocare), the implant length ranged between 8 and 16 mm while the diameter was either 3.5, 4.3 or 5 mm. The implant loading with a screw-retained prosthesis was immediate or delayed by six months, when the insertion torque was below 35 N.cm.

Outcome measures were radiographic marginal bone-level changes, survival of implants, soft tissue aspects (probing depth, and BOP index) and patient satisfaction. Marginal bone loss was measured with three-dimensional CT scan at the day of loading and at 24 months. Implants were considered successful if no pain or mobility was caused under unscrewing torque of 20 N.cm. Analytic statistical analysis was carried out on the resulting data.

**Results:** All the cases have at least 24 months follow-up, 3 implants were lost (CSR 94.6%). Every patient received a correct provisional prosthetic rehabilitation with high degree of satisfaction when it comes to masticatory function, social functioning and overall quality of life. Radiological examination showed a mean marginal bone loss of 1.12mm±0.50 mm. All of the patients present healthy soft tissues with stable probing depth and good BOP values after 24 months.

**Conclusions:** In this study, we applied a modified technique of computer assisted implant surgery in free flaps reconstructed jaws: from these preliminary findings this approach seems valuable when it comes to function, improving prosthetic restorations and aesthetics in challenging patients.

**O-1813****CLINICAL STUDY OF DENTAL IMPLANTS IN PATIENTS UNDERGOING RADIOTHERAPY**

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**Introduction:** The aim of oral rehabilitation after radical surgery and radiotherapy (RT) in oral cancer is to restore function and aesthetics in the oral cavity. Dental implants are a valid option for dental rehabilitation in these patients. Radiotherapy was originally a contraindication for implant placement, due to its harmful effects on tissues. In addition, radiation leads to bone and tissue hypoxia caused by endarteritis and reduction of cell proliferation, with damage to osteoclasts and, subsequently, alterations in bone remodelling, necessary for the expected osseointegration. **Aims:** To present a consecutive series of patients who underwent oral rehabilitation with osseointegrated implants and associated radiotherapy. To analyze the survival of dental implants placed in maxilla and mandible bone and to perform a review of the literature.

**Material and methods:** We studied twelve patients with oral cancer; eleven patients received RT prior to implant placement and only one patient received RT after oral rehabilitation. Five patients underwent reconstructive microsurgery with myo-osseous flaps. The average radiation dose was 55 Gy. Osseointegrated dental implants were titanium threaded with hexagonal connection and RBM surface (roast blasted medium) (Mozo Grau, SL, Valladolid, Spain), placed either in the maxilla or the mandible, with an average of 4 implants per patient. The medium waiting time for osseointegration was 8 months with regular radiological tests, and during the second surgery for transmucosal screw placement, the stability of dental implants was checked. Osseointegration was evaluated as well as the functional stability of dental implants.

**Results:** In our series the survival rate of implants of cases was 92.7%, with no statistically significant differences between the maxilla and the mandible. In all cases a removable prosthesis was used, which provides an acceptable functional and aesthetic result to the patient. Prosthesis were implant supported without mucosal loading.

**Discussion:** In the literature, implants survival rates in patients who underwent radiotherapy varies from 68.8% to 100%. Although maxillary implants seem to be more successful in the literature than mandible implants, there are only few studies where implants were placed in both locations: upper and lower jaw.

**Conclusions:** Oral rehabilitation with dental implants is a valid option in patients with oral cancer who have received or will receive adjuvant RT.

**O-1814****OSTEOBLASTS AND THE COLONIZATION OF DENTAL IMPLANT SURFACE WHILE METHOTREXATE ADMINISTRATION**

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**Introduction:** Physiological bone metabolism is a prior condition of bone healing and osseointegration of dental implants. Therefore osteoblasts as bone building cells play an important role in conditions of periimplant bone healing. Various things are able to influence this sensitive environment of bone resorption and apposition. The effect of anti-rheumatic drugs on bone turnover is controversial. Therefore we aimed to study the proliferation and differentiation of osteoblasts on sand-blasted, large grit, acid-etched implant surfaces while under Methotrexate therapy, still the first line medication in rheumatoid arthritis.

**Material and methods:** Bovine primary osteoblasts were cultured under constant conditions until confluence. Then cells were harvested and divided into study and control groups. Cells of the study group were cultured on SLA titanium surfaces and on common polystyrene surfaces with addition of various concentrations of MTX, according to concentrations found in human bone and cartilage. The control group was cultured without MTX addition to cell culture medium. Experimental series lasted over a period of eight days and included scanning electron microscope (SEM), MTT-Assay, immunostaining and digital supported cell count.

**Results:** On SLA surfaces osteoblasts showed a statistically significant reduction of proliferation and viability while under MTX incubation. This inhibitory effect was demonstrated by all kind of our research method. Moreover, the total number of cells and cell viability decreased in a dose dependent manner shown by statistical analysis of the MTT-assay and SEM pictures. However, neither osteogenic differentiation nor osteoblast morphology was altered by addition of MTX to culture medium.

**Conclusion:** Our examination reveals a high association between low dose MTX therapy, as used in RA patients, and reduction of dental implant surface colonization by osteoblasts. Therefore the oral rehabilitation by the use of dental implants should be seriously questioned during MTX administration. Doubtless, more clinical data has to be collected to define whether there is a higher risk in dental implantation in RA patients undergoing MTX therapy or not. However, maxillofacial and oral surgeons should be aware of the potential risk.

## Session 19. SKIN TUMOURS OF THE HEAD AND NECK

### O-1901

#### AN AUDIT OF HEAD & NECK SKIN CANCER TREATED BY THE OMFS DEPARTMENT AT WORCESTER ROYAL HOSPITAL IN 2011, UK.

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**Introduction:** Skin cancer is the most common type of cancer among white populations, in the UK and worldwide. As with many OMFS units in the UK, we have the opportunity to evaluate, diagnose, and treat patients presenting with head & neck skin cancer (HNSC). We receive referrals from Dermatologists and local GPs.

**Aim:** To evaluate skin cancer cases treated by the senior surgeon and his registrars during the year 2011.

**Methods:** We retrospectively evaluated our skin database for the year 2011.

**Results:** We treated 550 skin lesions in 501 patients during 2011. This shows steady increase in the number of cases treated by the department over the last 4 years (446 lesions/391 patients 2008, 396/365 2009 and 492/457 2010). Only 3.2% (18) were benign. Premalignant/ Carcinoma in situ represented 5.2% (29). Malignant lesions included 68.5% (377) BCC, 17.4% (95) cutaneous SSC, 4.2% melanoma and 1.4% other skin cancer. 95.8% were treated under local anaesthesia. Over 2/3 (68%) had comorbidities on presentation. Overall complete excision rate was 95.5% (96.7% of BCC and 93.3% of SSC). Repair of excision sites was with flaps (65%), 10.2% skin grafts while 24.8% closed either directly or with 2ndry intention.

**Conclusion:** Our workload is expanding. However, our complete excision rate is well comparable to other published work from surgical units dealing with HNSC (84-96%). Moreover, the department provides an excellent training opportunity for the registrars to learn managing HNSC.

### O-1902

#### SKIN CANCER IN THE KOSOVO POPULATION

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**Introduction:** Skin cancer is the most frequent cancer that affects humans.

The purpose of this study is to show the following: the incidence of these cancers, the most frequent pathohistology type, affected region, differences in sex, their occupation, patients' age, regional dispersion in Kosovo, metastasis and recurrence, and their treatment

**Patients and Methods:** A retrospective analysis of 986 patient with skin cancer, during the period 2007-2011. Melanoma and the skin adnexa, were not taken into account during the processing of data

**Results:** From 986 cases with skin cancer 51.5% were males. 80.5% of the patients were with BCC, and 19.5% with SCC. With the BCC 52.8% was mail and 47.2% female, while with SCC we had 53.6% males and 46.4% females. The most affected region with BCC was the nose with 23.6%, frontal region 17.2%, temporal region with 12.3% and in other regions were 46.7%. At SCC the most affected region was the temporal region with 16.5%, the frontal region 11.4%, nose at 9.8% and other attacked regions were at 63.5%. The upper third part of the face was affected with BCC in 31.6%, the middle one 53.9% and the lower one 14.4%. SCC we had 24.4% in the upper third of the face, 39.9% in the middle part and 35.9% in the lower part of the face. The highest age incidence with BCC in 59.3% was from 61-70 yrs. and with SCC 53.8%. SCC affected younger ages from 40-60 yrs. in 37.7% of cases and with BCC at this age we had 28.1%. In 65.7% of the cases affected with cancer were workers that work outside. The previous injuries that were causes of the SCC were in 7.3% of the cases and BCC were only 2.1%. We had recurrences in 5.5% of the cases with BCC and 5.2% of the cases with SCC. Metastases in SCC in 7.8% of the cases.

**Conclusion:** BCC is the most frequent cancer in the skin. The sun's ultraviolet rays are the most frequent causes of these cancers. The treatment of these cancers is mostly surgical and if they are treated in the proper way and in time, the prognosis is very good.

### O-1903

#### SIGNIFICANCE OF CLINICAL STAGE, EXTENT OF SURGERY AND OUTCOME IN CUTANEOUS HEAD AND NECK SQUAMOUS CELL CARCINOMA

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Cutaneous squamous cell carcinomas make up 20 percent of non-melanoma malignant skin cancers. Metastases are rare, while grade, site and stage of the primary tumour determine the risk of parotid and cervical metastases and treatment type. In the head and neck, parotid and cervical nodes are at risk for involvement.

The authors analyzed a new clinical staging system and its correlation with pathologic findings and patient survival. Patients were eligible for inclusion in this longitudinal retrospective cohort study if they had cutaneous squamous cell carcinoma on the head or neck, underwent surgery and had a minimum 3 year follow-up. The primary study variable was using a new clinical staging system. Secondary variables included the parotid as a predictor of metastatic spread to the lymphatic nodes in the neck and primary lesion histopathologic traits. The outcome variable was patient survival. Associations between variables were assessed using Fisher's exact test, Mann-Whitney test, Kaplan-Meier method and Mantel log-rank test. P

The sample was composed of 103 patients. Regional metastatic disease was found in 24 patients. Histopathological analysis showed a higher frequency of neck metastatic disease if the parotid was positive for metastases

( $p=0.022$ ). An extended staging system showed significant correlation between survival rate and substages ( $p=0.0105$ ). Perineural invasion was a negative prognostic factor ( $p=0.0151$ ).

In patients with regional metastatic disease, primary lesions localized in temporoauricular area, buccal and preauricular areas have a statistically significant higher rate of metastatic spread into neck regions IV and V than primary lesions localized in other areas of the head and neck. Histopathological analysis showed that there was a statistically significant higher frequency of neck metastatic disease if the parotid gland is also positive for metastases. The results of this study suggest that combining curative parotidectomy and elective neck dissection (and vice versa) could be beneficial in high risk patients with CSCC of head and neck. Regional disease should not only involve metastases of the neck, but also metastases in the parotid region, and both should be included in the clinical and histological N classification.

#### O-1904

### PROGNOSTIC FACTORS INFLUENCING METASTATIC SPREAD FROM CUTANEOUS SQUAMOUS CELL CARCINOMA. AN OBSERVATIONAL STUDY

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A cohort of 33 patients who developed nodal disease following excision of cutaneous SCC of the head and neck were reviewed retrospectively from Poole hospital over a period of 6 months to 5 years. Only patients who developed nodal metastatic disease following primary excision were included in the study group. Clinical notes and pathology reports were reviewed. Factors such as primary site and laterality, size and depth of primary lesion, degree of differentiation, lympho-vascular involvement, perineural invasion, the site of metastatic deposit, treatment (surgical and/or radiotherapy), follow up and recurrence was studied. The anatomic sites of primary cutaneous cancers were then correlated with these findings

**Results:** In this cohort of 33 patients, primary sites were ear (39.4%), cheek (15.1%), scalp (15.1%), temple (11.8%), forehead (6.1%), neck (6.1%), eyelid (3%), and nose (3%). 20 (61%) of these patients had metastatic disease in the parotid. A total of 31 patients were treated with both surgery and radiotherapy. 2 patients received palliative treatment only. Recurrence of disease was noted in 11 cases (33%). Among pathologically positive sites, intra-parotid lymph node involvement was most frequent - (61%), Involvement of the neck was as follows - (12.1%), Level I, (3%), Level II (6%), Level III (3%), Level IV (6%) and level V (9%). Multi level nodal involvement was a common feature requiring aggressive treatment. The authors recommend aggressive treatment to this group of patients and they present their treatment strategy.

#### O-1905

### SURGICAL MARGINS IN CUTANEOUS MALIGNANCIES OF THE HEAD AND NECK

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Skin cancer is the commonest human malignancy and has

a significant impact on public health due to the large number of cases treated each year throughout Europe. Definitive surgical treatment of cutaneous malignancy is based upon the achievement of adequate surgical margins.

We aimed to review all skin cancers of the head and neck treated surgically by our Maxillofacial Unit. By auditing the achieved histopathological margins we aimed to detect deficiencies in clinical care and propose appropriate improvement where required.

Retrospective review was undertaken of histopathological results and clinical notes of patients treated between June 2010 and December 2011. Histopathological and clinical data collected included the site, size, type and deep and radial margins. Gold standards were set at a clear excision rate of 95%.

275 patients were included in the cohort (male = 185, 67.3%). A total of 273 positive specimens were excised.

The most common tumour treated was basal cell carcinoma (BCC) (74.3%), with 203 tumours excised from 186 patients (male = 114, 56.2%). 61.1% of BCCs were Nodular variants. The most commonly affected sites in the cohort were Left Nose (10.3%), Right Nose (6.9%) and Right Cheek (6.9%).

42 squamous cell carcinomas (SCC) were excised from 37 patients (male = 32, 86.4%). Mean age of affected patients was 78.3 years (median 79 years). 81% of SCCs were moderately or poorly differentiated. The most commonly affected site was the scalp (n = 10, 23.8%).

The incomplete excision rate of BCCs was 4.8%. Margins were close ( $\leq 1$ mm) in 13.7% of cases. 7.1% of SCCs were incompletely excised, all with positive deep margins only. The overall incomplete excision rate for the cohort was 5.2%. The most common site for failure of excision was pinna of the ear (41.6%).

There were 6 cases of malignant melanoma in the cohort, with one positive margin (16.7%).

Audit standards were not met for overall excision rate. Also, higher than expected incidence of close surgical margins were detected. Local presentation of results and data has led to review of surgical technique. Re-audit is planned in 12 months time, following the instigation of on-going educational activities.

#### O-1906

### SURGICAL TECHNIQUES FOR SCALP SKIN MALIGNANCY ABLATION WITH A RECONSTRUCTION ALGORITHM.

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**Introduction:** The resections of skin cancer of the head are complex surgical procedures aimed at complete resection and good aesthetic outcome. Reconstruction of tissue in this area is difficult because mobilized skin overlying the calvarian bone can close only relatively small defects.

**Aim:** To analyze surgical procedures used for treatment of the scalp skin malignancies and to propose an algorithm

for selection of reconstruction method.

**Material and Methods:** Retrospective analysis of clinical data from 84 operations of scalp malignancies in Cancer Centre from 2001-2010. Mean age was 73,3 years (41-93). There were 44 women and 40 men. 28 patients had squamous-cell carcinoma, 56 basal-cell carcinomas. Resected skin surface was from 0.81 to 187.5 cm<sup>2</sup> (median 15,97). The pathological margins were measured during microscopic evaluation of the tumour. We have analyzed our data in Stat Soft Inc STATISTICA 10.

**Results:** Basal-cell carcinomas were reconstructed by local plastic closure (LPC, 10 cases; mean size of tumour 1,68 cm<sup>2</sup>), Local flap (LF, 14; 2,36 cm<sup>2</sup>), skin graft (SG, 26; 15,5 cm<sup>2</sup>). Squamous-cell carcinomas were reconstructed by LPC (2; 0,47cm<sup>2</sup>), LF (4; 3,74 cm<sup>2</sup>), SG (15; 13,98 cm<sup>2</sup>). Neoplasms infiltrating bone were operated by local flap with skin graft (9 cases; mean size 38,28 cm<sup>2</sup>) or free flaps (4; 101,8 cm<sup>2</sup>). We have observed statistically significant differences in lateral pathological margin comparing SG group (mean:0.5 cm, SD: 0.41) and LPC group (mean:0.17, SD: 0.12) or between SG group and LF group (mean:0,24, SD 0,12) (p

Basing on statistical analysis of our material, we propose algorithm for reconstruction of scalp skin defects after surgical tumour ablation.

**Conclusion:** Our research may provide a decision algorithm for suitable closure technique that depends on the size of ulceration. Our results may suggest that more radical resections followed by skin graft reconstruction provide wider margin.

#### O-1907

##### THE FEATURES OF BASAL CELL CARCINOMA USING THE CRYOSURGICAL, CRYOLASER AND SURGERY TREATMENT.

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The urgency of basal cell carcinoma (BCC) study affecting maxillofacial area and neck is not only caused by high prevalence of this disease, but also insufficient efficiency of existing treatment methods which lead to full or partial recovery in only 60-98% of cases. The recurrence rate is affected by different factors. Microcirculatory and oxygenation disorders cause uncontrolled tumour growth, migration, surrounding tissue invasion and ultimately contributes to the development of tumour recurrence.

The aim of this study was to improve the efficiency of diagnostics and surgical treatment of Basal Cell Carcinoma (BCC) of maxillofacial and neck area.

The most simple and exact noninvasive methods of diagnostics such as Laser Doppler Flowmetry (LDF), Tissues Reflectance Oximetry (TFO), Laser Fluorescence Diagnostics (LFD) allow evaluation of soft tissue functional status in vivo.

We analyzed the results of 120 BCC cases by using the cryosurgical, cryolaser, surgery treatment. We have tested the group of 90 patients with primary and recurrence types of basal cell carcinoma by means of LDF, LFD and TFO

before operation. According to the severity of clinicomorphological features of BCC patients were divided into 2 groups: 70 patients formed the 1st group, 50 of them received surgical treatment, the other 20 received cryolaser treatment.

20 patients with severely malignant types and clinicomorphological features of BCC in comparison with the 1st group of patients, formed the 2nd group. Among them 10 patients underwent cryosurgery, the other 10 received cryolaser treatment. Both groups had different tumour localization, but in the group1 primary tumour and T1, T2 prevailed over the recurrence and T3,T4 with defects and deformations of maxillofacial area and a neck. BCC with soft tissue invasion of 0,5 cm and «morphoea» histological subtype have generated the second group. The first group was represented by BCC with solid, solid-adenoid histological subtype, multicentric, ulcerous form.

It was shown that the LDF, LFD,TFO data indicates the results of cryosurgical and cryolaser treatment.

30 patients with BCC of maxillofacial area and neck had received surgical treatment which included tumour excision and reconstructive flap surgery depending on the localization and expansion of the lesion.

#### O-1908

##### AGGRESSIVE-GROWTH BASAL CELL CARCINOMA OF THE FACE

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**Aim:** To analyze the incidence of aggressive-growth basal cell carcinoma (BCC) of the face.

**Material and methods:** A group of 471 patients, operated on between 1997-2010 in the Department of Maxillofacial Surgery of the Jagiellonian University in Cracow, with BCC of the face was analyzed.

**Results:** In 46 patients (9,7%) the diagnosis of aggressive-growth BCC was established; 23 (50%) patients presented the infiltrating variant of BCC; 16 (35%) patients – the metatypical type, 4 (9%) patients – the micronodular type, 1 (2%) patient - the morpheiform type and 2 (4%) patients presented the mixed pattern. Lesions were mostly located on cheek - 13 (28%), the nose – 13 (28%), and in the canthal region of eye – 8 (17%). Immediate reconstruction was performed in 40 (87%) patients and delayed reconstruction in 6 (13%) patients. In immediate reconstruction: regional flaps in 22 (55%) patients, local flaps in 11 (28%) patients, skin grafts in 4 (10%) patients and free flaps in 3 (7%) patients, were used. Surgical margins were negative in 24 (52%) patients and positive in 22 (48%) patients. Regional metastasis occurred in 3 patients (the infiltrative type of BCC). Recurrence was observed in 12 (26%) patients, within this group 8 patients had positive excision margins.

**Conclusions:** The most frequent aggressive-growth BCC of the facial skin is the infiltrative type. The method of choice in treatment of these neoplasms is surgical excision with wide margins and intra-operative evaluation of the margins. In aggressive-growth BCC radiologic diagnostic of regional lymph nodes is necessary in order to detect early metastases.

**O-1909****MALIGNANT MELANOMA OF THE HEAD AND NECK. OUR EXPERIENCE BETWEEN 2000 AND 2011.**

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**Introduction:** Malignant melanoma is a malignant neoplasm characterized by proliferation of atypical melanocytes at the epithelial-connective tissue interface associated with upward migration into the epithelium and by invasion of the underlying connective tissues. The head and neck region has been reported to be one of the most common anatomic sites for that tumour.

**Objective:** to review our experience between 2000 and 2011 with cutaneous melanoma of head and neck.

**Materials and methods:** A series of 205 patients with cutaneous malignant melanoma of head and neck region has been studied.

**Results:** the mean age was 71.87 years old (35-95) with 46.34% males and 53.65% females. Cervico facial distribution of melanoma has been grouped into three areas: upper, middle third (including the ear) and lower third (including the neck): 31.7% occurred in the upper third, 58.53% in the middle third and 9.75% in the lower third. In relation to the types of melanoma, 68.29% were lentigo maligna, 13.41% superficial spreading, 15.85% nodular and 2.43% others. According to Clark's classification 46.75% were in stage I, 11.68% in II, 9.09% in III, 29.87% in IV and 2.59% in V. The mean Breslow was 1.24 mm. 14.63% were ulcerated. Histopathological examination demonstrated that 13.41% of them were related with melanocytic nevi and 7.31% with basal cell carcinoma. According to AJCC clinical staging 27.84% were in stage 0, 37.97% in IA, 3.79% in IB, 10.12% in IIA, 11.39% in IIB, 3.79% in IIC and 5.06% in III. Sentinel lymph node was performed in 13.41% of the patients, 63.63% of them were negative and 36.36% positive. Neck dissections were done in all positive sentinel nodes, 75% of them were negative and 25% were positive. The recurrence rate was 8.86%, 57.14% were in nodular melanoma type and 42.85% in lentigo maligna. Five year survival rate was 81.70%.

**Conclusions:** malignant melanoma of head and neck region occurs more frequently in female and at middle third. Early diagnosis is essential for the healing of the disease. With sentinel lymph node technique we can early know node involvement and perform neck dissections only when it is necessary, thus reducing morbidity.

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Photochemical internalization (PCI) is a novel technique for local treatment of cancer, using a combination of a light-activated drug and a chemotherapeutic agent to kill cancer cells.

Difficulty in traversing the cell membrane limits the efficacy of chemotherapeutic agents: drug molecules are often degraded by the endolysosomal system before they are able to reach their therapeutic target.

In simple terms, PCI can be thought of in three steps. Step 1: patients are treated with a photosensitizer (eg Amphinex®, TPCS2a, tetraphenyl chlorin disulphonic acid). Due to its amphiphilic nature, Amphinex can attach to the plasma membrane of the target cell, and can enter the cell endosomal system by endocytosis, with photosensitizer located on the inside of the endosomal membranes. Step 2: four days later, when Amphinex has cleared from the cell membrane, the chemotherapeutic agent is administered, and also enters the cell endosomal system by endocytosis (two to four hours is required for bleomycin). Step 3: laser light at 652nm is used to activate the Amphinex, leading to rupture of the endosomal membranes and release of the chemotherapeutic agent into the cytosol.

A Phase I dose-finding study has demonstrated the therapeutic potential of PCI in patients with a variety of advanced cancers, mainly of the head and neck. Fourteen patients with locally recurrent or advanced / metastatic, cutaneous or subcutaneous malignancies were treated with a combination of Amphinex and bleomycin. Preliminary findings suggest that this treatment can be effective in these tumours: 28 days after treatment, the local tumour response was complete in 11 patients and partial in two patients. The treatment, given with analgesia and anaesthesia, was well tolerated. A Phase II study in head and neck cancer is now under way to confirm the clinical utility of this technology.

This new technique could be a useful addition to those already employed by surgeons engaged in the treatment of head, neck, and other tumours. Carefully directed laser light for targeted activation of a photosensitizer will allow the surgeon to increase the efficacy of chemotherapy, sparing non-target tissue and limiting its actions to the tumour site. As only a single cycle of chemotherapy is given, it is expected that the adverse effects of multiple cycles will be reduced.

**O-1910****PHOTOCHEMICAL INTERNALIZATION (PCI) WITH AMPHINEX®: A NEW TECHNIQUE FOR LOCAL CANCER TREATMENT**



## Session 20. SURGICAL HEAD AND NECK ONCOLOGY III

### O-2001

#### IMPLICATIONS OF THE HUMAN PAPILLOMA VIRUS IN THE CARCINOGENESIS OF EPIDERMAL MUCOSA ORAL CANCER IN PATIENTS UNDER OF 45 YEARS. PRELIMINARY STUDY

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**Introduction:** The oral cavity squamous cell carcinoma is classically related to male patients, over 50 years, with chronic use of tobacco, alcohol and presence of traumatic factors. In recent years, the incidence of these tumours in patients younger than 45 years with or without these risk factors (FR) is increasing, which suggests that there must be new FR such as the human papilloma virus (HPV).

**Patients and methods:** 15 oncologic patients under age 45 and 12 patients with benign oral lesions who met the inclusion criteria were chosen to determine the presence of HPV reaction by polymerase chain and thus study the correlation between this cancer and HPV.

**Results:** We used the Fisher exact test for qualitative variables of cases and controls to test whether the oral cavity squamous cell cancer and HPV are dependent. This was statistically significant  $p \leq 0.05$ . 46.6% of the cases and 6.66% of controls were positive for this biological agent. The most common genotype in cases of high risk was 16 in a 85.71% followed by genotypes 33 and 35 at 28, 57% of cases each one. With 95% confidence the oral cavity squamous cell cancer and HPV are related statistically in this series.

**Conclusions:** It is necessary to carry out studies of greater sample size to further explore the role of HPV oncology in carcinogenesis of this tumour as well as raise new treatment protocols, new prognostic factors and long-term survival. Currently, a retrospective study in oncologic patients treated between 2007-2010 is ongoing in this Department to analyze the involvement of HPV as well as the role of the overexpression of p16 and Ki67.

### O-2002

#### HPV PREVALENCE IN SQUAMOUS CELL CARCINOMAS OF THE ORAL CAVITY AND OROPHARYNX AS MARKERS OF BIOLOGICAL BEHAVIOURS

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**Background:** Variable prevalence of human Papilloma-virus (HPV) DNA (23-35%) has been reported in head and

neck squamous cell carcinomas (HNSCCs). Available data for SCCs of the oral cavity proper are limited in particular for SCCs of the mobile tongue whose incidence is increasing among young subjects. Higher frequency of high-risk (HR) oncogenic HPVs, in particular HPV16, has been consistently found in oropharyngeal SCCs compared to other sites where it correlates with specific histological features, lack of exposure to alcohol and smoke, overexpression of p16, absence of p53 mutations, better survival and response to radio/chemotherapy.

**Aims:** In this study we researched the prevalence of various HPV type in formalin-fixed paraffin-embedded (FFPE) pathological specimens to determine their role as markers of biological behaviour of carcinomas of the head and neck and their correlation with immunohistochemical, pathological and clinical parameters.

**Materials and methods:** We analyzed a retrospective series of 203 invasive SCCs (133 males, mean age 66 years) of the oropharynx (36) and the oral cavity (167, 80 tongue) consecutively observed in a single tertiary maxillo-facial surgery Unit. HPV detection and typing was performed by the INNO-LiPA HPV genotyping assay on DNA extracted from pathological archival specimens.

**Results:** Overall HPV-DNA prevalence was 69.4%, 59.7% for HR-HPV types. The most common genotypes were HPV31 (18%), 33 (17%), 52 (15%), 35 (14%), 6 (13%), 16 (10%) and 39 (10%); 38% of infections were sustained by multiple types. p16 immunoreactivity was observed in 23% and p16 promoter methylation in 56% of cases. HR-HPVs were significantly more frequent among men in the oropharynx ( $p < 0.01$ ).

### O-2003

#### ANALYSIS OF CARCINOGENESIS FOR BOTH HPV-POSITIVE AND NEGATIVE ORAL SQUAMOUS CELL CARCINOMA USING NORMAL HUMAN TONGUE KERATINOCYTES

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**Aim/Objective/Purpose:** Oral squamous cell carcinomas (OSCCs) are considered to arise from human oral keratinocytes. DNAs of human papillomaviruses (HPVs), predominantly types 16 and 18, etiological agents of cervical cancers have been detected in approximately 25% of OSCCs. In accordance with the established role of E6 and E7 which can inactivate p53 and pRb, respectively, mutations of p53 and inactivation of p16INK4a are frequently observed in HPV-negative OSCCs. In addition, other alterations such as overexpression of epidermal growth factor receptor (EGFR) are often observed in both HPV-positive and -negative OSCCs. However, causal-relationship between accumulation of these abnormalities and multi-step carcinogenesis are not fully understood. Our goal is to develop an appropriate model for reproducing the development and progression of both HPV - positive and -negative human oral cancer.

**Material and Methods:** To elucidate the carcinogenesis process, we established new human tongue keratinocyte (HTK) cell lines derived from tongue mucosa with retrovi-

ral vectors expressing either HPV16 E6/E7 or a mutant CDK4 (CDK4R24C), cyclin D1 and human telomerase reverse transcriptase (hTERT). Expression of transgenes in HTK cells was confirmed by TRAP assay and western blot. Tumourigenicity of HTK cells in nude mice was also examined.

**Results:** HTK-16E6E7 and HTK-CDK4R24C/ cyclinD1/hTERT (termed HTK-K4DT) retaining most of the original characteristics of primary tongue keratinocytes showed no tumourigenicity in xeno-transplanted mice. Additional transduction of oncogenic Hras or EGFR together with c-myc into the HTK-16E6E7 and HTK-K4DT expressing DNp53 (dominant negative form of p53) showed the anchorage-independent growth and subcutaneous tumour formation in nude mice. Orthotopic transplantation of HTK-K4DT-DNp53-HrasV12-c-myc-wt (wild type c-myc) and HTK-K4DT-DNp53-EGFR-c-mycT58A (mutant-c-myc) cells resulted in local growth of tumours in all the mice tested and some of them yielded regional metastases in 2-3 weeks.

**Conclusions:** Our experimental model should facilitate further studies to understand genesis of oral cancer and hopefully will assist in the evaluation of new therapies.

#### O-2004

### LYMPH NODE DENSITY IS A SIGNIFICANT PREDICTOR OF LOCOREGIONAL FAILURE IN PATIENTS WITH ADVANCED HEAD AND NECK CANCERS

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**Objective :** To assess the number of lymph nodes removed in neck dissection and the relationship between lymph node density (LND) and locoregional failure.

**Methods :** A retrospective study involving 56 patients with (pharyngo) laryngeal squamous cell carcinoma. Among them, 48 were males and 8 females, with a mean age of 58 years. As to the primary tumour site, 16 were in the tongue, 17 in the larynx and 23 in the hypopharynx. All the tumours were staged T4. We carried out 112 neck dissections. All the lymph nodes harvested from the neck dissection were carefully examined, with LND (Lymph node density) calculated as the ratio of positive lymph nodes to total lymph nodes removed. Lymph node density (number of positive lymph nodes/total number of excised lymph nodes) was subjected to statistical analysis.

All the patients received adjuvant (chemo) radiotherapy.

**Results:** ROC curve analysis showed that LND was found to be significantly associated with locoregional failure. LND > 0.09 (as the cut off point) could predict locoregional failure after surgery for tongue and (pharyngo) laryngeal cancers with a sensibility of 93% and specificity of 100%.

**Conclusions:** After surgery, pathologic evaluation of the neck using LND was found to reliably stratify the risk of disease recurrence.

#### O-2005

### THE ROLE OF SNB IN THE MANAGEMENT OF ABERRANT LYMPHATIC DRAINAGE IN ORAL CANCER; AN EVALUATION OF THE EUROPEAN SENTINEL NODE TRIAL (SENT).

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**Background:** Tumour within cervical lymph nodes appears to spread in an orderly fashion from one nodal basin to the next. However, historical concerns regarding 'skip metastasis' have led to caution in using Sentinel Node Biopsy (SNB) techniques in oral cancer. The European Sentinel Node Trial is adding further data on the distribution of oral tumours and their draining lymph nodes as identified by lymphoscintigraphy.

**Methods:** A multicentre European (n=15) observational SNB study commenced in 2006. Eligibility: 0.5-4cm oral squamous cell carcinoma with CT proven N0 necks. Patients with identifiable Sentinel Nodes on lymphoscintigraphy were entered in the study and nodes retrieved intraoperatively by hand held gamma probe and blue dye.

**Results:** 549 patients were evaluated. The most common site for primary tumour was anterior tongue (50%) followed by floor of mouth (28%) and posterior tongue (9%). Positive sentinel nodes were seen in 28% of tumours, more prevalent in tumours of the lower alveolus (44%) and retromolar region (42%) and least likely in the lower lip and hard palate (0%).

11% of tumours were in the midline of which half (56%) drained bilaterally. Of lateralised tumours, 13% showed bilateral drainage. It was rare to have bilaterally positive SNB (

Contralateral-only drainage was rare (1%). However, positive contralateral nodes were identified in 2% of patients and would have been missed by conventional treatment with ipsilateral elective neck dissection.

A positive sentinel node at level 3 or lower was identified in 4% of the patient population suggesting a skip lesion (in one case only, did completion neck dissection show that the sentinel node had been incorrectly identified). This was seen in 11% of lower alveolus tumours, 6% of posterior tongue tumours, 4% of anterior tongue and floor of mouth tumours, but not in other tumour sites.

**Conclusions:** The results of the SENT study have added to what is known about the patterns of lymphatic drainage from oral squamous cell carcinoma. This study confirms that rarely is there aberrant drainage within the neck but supports the use of SNB to identify when this does occur.

#### O-2006

### SENTINEL NODE BIOPSY AND ORAL CANCER: AN INTERIM REPORT OF THE SENTINEL EUROPEAN NODE TRIAL (SENT)

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**Background:** Debate still persists regarding the optimal management of patients with locally resectable oral cancers and clinically N0 necks. As the occult cervical metas-

tasis rate is greater than twenty percent, traditional management involves elective neck dissection. It remains to be established if the Sentinel Node Biopsy technique in oral cancer precisely identifies the node containing occult metastatic disease. If negative for metastasis, a neck dissection could be avoided. The object of this interim analysis is to assess the reliability of the technique in staging the N0 neck in patients with early mouth cancer.

**Methods:** Sentinel European Node Trial (SENT) was commenced in 2005, as a multicentre (n=14) prospective observational study. This to date has recruited 434 patients with T1-T3 oral squamous cell carcinoma and Computed Tomography proven N0 necks. Patients with identifiable Sentinel Nodes on lymphoscintigraphy were entered in the study and nodes retrieved intra operatively by a hand held gamma probe and blue dye. A positive sentinel node led to neck dissection within 3 weeks of biopsy.

**Results:** An average of 2.8 nodes was removed per patient. The sensitivity of SNB was 87.5% and the negative predictive value 96%. Positive sentinel nodes were found in 24% of patients and in the subsequent neck dissection 80% had no further positive nodes. False negative biopsy results were given in 15 patients, of whom 7 have been successfully treated by salvage procedures. Recurrence after a positive result occurred in 21 patients of which 15 were in the neck. Only 5 of these patients have been cleared of disease.

Mean follow up time of 47 months (range 15-78 months) has seen 87% patients alive with no evidence of disease and 1% alive with disease.

**Conclusions:** These preliminary findings from the Sentinel European Node Trial suggest SNB to be a reliable technique in the staging the N0 neck in patients with early mouth cancer.

#### O-2007

##### THE USE OF LIGASURE TISSUE FUSION SYSTEM IN HEAD AND NECK ONCOLOGY DISSECTION: EXPERIENCE IN A TERTIARY CARE HOSPITAL.

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**Introduction:** New techniques for dissection in head and neck surgery have been developed in the last years. The LigaSure™ vessel sealing system is an energy-based ligation method that achieves complete haemostasis by reforming the collagen and elastin in vessel walls.

**Objective:** We describe through a retrospective study the experience in our hospital in the last year, using this sealing system in oncological surgery with different locations

**Material and Methods:** We have reviewed 48 cases, 17 located in the tongue, 17 in the parotid gland and 14 in the neck. We also have recorded a video that describes the surgical technique.

**Results:** The system is really simple to perform and does not need any special training. We have only found two major complications related to the haemostasis (one haemorrhage, one hematoma) and two patients with minor complications (seroma). No differences were found in surgical length comparing to the surgeries where this

sealing system was not used.

**Discussion and conclusion:** We consider the use of this sealing system really useful because it reduces the operative blood loss, deriving in fewer blood transfusions. The number of complications was very low and the cost of the material is similar to other sealing systems.

#### O-2008

##### THE FUNCTIONAL NECK DISSECTION IN THE N0 NECK

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Management of the N0 neck in head and neck malignancy remains controversial.

Elective neck dissection versus wait and see will often be considered in the treatment of these patients. Although surgical techniques and clinical examination shows low sensitivity and low specific oncological proof of occult neck metastasis, MRI and CT demonstrates up to 40 and 88%, PET\_CT however proves to have a sensitivity of 67% and a specificity of 85%. Occult neck nodes remain undiscovered due to micrometastasis in up to 25 %(1).

**Materials and methods:** In a retrospective study, a sample of 14 consecutive patients (10M, 4F) – mean age 56 (27-77y) were examined. Exclusion was used when a medical history regarding the neck was noted, especially when previous orthopaedic or neck surgery was performed. The preoperative stage was T1N0 intraoral squamous carcinoma. All patients were operated unilaterally (8 right, 4 left).

Accessory nerve impairment. Shoulder, arm and head rotation was examined. No significant difference could be found comparing operated and non-operated side. One patient showed shoulder pain and dysfunction 5 months after surgery. 92 % showed no restriction in head rotation. One patient showed restriction in turning head to non-operated side. Questionnaire based on EORTC quality of life – H&N35 was used.

**Discussion:** There were no Chylous fistula's noted(2). Transient Facial nerve dysfunction postoperative was present in 14%. 21% of the patients received lymph drainage due to persistent lymph oedema. 57% developed sensibility disturbance in the operating field. 1 patient presented with shoulder pain 5 years after surgery. 1 patient showed restriction in head turning to the non-operated side.

In regard of this pathology being a malignant disease it is impossible to treat patients in a suboptimal way. Therefore it is difficult to present these findings other than retrospectively. The limited sample size is also due to consecutive T1 patients.

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(2) De Gier HH, Balm PF, Gregor RT, Hilgers FJ. Systematic approach to the treatment of chylous leakage after neck dissection. Head Neck 1996: 347-351

**O-2009****CERVICAL LYMPH NODE METASTASIS IN ORAL SQUAMOUS CELL CARCINOMA**

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**Introduction:** Oral squamous cell carcinoma is the 10th most common human malignancy worldwide being the most frequent malignant tumour in certain countries.

Cervical lymph node metastasis is one of the most important prognostic factors in head and neck squamous cell carcinoma.

Some authors propose selective supraomohyoid neck dissection as the cervical treatment. Management of the clinically negative neck still remains a controversy.

**Objectives:** The main goal of this paper is to analyse the incidence of nodal metastasis in N0 neck.

**Material and methods:** Between 2009 and 2010, 45 patients with a clinical N0 neck underwent surgery at Gregorio Marañón Hospital. They were all diagnosed of oral squamous cell carcinoma. The patients were 33 men (75%) and 12 women (25%) aged between 37 to 85 years old (65. 2). 36 patients showed smoking habit and 9 did not smoke ever. 16 patients out 45 had tongue cancer, 7 cases were located in the floor of the mouth, 5 in the mandibular alveolar bone, 5 in the retromolar trigon, 5 in the buccal mucosa, 5 in the inferior lip and 2 in the tonsillar pillar.

Supraomohyoid neck dissection or a modified radical dissection was performed depending on patient's comorbidity, tumour's location and tumour's grade.

**Results and conclusions:** 60 neck dissections were performed in 45 patients (15 patients underwent bilateral neck dissection) and 9 neck dissections (15%) were positive (no bilateral node metastasis were found). 100% of the metastasis were always in the homolateral neck. It is important to note that 8 of these patients underwent a modified radical neck dissection (I-V levels) and only one was a supraomohyoid neck dissection. In conclusion, although it is a small sample, we highly recommend the surgical treatment of the neck in patients with a clinical N0 neck.

**O-2010****CERVICAL METASTASIS FROM SQUAMOUS CELL CARCINOMA OF THE MAXILLARY GINGIVA, ALVEOLUS AND HARD PALATE: A MULTICENTRIC ITALIAN STUDY OF 65 CASES**

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The occurrence of occult cervical metastases due to squamous-cell carcinoma of the hard palate and maxillary alveolar ridge has not been studied systematically. We have observed that many patients return with a delayed cervical metastasis following resection of a primary cancer

at these sites. Some of these patients have died as a result of a regional or distant metastasis, despite control of the primary cancer. The literature contains few recommendations to guide the treatment of maxillary squamous-cell carcinoma; prospective studies are difficult due to the rarity of such tumours. The aim of this study is to define the incidence of cervical metastasis and to investigate whether elective neck dissection is justified. We present a retrospective multicentre study of 65 patients with squamous-cell carcinomas of the maxillary alveolar ridge and hard palate and review of the existing literature. The overall incidence of cervical metastases was 21%. We evaluated the significance of primary-site tumours as indicator of regional disease. The maxillary squamous-cell carcinoma cases in our multicentric study and in the literature review exhibited aggressive regional metastatic behaviour, comparable with that of carcinomas of the tongue, mouth floor, and mandibular gingiva. Based on our findings, we recommend selective neck dissection in clinically negative necks as a primary management strategy for patients with maxillary squamous-cell carcinomas involving the palate, maxillary gingiva, or maxillary alveolus.

## Session 21. ORBITAL TRAUMA & PATHOLOGY

### O-2101

#### USEFULNESS OF SUBCILIARY APPROACH BY USING LACRIMAL SAC STRIPPING FOR LARGE ISOLATED MEDIAL ORBITAL FRACTURE RECONSTRUCTION

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**Purpose:** There have been several approaches used for 'isolated' medial orbital wall reconstruction, such as the subciliary approach, the transcaruncular approach, the medial brow incision approach, the bicoronal approach, etc. Among them, the selection of best method has been controversial, as each of them has its pros and cons. The purpose of this study was to determine the safety and effectiveness of the subciliary approach by using lacrimal sac stripping for adequacy of exposure and good operative field for the operator with minimal postoperative morbidity.

**Patients and Methods:** We conducted a retrospective study of patients with medial orbital fracture over the previous 5 years. The medical data of 19 patients, who presented with 'isolated' medial orbital fracture and treated with open reduction and orbital wall reconstruction via a subciliary approach using lacrimal sac stripping, were reviewed. The extent of the defect size and plate size, follow up details and complications were analysed.

**Results:** There were 15 male patients and 4 female patients. According to the pre/post-operative computed tomography, the vertical defect ranged from 8mm to 22mm, longitudinal defect ranged from 10mm to 27mm, vertical plate length ranged from 11mm to 28mm, longitudinal plate length ranged from 16mm to 30mm. The follow-up period was from 2 weeks to 32 months. Among them, only one patient complained of post-operative complication, persistent diplopia on extreme lateral gaze. However, there was no other problem associated with enophthalmos, lower eyelid scar formation, post-operative ectropion or other complication combined with the lacrimal apparatus.

**Conclusion:** Our study showed that a 'subciliary approach by using lacrimal sac stripping' method offers a safe access route to the defect and satisfactory exposure, as well as allowing insertion of an adequately sized implant for a large defect. This method is a relatively easy, effective technique for large isolated medial orbital wall defect, without significant post-operative morbidity.

### O-2102

#### TRANSCONJUNCTIVAL VERSUS SUBCILIARY APPROACH IN ORBITAL FLOOR FRACTURES

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**Introduction:** The aim of this study is to analyze the subciliary approach in contrast to the transconjunctival, in combination with lateral canthotomy, in the treatment of fractures of the orbital floor and evaluate their indications, advantages and complications.

**Material And Methods:** We present a study of 78 cases of orbital floor fractures that underwent surgery at our centre from January 2007 to April 2012. Inclusion criteria were patients with orbital floor fracture, with or without other facial bone defects. They were divided according to the approach used, finding 26 cases underwent a transconjunctival approach, with lateral canthotomy (transcaruncular extension was performed in 5 cases that had associated medial orbital wall involvement) and 52 subjects with subciliary access.

Patients were retrospectively analyzed by sex, age, injury mechanism, reconstruction material and associated complications.

**Results:** All patients showed clinical functional improvement. No severe complications were permanent. Enophthalmos and regional sensory deficits improved in all cases. The diplopia persisted temporarily in 5 cases. We had no cases of lagophthalmos, ectropion, entropion or malposition of the lateral canthal ligament in any of the patients who underwent the transconjunctival approach. The subciliary scar was visible moderately, after slight infection, in 3 patients. In 2 of the 16 cases in which the implant used was Silastic®, this had to be removed due to rejection. There were no problems of biocompatibility with the reconstruction titanium meshes.

**Discussion:** The association of lateral canthotomy in the transconjunctival approach to the orbital floor fractures significantly reduces the problem of limited surgical field. In cases of an associated fracture of the infraorbital rim, the nasoethmoidal complex or a preexisting disease of the eyeball we choose the subciliary approach.

We found very few functional differences between the two approaches but the best aesthetic result was obtained with the transconjunctival approach, taking into account the almost negligible handling of the orbit in short and long term.

**Conclusions:** The few differences observed in our experience with both techniques, from the functional point of view, seem to lean toward the transconjunctival approach, but we should not forget the complications associated with this technique and its technical limitations.

**O-2103****RETROBULBAR HAEMORRHAGE FOLLOWING SURGICAL TREATMENT OF ZYGOMATICO MALAR COMPLEX FRACTURES – ARE THEY A PROBLEM?**

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**Introduction:** Retrobulbar haemorrhage (RBH) is a complication of the surgical treatment of zygomatico malar complex (ZMC) fractures. Although rare, the effects can be devastating, leading to loss of vision and cosmetic deformity. Because of this ZMC fractures are routinely kept in hospital overnight in the UK after surgical treatment in case an RBH develops.

We carried out a retrospective study of all ZMC injuries treated surgically over an 11 year period in our unit to determine the incidence and presentation of postoperative RBH.

**Methods:** We obtained the records of all the patients who had had surgical treatment of ZMC fractures carried out at the Ulster Hospital, Dundonald, between January 2001 and December 2011 and identified patients who developed signs suggestive of RBH.

**Results:** 1,517 ZMC fractures were operated on during the period in question. 3 patients developed signs suggestive of a RBH. All these occurred before the patient left theatre. All were treated immediately. There were no long term complications.

**Discussion:** The incidence of RBH in our series is less than 0.2%. All cases presented immediately.

**Conclusion:** ZMC fractures can be safely managed as day cases with regard to RBH.

**O-2104****BULLFIGHTER TRAUMATIC LUXATION OF THE GLOBE INTO THE MAXILLARY SINUS: CASE REPORT**

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Complete globe dislocation into the maxillary sinus after trauma is an unusual situation. It results from direct transmission of a traumatic force on the orbital cavity or may result from an increased pressure to the orbital contents leading to a blowout fracture. In spite of urgent management and surgical repair, the patient's visual acuity has poor prognosis.

The authors present a case report of a bullfighter with a complete globe dislocation into the maxillary sinus in the context of a bullfight-accident.

A 28-years-old-man was admitted to Central Lisbon Hospital after a bull's horn penetrated his face through left malar region with massive swelling in the area. On examination the globe was not seen in the orbit. CT revealed a large orbital floor fracture with globe luxation into left maxillary sinus.

The patient underwent emergency surgery with repositioning of the globe into the orbital cavity and orbital floor reconstruction. The operative exploration showed no globe rupture or optic nerve laceration; however continuity of orbit muscles was irreparably lost. Postoperative CT revealed correct anatomic status of the globe and good reconstruction with no muscle incarcerations, although, in follow up consultations, the patient exhibited impaired visual acuity and restriction of eye movement.

**O-2105****MANAGEMENT OF EXOPHTHALMOS IN ENDOCRINE ORBITOPATHY. RATIONALE OF TREATMENT**

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**Key words:** Thyroid, exophthalmos, orbital decompression, eyelid surgery, surgical rehabilitation

**Summary:** The Authors describe their experience in treating exophthalmos in Endocrine Orbitopathy (Graves disease). A protocol of treatment is finalized according to the different prevalence of the orbital content. General surgical guidelines and an algorithm of treatment are suggested.

**Introduction:** Endocrine Orbitopathy (E.O.) (Graves/Basedow disease) is a chronic and multisystem disorder caused by an autoimmune process, characterized by the presence of antibodies that stimulate a general fibroblastic reaction (thyroid gland and lower extremities), and involves orbital fat tissue and muscles.

**Methods:** The clinical findings and therapy for the treatment of the exophthalmos, such as changes in extrinsic eye motility, diplopia, optic nerve involvement, and lid retraction, must be analyzed, and the various types of surgical treatment currently available for endocrine ophthalmopathy are evaluated. The aim is to choose the best option to treat each case.

The surgical techniques can be transpalpebral decompression by removal of intraorbital fat, three-wall osseous expansion, and zygomatic osteotomy. Adjunctive procedures are lengthening of the elevator muscle of the upper eyelid, lengthening of the retractor of the lower eyelid, and surgery of the extrinsic muscles to correct diplopia. All these techniques were useful in treating the disease, which is characterized by chronic evolution and, at times, a "malignant" outcome.

**Results:** Close cooperation among a team of specialists, including Endocrinologist, Ophthalmologist, Neuroradiologist, General Surgeon, Anesthesiologist, and Radiotherapist, is essential to manage and to quantify the postoperative results of this complex disorder.

**Conclusion:** The patient with endocrine orbitopathy must be considered as an "orbital cripple".

The authors present their experience and the application of different surgical strategies based on functional, morphological, aesthetic rehabilitation.

**O-2106****ORBITAL CAVERNOMAS: CLINICAL- IMAGING FEATURES AND SURGICAL EXPERIENCE ON A SERIES OF 16 CASES.**

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**Introduction:** orbital cavernomas are congenital low-flow vascular malformations. The common clinical features are a painless, slow, progressive proptosis with some decrease in vision. They usually tend to be well-circumscribed intraconal masses at CT or MRI. Indications for surgical removal are eye motility disturbance and visual deterioration. Relief of cosmetic disturbing proptosis is an indication for treatment after full disclosure of potential complications, including vision loss. In cases of orbital cavernomas diagnosed by chance with normal ophthalmic findings, observation is indicated. In this study we retrospectively analysed the clinical, radiological features and the surgical results of 16 patients operated at the Division of Maxillofacial Surgery, University of Turin, Italy.

**Patients and Methods:** The present study includes 16 patients who underwent surgical removal of their orbital cavernoma from January 2000 to September 2011. Clinical-ophthalmological evaluation, CT scans and MRI were performed in all cases pre and postoperatively. Minimum follow up was 8 months. Radiological and surgical findings, aesthetic and ophthalmological results and complications were recorded.

**Results:** Thirteen patients showed a painless gradually progressive proptosis and eyelid swelling; 10 complained of visual disturbance. CT/MRI imaging showed well-circumscribed, round-oval lesions located in the retrobulbar area. Three patients had an acute presentation with acute proptosis, pain, limited ocular movements and onset of rapidly progressive visual deterioration. In these cases a high-intensity internal signal suggestive of a haemorrhage was visualized on the T1-weighted images. The surgical approach in 10 cases was lateral orbitotomy for lesions located superior, lateral and inferior to optic nerve, in 3 cases lateral orbitotomy combined with anterior medial approach for lesions medial to optic nerve, in 1 case a combined neurosurgical approach and in 2 cases an anterior orbitotomy without osteotomy. Two out of the three patients with acute presentation had complete visual recovery, while one lost vision. Long-term morphological and aesthetic results were good in all patients with no evidence of recurrence.

**Conclusion:** clinical presentation may be quite variable: slowly progressive proptosis without visual loss or true visual loss secondary to optic-nerve compression after bleeding. Surgical pathway must be individualized according to the tumour location.

**O-2107****MULTIDISCIPLINARY APPROACH IN UNILATERAL TUMOURAL PROPTOSIS**

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The development of a tumour inside the orbit increases orbital tissue volume and is followed inevitably by a con-

flit between the container (orbit) and content (eyeball and annexes) resulting in the proptosis of the eyeball alongside a multitude of different symptoms including diplopia, strabismus, decreased visual acuity.

The treatment of unilateral tumoural proptosis is a difficult one because of the extension of the tumour in multiple neighboring surgical spaces. We wish to present our experience in the mixed approach: maxillo-facial surgery - neurosurgery, of this pathology.

**Methods:** Between 2006 and 2011 there were 14 patients with unilateral proptosis of tumour cause treated in collaboration with neurosurgeons. In 9 of the cases the tumours were malignant, the rest of them benign. In relation with the maximum extension of the tumour, the approach was different: transfacial in 9 of the cases, bicoronal in 2 of the cases, in other 2 cases the orbital exenteration was imposed, and in one last case the approach was transnasal. In the patients presenting with malignant tumours, surgery was followed by radiotherapy and chemotherapy.

**Results:** All patients survived. In 11 cases binocular vision was restored, as well as the facial symmetry, and in one of the patients the visual acuity remained zero after surgery.

**Conclusions:** The mixed teams approach allows the treatment of patients believed to be surgically unapproachable in the past, obtaining good quality postoperative aesthetic and functional results and with minimal postoperative morbidity.

**O-2108****MINIMAL INVASIVE BIOPSY OF INTRACONAL EXPANSION BY PET/CT IMAGE FUSED NAVIGATION SYSTEM, A WELL-PROVEN METHOD**

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**Background:** Intraorbital tumours often remain undetected for a long period and may lead to compression of the optic nerve and loss of vision. Though CT, MRI's and ultrasound can help in determining the probable diagnosis, most orbital tumours are only diagnosed by surgical biopsy. Especially in intraconal lesion this may prove difficult as the expansions are situated next to sensitive anatomical structures (eye bulb, optic nerve). In search of a minimal-invasive access to the intraconal region, we describe a method of a three-dimensional, image-guided biopsy of orbital tumours using a combined technique of hardware fusion between F18-FDG Positron Emission Tomography (F18-FDG-PET) and Computed Tomography (CT).

**Material and Methods:** We present 6 patients with intraorbital lesions, all of them suffering from diplopia and/or exophthalmus. One of the patients already showed early loss of vision. Another of the patients presented lesions in both orbits. There were 4 male and 2 female patients. The patients' ages ranged from 44 to 68 years. The decision to obtain image-guided needle-biopsies for treatment planning was discussed and decided in an interdisciplinary board comprising other subspecialties (ophthalmology, neurosurgery, maxillofacial surgery, ENT, plastic surgery). All patients underwent F18-FDG PET/CT preoperatively for data acquisition. Biopsy-needles were calibrated intraoperatively and all patients underwent three-dimensional image-guided needle biopsies under general

anaesthesia.

**Results:** A total of 7 biopsies were obtained. The histologic subtype was orbital pseudotumour in 2 cases, lymphoma in 2, Merkel cell carcinoma in 1, melanoma in 1 and in the last case inflammatory tissue was found. The different pathologies were subsequently treated in consideration of the actual state of the art. In cases where surgical removal of the lesions were performed the histological diagnosis was confirmed in all cases.

**Discussion:** There is a wide range of possible treatment modalities of orbital tumours depending on the nature of the lesion. Histological diagnosis is mandatory to select the proper procedure. The method presented allows minimally-invasive biopsy even in deep intraconal lesions thus enabling the surgeon to spare critical anatomical structures. Vascular lesions like haemangioma, however, present a contraindication and have to be excluded at the outset.

#### **O-2109** **SURGERY OF THE ORBIT CONDUCTED WITH A PIEZOELECTRIC SAW.**

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**Introduction:** The bone surgery of the orbit has many limitations created by its content, applied technical devices (osteotomy and fixation), and various clinical experience.

Whereas the surgery of the lower third of the face became a well-known procedure within the last thirty years, the middle third of the face still remains a challenge for many surgeons. The application of piezo cutting devices makes these procedures much easier.

**Aims:** The authors, having a reasonable experience in the field of maxillofacial and orthognathic surgery conducted by various piezosystems, wanted to assess the clinical application of such technology in the orbital and craniofacial surgery and compare it with the classic osteotomy devices, (drills ,oscillating saw, reciprocating saw) The advantages and differences of the piezo surgical technique over the usual methods are graphically explained.

**Material and methods:** Between 2005-2012 the authors operated on 37 patients who require different forms of orbital surgery. The aetiologies of deformity were of various origin

9 cases presented severe post traumatic deformity. In 28 cases the orbital dysmorphology have a congenital aetiology such as non syndromic craniostenosis (11 cases) syndromes: Crouson (4 cases), Apert (5 cases) Saethre Chotzen (2 cases), Cloverleaf (2 cases), Treacher Collins (3 cases) facial cleft (2 cases).

The team usually consisted of maxillofacial and neurosurgeon.

The aesthetic outcome length of surgery, blood loss and recovery period were compared with the cases that were operated by conventional methods ( 13 patients).

**Results:** The results achieved were very satisfying. The

piezo craniotomy in our hands was shorter and less traumatic than usual craniotomy. The blood loss was almost fifty percent less, no damage to the content of the orbit was reported. In 3 syndromic cases the procedure due to the recurrence of the exorbitism and cranio stenosis was repeated within 18 months.

**Conclusions:** Piezo Surgical technique is a milestone in the development of the bone orbital and craniofacial surgery. It gives new possibilities allows to perform extensive osteotomies via limited approach (eg. c- shape on circular osteotomy of the orbit via bicoronal approach)

#### **O-2110** **ANOPHTALMOUS RECONSTRUCTION WITH SELF INFLATING HYDROGEL EXPANDER PRIOR TO ORBITAL IMPLANT : RATIONALE AND RESULTS.**

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**Objective :** Expansion of the orbit in the reconstruction of anophthalmic patients is needed when tissue retraction will not allow implant insertion at the time of surgery. The authors present here a procedure of expansion with self inflating hydrogel implants using osmotic principles to gain volume before the implant insertion.

**Methods:** Self inflating hydrogel implants tissue expander spheres (Osmed ®) were used for retro-conjunctival augmentation during 1 month. After expansion, a second surgery was performed to insert a porous polyethylene implant with optimal size allowed by the gain of tissue volume.

**Results :** A preliminary report of three cases (2 post-traumatic reconstruction at 1 year and 20 years ; 1 for retinoblastoma surgery-radiotherapy sequelae) is presented. The gain of volume and the position of the implant are evaluated with CT-scan images. Advantages and disadvantages are analyzed to appraise the procedure and the potential extension of indications in other fields.

**Conclusion :** Self inflating expander spheres allows the insertion of 20 to 23 mm implant diameters in retruded anophthalmous cavities with a short surgical time. This hydrogel implants using osmotic principles has a good tolerance and avoids the multiple manual expansion of the classical expanders. No loss of the expander or the implant was noted in our report, when the essential drawback of these self inflating expanders is the lack of control of the expansion rapidity.

No conflict of interest to declare.



## Session 22. BENIGN TUMOURS & VASCULAR LESIONS

### O-2201

#### TREATMENT APPROACHES IN CHILDREN WITH BLOOD VESSELS HYPERPLASIA (I.E. INFANTILE HAEMANGIOMA) IN MAXILLOFACIAL REGION.

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**Objectives:** creating a treatment algorithm for children with hyperplasia of blood vessels (IH) in maxillofacial region considering the possibility of spontaneous involution, conservative therapy, and the use of surgical intervention only when it is justified and necessary.

**Patients and methods:** selective retrospective analysis of 300 cases of children with blood vessels hyperplasia (IH) in the maxillofacial region (2000-2010) and prospective analysis of 150 own observation reports (2010-2011 – after the introduction of the term “vascular hyperplasia” in clinical practice.

**Results:** before 2010 unjustified aggressive methods of treatment were often used: cryotherapy – 21 patients (7%), radiotherapy – 15 (5%), sclerotherapy – 15 (5%), prednisolone – 30 (10%). Different combinations of these methods were used in 31% of cases (93 patients). Surgical treatment (42% - 126 patients) was used for all localizations and stages of lesion that led to recurrence, pathological scars, cosmetically and functionally unsatisfying results.

Since 2010 the research has been conducted on understanding that “IH” is not a tumour but blood vessel hyperplasia – a reactive process. This led to a great change in treatment tactics. Among 120 patients 70% had been directly referred to the clinic and 30% turned for help after unsuccessful treatment in other medical institutions.

At present time we are using the following types of treatment: expectant management (33,3%), propranolol (30%), surgical treatment (36,7%). The therapy depends on the stage, size (focal or segmental) and localization (critical location or esthetically important region) of the lesion and the children’s and their parents’ psychological status.

**Conclusions:** in order to choose a treatment approach we should take into consideration patients’ age, clinical characteristics of blood vessel hyperplasia (IH). Sparing methods should predominate in complex therapy. We discuss the combination of the up-to-date drug therapy and the subsequent surgical correction.

### O-2202

#### DIAGNOSTICS, CLINICAL AND MORPHOLOGICAL FEATURES OF BLOOD VESSELS HYPERPLASIA IN MAXILLOFACIAL AREA IN CHILDREN.

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**Objective:** to determine the clinical and morphological features and diagnostic criteria for hyperplasia of blood vessels in infants (i.e. infantile hemangiomas (IH)).

**Patients and methods.** 120 patients with hyperplasia aged from 0 to 8 were included. All the patients were examined clinically, diagnostic imaging included ultrasound examination, CT scan with contrast, MRI. Computer capillaroscopy, morphological and immunohistochemical examination were also carried out.

**Results.** Girls with hyperplasia outnumbered boys 4:1. 96% percent of mothers had a compromised obstetric history. Single lesions were observed in 45% of cases, 55% had multiple lesions. Lesions were isolated in 71% of cases and part of a syndrome in 29%. PHACES syndrome was diagnosed in 9% of patients. Three stages of clinical manifestations of the vascular hyperplasia have been offered:

1. The manifestation stage.
2. The stage of active growth
3. The stage of involution startup
4. The stage of involution
5. The stage of residual manifestations

The lesions may occur and disappear in different parts of body, at different times at one and the same patient. Involution time depends on time of appearance, area and volume of the lesion. Vascular hyperplasia (IH) can develop and pass through initial stages in utero and finish the development after birth (46%). In any case the only possible outcome is the involution of the lesion.

Three types of lesion have been offered:

Type 1 – cover tissues only – 26%

Type 2 – deep tissues only – 7%

Type 3 (mixed) – cover and deep tissues – 67%

The involution affects the vascular part only. Occasionally fibro-fatty areas and the sagging skin remain.

**Conclusions.** It is important to take into consideration the age of patient, time of origin of the abnormality, clinical course and localization of hyperplasia. In uncertain cases imaging studies and morphometry should be applied. The term “blood vessel hyperplasia» (2010) elucidates the biological basis of “IH”.

### O-2203

#### CLASSIFICATION OF BLOOD VESSELS LESIONS OF HEAD AND NECK AREA: NEW VISION.

*Vitaliy Roginskiy*<sup>1,\*</sup>, *Andrey Nadtochiy*<sup>1</sup>, *Alexey Grigoryan*<sup>1</sup>, *Sokolov Yuriy*<sup>2</sup>, *Yuriy Soldatskiy*<sup>2</sup>, *Alexander Nerobeev*<sup>1</sup>, *Vladimir Kovyazin*<sup>3</sup>

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**Objective:** to develop a clinical-biological classification of blood vessels lesions based on the results of a multidisciplinary study

**Material:** We carried out 1600 case studies (prospective and retrospective) in patients from different age groups (1300 children and 300 adults) that were treated and followed-up in the institutional clinics in 1990-2010.

Methods included clinical and laboratory examinations, diagnostic imaging (US, MRI, CT with angiography), morphological and immunohistochemical studies and capillaroscopy.

*Results:* head and neck blood vessels lesions may be subdivided into 3 main groups based on their clinical and biological characteristics: hyperplasia, malformations and tumours.

Hyperplasias (used to be defined as IH, RICH) occur only at birth or 2-4 weeks after. Their major morphological characteristic is proliferation of vessels endothelium, or to a less degree - of other tissues, thus determining the affected area. The main clinical feature is involution (full or partial). The vast majority of lesions occur in infants under 1 year of age (90%).

Malformations (CM, VM, AVM, CVM etc.) manifest immediately after birth or a few months or years after. They are characterized by quantity disorganization of normal vessels with various hemodynamic defects. The progress is slow. The lesion is not subjected to involution. Their share among other forms of vessels lesions in newborns is about 6%.

Tumours may occur both prenatally and after birth at any age. They are characterized by local growth of the tissues and autonomous, unlimited growth. Histological picture varies considerably. For clinical purposes it is important to verify the benign or malignant nature of tumour. Incidence is 2-4% of other lesions.

*Conclusion:* the classification of head and neck blood vessels lesions was elaborated, tested in several clinics for 2 years and gave positive assessment.

#### O-2204

### FUNCTIONAL ANATOMY OF THE MICROVASCULATURE IN HEALTHY CHILDREN AND PATIENTS WITH NON-TUMOUR VASCULAR LESIONS –HYPERPLASIA (IH) BY COMPUTER CAPILLAROSCOPY.

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*Objective:* Imaging of the functional anatomy of the microvasculature in healthy children and patients with non-tumour vascular lesions –hyperplasia (IH) by means of high-resolution device.

*Methods:* The imaging device (probe) was used computerized electronic-optical contrast, magnification and visualization of objects aiming to describe the relationship between the various components of the microcirculatory system.

Images were obtained with more than 1 micron resolution in 82 children with hyperplasia of blood vessels in different anatomical regions (head, face, neck, torso, limbs) and in 10 children without pathology. The images were processed by specialized software "Angioscope." The technology allows one to visualize the anatomy of the capillaries and to assess the hemodynamic parameters.

*Results:* Computer capillaroscopy allows the study of functional anatomy features and measurement of microcirculation in normal tissues and hyperplastic blood (i.e. IH).

We have studied the extent and nature of microcirculatory disorders at every stage of the disease according to the morphometry of capillaries and pericapillary area. The study also revealed hemodynamic characteristics of the capillary blood flow in healthy tissues and in blood vessels hyperplasia (IH).

*Conclusion:* Computer capillaroscopy gives an opportunity to identify new microscopic features of the functional anatomy in non-tumour blood vessels lesions –hyperplasia (IH). The obtained data was compared with the clinical patterns, as well as the results of ultrasound, pathomorphological and immunohistochemical studies. This allowed development of new diagnostic criteria and assessment of the effectiveness of conservative treatment.

#### O-2205

### TRANSCUTANEOUS RADIOFREQUENCY ABLATION OF VASCULAR LESIONS IN MAXILLOFACIAL AREA

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*Objective.* To develop and implement a modern minimally invasive treatment in children with extensive cavernous and mixed vascular malformations with complex anatomical localization by means of radiofrequency thermoablation.

*Methods.* Transcutaneous radiofrequency thermoablation using a "Cool-tip RF Ablation System" device was performed in 16 patients. Pathological lesions in the buccal, parotidomasseteric, paraorbital, temporal, zygomatic, pterygomaxillary, upper and lower lip and tongue areas were operated on. The lesions were cavernous in all cases. Active 1 mm electrode with 1 cm working length guided by ultrasound was injected through the transcutaneous or transmucosal puncture in the centre of the lesion. Oscillation of charged particles in the pathological lesion occurs due to the alternations of the electromagnetic field generated after the device's startup. These micro movements of intracellular structures heat cells to coagulation. The temperature inside the lesion rises above 70 ° C, causing coagulation necrosis.

*Results.* The thermal effect resulted in soft tissue infiltration in the lesion area. This infiltrate lasted for a few days. Subsequently the coagulation clot transformed in fibrous tissue in the area.

*Conclusion.* The results obtained show the efficiency of this method in the treatment of patients with vascular malformations.

#### O-2206

### PROPRANOLOL FOR THE TREATMENT INFANTS WITH INFANTILE HAEMANGIOMA: RESULTS FROM A SERIES OF 70 PATIENTS.

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*Objectives.* The purpose of this study was to describe the results of propranolol treatment of infantile haemangioma in terms of the efficacy, treatment approach and adverse

events.

**Patients and methods.** The study included 70 infants with infantile haemangioma in the proliferative or early involutive phase. Cardiological examination (ECG, cardiac ECHO, Holter monitoring, blood pressure), checking blood glucose level and serial photographs was obtained before, during, and after the treatment. During pre-treatment examination 5 patients (7,1%) were diagnosed with congenital heart diseases and 4 patients (5,7%) were diagnosed with PHACE syndrome. After pre-treatment examination all patients began propranolol treatment from the dosage 1.0 mg/kg/day. During the treatment dosage increase was cried out step-by-step up to a maximum of 2-3 mg/kg/day. The average length of treatment was 7 months and 20 days.

**Results.** Propranolol demonstrated effectiveness in all cases, with a good or excellent clinical effect in 70.0% cases after 6 months of treatment. Effects were visible on the first days of treatment, both in growing and involuting of infantile haemangioma. Adverse effects were observed at 3 patients. 2 patients had short and self-resolved episodes of hypotension with hypoglycemia. Treatment was continued for both patients. 1 patient has shown prolonged sinus-arrest episode which was registered by Holter monitoring and treatment was discontinued. The average decrease of systolic blood pressure in the treated group was 8,86 mm Hg ( $p=0,01$ ), diastolic blood pressure was decreased on 5,29 mm Hg ( $p=0,01$ ), and cardiac rate was decreased on 20,31 beats per a minute ( $p=0,01$ ).

**Conclusions.** In all cases, oral propranolol produced rapid and sustained improvements in infantile haemangioma as much in the proliferative phase as in the early involutive phase. Using propranolol to shorten the natural course of the disease is indicated. All adverse events were episodic cases. However, the incidental finding without any complication requires more intensive monitoring for possible drug toxicity.

#### O-2207

##### THE NEED FOR TRACHEOSTOMY IN VASCULAR ANOMALIES: A LITERATURE META ANALYSIS.

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Vascular anomalies encompass an extremely wide spectrum of pathologies. There are simple single angiomas which do not pose any diagnostic and therapeutic difficulty.

On the other hand, there are extremely severe conditions such as congenital gigantic lymphatic malformations involving the upper respiratory tract that can require an Ex Utero Intrapartum Therapy (EXIT).

In general, when a vascular anomaly affects the airways, there could be the risk of asphyxia spontaneously, during certain physiological conditions such as the Valsalva manoeuvre, during intubation or during the surgical management of the vascular anomaly.

The aim of the present paper was to extensively review the literature in the search for indications and techniques to see if a guideline can be proposed to protect the upper airways of patients affected by haemangiomas and vascu-

lar malformations.

In detail we tried to investigate the conditions that suggest a surgical airway versus a conservative management.

As to what pertains to haemangiomas we have thoroughly reviewed the literature regarding subglottic haemangiomas treated before and after the advent of propranolol.

For the vascular malformation we have considered the various clinical conditions that can suggest a surgical airway.

Eventually we try to see if a guideline can be proposed.

#### O-2208

##### COLLATERAL ARTERY GROWTH BYPASS ARTERIAL LIGATION IN PATIENTS WITH HEAD AND NECK ARTERIOVENOUS MALFORMATIONS

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**Background:** Collateral artery growth, termed arteriogenesis, is probably a multifactorial process in which interplay of several growth factors, chemokines and proteases are orchestrated to rebuild an artery from a preexisting arteriole. Arteriogenesis is induced not only by proliferation of vessel-resident smooth muscle cells (SMCs) and endothelial cells (ECs) but also by migration of circulating monocytes, CD4+ T-lymphocytes, NK and bone marrow-derived progenitor cells. Sudden occlusion of a feeding artery develops a steep gradient of increased blood pressure, thus causing fluid shear stress (FSS). The signaling transduction cascades that are initiated as a result of the FSS lead to the activation of cells. The mechanism of arteriogenesis is largely, but yet not fully, understood.

**Patients and methods:** A multidisciplinary approach is needed for the assessment and treatment of these lesions. We treated eight patients with arteriovenous malformations (AVM) during last 10 years, three of them were previously treated in other clinics. Few years after proximal ligation of feeding artery, they developed collateral arteries as seen on arteriograms that we present. Therefore those three patients had to be retreated by surgical resection of a previously embolised lesion.

**Conclusion:** The successful treatment of AVMs is often compromised, since a high incidence of recurrence could be expected if the lesion is not managed properly, as we reported. AVM superselective embolisation followed by surgical resection should be method of choice for fast-flow malformations of head and neck.

#### O-2209

##### COMPLEX EXAMINATION OF PATIENTS WITH LYMPHANGIOMAS OF THE MAXILLOFACIAL REGION.

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**Introduction.** The lymphangioma is a benign formation from lymphatic vessels, being a defect of the lymphatic system. The specific features of lymphangiomas is their

ability to inflame. The purpose of our work is a complex examination and treatment of patients with lymphangiomas of face and neck.

**Material and Methods.** We have examined 40 patients with lymphangiomas of face and neck, 33 persons with the flame of lymphangioma in the anamnesis. We made clinical and immunological examination. We studied bacterial contamination of the lymphangioma's tissues in the inflammation and remission stage by method of polymerase chain reaction (PCR).

**Results.** In the lymphangioma samples from all patients we identified markers of the most pathogenic gram-negative species of microbes, usually detectable in periodontitis: *Bacteroides forsythus*, *Prevotella intermedia*, *Treponema denticola*, *Porphyromonas gingivalis*, *Actinobacillus actinomycetemcomitans*. Four species of microbes (*B. forsythus*, *T. denticola*, *P. intermedia* or *A. actinomycetemcomitans*) were found most commonly in patients with inflamed lymphangiomas. The most virulent species of microbe - *P. gingivalis* was not detected. The DNA of the Epstein-Barr virus was found in the inflamed lymphangioma samples and remission stage using PCR. We observed a threefold increase of antibodies to Epstein-Barr virus in the peripheral blood serum. We can confirm the view that the emergence of immune reactions in various tissues of the body is caused by the long-term presence of pathogenic microbes in these tissues or close proximity to them.

**Conclusion.** Consistent immunological changes were shown, not only in patients with inflamed lymphangiomas, but also in patients with lymphangiomas in remission. Such patients need a complex examination and treatment. We may assume that the aetiology of lymphangioma inflammation is periodontopathogenic microbes. For the treatment of inflamed lymphangiomas we recommend to use antibiotics of the macrolide group.

#### O-2210

#### BLEEDING COMPLICATIONS OF CUTANEOUS SURGERY IN PATIENTS ON ANTICOAGULANT TREATMENT

Wolfgang Eichhorn<sup>1,\*</sup>, Evgeny Barsukov<sup>1</sup>, Henning Hanken<sup>1</sup>, Alexander Gröbe<sup>1</sup>, Marc Eichhorn<sup>2</sup>, Max Heiland<sup>1</sup>, Marco Blessmann<sup>1</sup>, Ralf Smeets<sup>1</sup>

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**Background:** In patients on oral anticoagulation the CMF surgeon has frequently to balance the risk of postoperative bleeding against the risk of thromboembolism by modifying the anticoagulation regimen. The management of these patients is still under constant discussion.

**Objective:** The purpose of this retrospective case-control study was to assess the extent of postoperative bleeding in 104 patients treated with coumarins undergoing cutaneous surgery in the head and neck without interruption of the anticoagulant treatment.

**Methods and materials:** 104 patients underwent 177 surgical procedures on an outpatient basis without changing the anticoagulant therapy. In the control group, consisting of patients without an anticoagulative medication, 124 patients underwent 214 procedures. All procedures were

performed by the same surgeon.

**Results:** The overall bleeding rate in the study group was 9.0%. 5 patients with haemorrhage had to be treated in hospital with a mean duration of 2.9 days. The bleeding rate of the control group revealed to be 2.8%, with 1 admission to the hospital. Local measures revealed to be sufficient in all cases except for one patient, where the postoperative anticoagulant treatment had to be changed for 7 days.

**Conclusion** In most cases, cutaneous surgery can safely be performed with a continued oral anticoagulant treatment on an outpatient basis.

## Session 23. SALIVARY GLANDS - SURGERY AND PATHOLOGY

### O-2301

#### MANAGEMENT OF EXTENDED PAROTID TUMOURS

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**Introduction.** Extended parotid tumours are a challenge for OMF surgeons because of their complexity, infiltration of nearby structures, subsequent composite and large defect, postoperative sequels, the old age and poor general status of patients.

**Aim.** The aim was to establish a treatment protocol for extensive parotid tumours and their sequelae, and to identify parameters which determine resection and reconstruction technics.

**Material and method.** The study included 26 patients with extensive parotid tumours operated between 2005 & 2012. These were primary (15) or secondary (11) from skin tumour infiltration (9) or metastatic parotid lymphnodes (3). Reconstruction technics were: 5 radialis and 3 latissimus dorsi free flap, 6 platysma flap, 2 major pectoralis musculocutaneous flap, one major pectoralis muscle flap, 4 sternocleidomastoid flap, 4 skin rotation flap and 1 no reconstruction. Paralytic lagophthalmos was treated in 5 cases with a golden weight implant in upper eyelid. Facial asymmetry was addressed in 6 cases using Coleman technique.

**Results.** All flaps were viable. The best esthetic and functional results were obtained with free flaps. One patient with latissimus dorsi presented dehiscence of the wound in the parotid region and ectropion. Pectoralis Major musculocutaneous flaps suffered an important atrophy resulting facial asymmetry. Golden weight implant was effective in treatment of lagophthalmos. Facial asymmetry was corrected. At this moment overall survival rate is 61.29%.

**Discussion.** For patients with poor general condition, we preferred the platysma flap, if the defect was not extensive. Major pectoralis musculocutaneous flap was useful in cases with comorbidities and large defect, in one patient involving the skull base. Radialis free flap is useful in medium and superficial defects because it is thin and pliable. Latissimus dorsi is excellent in bulky and extensive defects, where it can seal "watertight" the cranial base in case of temporal bone resection. Sternocleidomastoid flap was used in small defects involving soft tissues.

Treatment of sequels depended mainly on each patient's expectation and compliance.

**Conclusions.** Extensive parotid tumours represent difficulties in treatment planning because of complexity of the defect, the age and general status of patients. Taking into consideration the good survival at this time, we can say that the surgical treatment of extensive parotid tumours is effective.

### O-2302

#### ATYPICAL FORMS OF WARTHIN'S TUMOUR IN THE MATERIAL OF THE DEPARTMENT OF CRANIO-MAXILLO-FACIAL SURGERY IN CRACOW

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Warthin's tumour is the second most common benign salivary gland tumour, typically located in the parotid gland. Extraparotid Warthin's tumour may involve I-III cervical levels in 2,3-8% of cases.

The aim of this study was to determine the relative frequency and distribution of Warthin's tumours.

**Materials and Methods:** Retrospective review of medical records of 43 patients (19 females, 24 males) with Warthin's tumours, with typical and atypical location, treated at the Department of Cranio-Maxillo-Facial Surgery of the Jagiellonian University in Cracow in the years 2000 - 2011.

**Results:** Warthin's tumour comprised 17.4% of all parotid gland tumours. The mean age of patients was 62 years. Apart from 7 cases (16.6%) of multifocal and 11 cases (26.2%) of bilateral parotid Warthin's tumours, 2 cases (3.8%) of papillary cystadenoma lymphomatosum involving II cervical level were found. Synchronous Warthin's tumours with squamous cell carcinoma (buccal mucosa, tongue and skin) were found in 3 cases (5.6%). The most commonly performed procedure was excision.

**Conclusions:** Extraparotid Warthin's tumour may cause diagnostic and therapeutic problems, especially in cases of synchronous occurrence with squamous cell carcinoma of head and neck.

### O-2303

#### AESTHETIC REFINEMENTS IN PAROTID BENIGN TUMOUR SURGERY

Andrea Ferri<sup>1,\*</sup>, Bernardo Bianchi<sup>1</sup>, Silvano Ferrari<sup>1</sup>, Chiara Copelli<sup>1</sup>, Pietro Boni<sup>1</sup>, Massimiliano Leporati<sup>1</sup>, Enrico Sesenna<sup>1</sup>

<sup>1</sup>University Hospital of Parma, Italy

The aim of this presentation is to discuss the efficacy of partial parotidectomy, selective deep lobe parotidectomy, face-lift incision, sternocleidomastoid muscle flap and SMAS flap for improving aesthetic results in patients undergoing resection of benign parotid tumours. Advantages of partial parotidectomy will be presented and a comparison with standard approaches such as superficial and total parotidectomies, based on a literature review, will be made. The role of reconstructive techniques in preventing facial contour defects will also be discussed. Finally some clinical cases will be presented.

**O-2304****ANALYSIS OF 160 SUBMANDIBULAR GLAND EXCISIONS**

*Daniel García Molina<sup>1,\*</sup>, María José Morán Soto<sup>1</sup>, Paula Barba Recreo<sup>1</sup>, Eduard Mirada Donisa<sup>1</sup>, Jorge Guñales Díaz de Cevallos<sup>1</sup>, Miguel Burgueño García<sup>1</sup>*

<sup>1</sup>Hospital Universitario La Paz, Spain

**Objective:** A review of 160 submandibular gland excisions performed at Hospital Universitario La Paz (Madrid) over a ten year period is presented.

**Patients and methods:** The medical record and case notes of all patients with submandibular gland excision were reviewed retrospectively from January 2001 to July 2011. This data included gender, age, histopathology of the submandibular gland, diagnostic procedures, operative reports, complications, additional treatment and follow-up. We compared our study with similar studies published in other countries.

**Results:** In our series chronic sialoadenitis and sialolithiasis of the submandibular gland was found in 114 cases (71,25%). Thirty-seven neoplasms (75% benign and 25% malignant) were found. The most frequent benign and malignant neoplasm found were pleomorphic adenoma (26 cases) and adenoid cystic carcinoma (7 cases), respectively.

**Conclusions:** It can be concluded that the present study shows that in Spanish population the main cause of submandibular gland excision is sialoadenitis and sialolithiasis. The most frequent neoplasms were pleomorphic adenoma and adenoid cystic carcinoma, like reports published. We had a higher incidence of benign neoplasms than previous reports.

**O-2305****DOES A SUPERSATURATED CALCIUM PHOSPHATE MOUTH RINSE AT PREVENT OR REDUCE THE SEVERITY OF ORAL MUCOSITIS (OM) IN PATIENTS UNDERGOING RADIOTHERAPY (RT) OR CHEMORADIOTHERAPY (CRT) TO THE HEAD AND NECK?**

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OM is a common severe side effect of RT/CRT in head and neck cancer. It is frequently painful and debilitating, and when severe results in hospital admission, interventions to assist feeding (eg. nasogastric feeding tube) and interruption of radiation treatment. OM is estimated to affect more than 70 percent of those undergoing conditioning therapy for bone marrow transplantation, and virtually all patients receiving radiation therapy for head and neck cancer. OM usually manifests itself within seven to 14 days after initiation of therapy. Several regimens and products have been suggested as a means of managing this condition these include topical analgesics such as benzydamine, antimicrobials such as chlorhexidine, and bioadherent gels such as gelclair, muguard, and episil. There is as yet no nationally agreed standard protocol.

Caphasol is a supersaturated calcium phosphate mouth rinse which has been identified as a potential treatment in the prevention and management of mucositis. Papas et al

2008, demonstrated that caphasol had a beneficial effect in reducing mucositis in patients undergoing total body radiation prior to bone marrow transplant. We examined the RTOG mucositis scores for 116 consecutive patients undergoing RT or CRT under the care of the SRH head and neck MDT.

Up until September 2009 patients were not using caphasol, but being treated if they developed OM.

After September 2009 patients were using caphasol, from the beginning of RT or CRT as a preventive measure, in addition to receiving treatment should they develop OM. There were 78 patients in the caphasol group and 28 in the control group.

In the control group, 10% had no mucositis, 57% Grade 1 or 2, and 31% patients developed grade 3 or 4 mucositis. In the treatment group 28% of patients had no mucositis, 55% had Grade 1 or 2, and 15 % grade 3 or 4 mucositis.

Caphasol appears to be beneficial in preventing the onset of OM, and reducing its severity. This could reduce admissions, and dependence on NG or PEG feeding. Randomised controlled trials are needed.

**O-2306****COMPARISON OF RHEOLOGICAL BEHAVIOUR BETWEEN COMMERCIAL SUBSTITUTES AND THE HUMAN SALIVA**

*Arnaud Béduneau<sup>1,\*</sup>, Edouard Euvrard<sup>2</sup>, Gaëlle Brunotte<sup>3</sup>, Yann Pellequer<sup>1</sup>, Lionel Pazart<sup>3</sup>, Christophe Meyer<sup>2</sup>*

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**Introduction:** Xerostomia represents one of most common side effects caused by the radiation therapy of malignant diseases in the head and neck regions. Patients suffering from xerostomia have difficulties in speaking, swallowing and eating. In addition, dental health may be seriously affected. Many saliva substitutes have been developed for decades; nevertheless their efficiency has not been yet clearly demonstrated. Difficulties arise in the complexity of saliva composition that confers many mechanical properties such as lubrication, wetting properties, viscosity and viscoelastic behaviour. Artificial saliva was developed by mimicking saliva components, as in mucin-based substitutes, by using thickening and wetting agents or mucoadhesive polymers. However, the optimization of these formulations was limited by the lack of relevant data about the physical characteristics of saliva. The rheological (elastic and viscous) behaviour of unmodified saliva was not extensively determined despite its key role in the lubrication and in the coating of the bolus. The goal of our study was to evaluate the rheology of human saliva to determine a standard rheological profile.

**Material and methods:** The linear viscoelasticity and the viscosity versus the shear rate were measured at 37°C using a cone/ plate rheometer in 50 healthy volunteers. Standard profile was compared with the rheological behaviour of different classes of commercial saliva substitutes. Comparisons were then corroborated with their clinical evaluations in order to assess the relevancy of the

method.

**Results:** The storage modulus  $G'$  was dominant over the loss modulus  $G''$  and was not dependent on the frequency, revealing a gel-like material response. Flow tests showed a significant decrease of the apparent viscosity with the shear rate indicating a highly non-Newtonian shear thinning behaviour. Among the ten commercial formulations tested, only a few substitutes exhibited a rheological profile close to the human saliva in terms of viscoelasticity and viscosity.

**Discussion :** Similar rheological profiles observed between human saliva and a few commercial substitutes were explained by the presence of high molecular weight components. Surprisingly, mucin-containing saliva substitutes did not show a gel-like material response.

**Conclusion :** Rheological characterization represents a promising approach to evaluate the interest of saliva substitutes.

### O-2307

#### THE ACCURACY OF ULTRASOUND SCAN AND ULTRASOUND GUIDED FINE NEEDLE ASPIRATION CYTOLOGY IN THE DIAGNOSIS OF PAROTID GLAND LESIONS

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**Introduction:** Ultrasound scanning (USS) and ultrasound (US) guided fine needle aspiration cytology (FNAC) are of great diagnostic value in differentiating between malignant or benign parotid gland lesions. The result of these investigations correlated with the clinical presentation is determinant for further management.

We analysed the accuracy of the USS and US guided FNAC based diagnosis in a cohort of patients who progressed to surgery afterwards.

**Method:** All the reports of parotid glands US examinations performed in the last four years at the University Hospital Coventry and Warwickshire NHS Trust were identified and reviewed (n=311).

In order to assess accuracy only the reports including a diagnosis based on USS or US guided FNAC of patients who subsequently underwent surgery were selected.

We calculated the sensitivity and specificity of these investigations with regard to discriminating between the malignant or benign nature of parotid lesions otherwise confirmed post surgery through histopathological examination.

**Results:** In 21 cases the USS alone concluded with a diagnosis or comment on the nature of the lesion with a sensitivity of 67% and a specificity of 100%. In 23 patients the US guided FNAC provided a diagnosis on the nature of the neoplasm with an identical sensitivity and specificity.

**Conclusion:** Both these investigations had similar accuracy with 100% specificity.

With as sensitivity of 67%, USS and US guided FNAC of parotid lesions cannot be used exclusively to rule out malignancy.

### O-2308

#### USEFULNESS OF FNA BIOPSY IN PAROTID TUMOURS

Dolores Martinez-Perez<sup>1</sup>\*, Julian Ruiz Jimenez<sup>1</sup>, Juan Rey Biel<sup>1</sup>, Lourdes Maniegas Lozano<sup>1</sup>, Silvia Roson Gomez<sup>1</sup>, Alicia Cazorla<sup>1</sup>

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**Objective:** The management of parotid tumours is based on clinical, imaging and cytologic data. Initial concerns regarded the possibility of bleeding, tumour seeding and facial nerve injury. In this study we present our study of the accuracy of FNAB in our institution.

**Patients and methods:** We conducted a retrospective study of the medical records of 157 patients who underwent FNAB and subsequent surgical treatment for parotid tumours between January 1 2000 and Jan 1 2011. Cases referred to us from other institutions with previous biopsies have been excluded.

**Results:** 157 patients were included in the study. 82 women, 75 men. Median age at diagnosis was 51,08 years (12-91 years). Final pathologic diagnosis was 129 benign tumours, 23 malignant tumours, 5 inflammatory lesions (2 lymphoepithelial cysts, and 3 chronic sialoadenitis). Within the benign tumours the following distribution was found: 57,3% Pleomorphic Adenomas (90), 17,8% Warthin tumours (28), 1,9% Basal cell adenomas (3), 1,9% Oncocytomas (3), 1,9% Myoepitheliomas (3), 0,6% Lymphatic malformation (1) y 0,6% Intraparotid Paraganglioma (1). Malignant tumours were: Squamous cell Carcinoma (7), Cystoadenocarcinoma (3), Adenocarcinoma (3), Adenoid cystic Carcinoma (3), Mucoepidermoid Carcinoma (2), undifferentiated carcinoma (2), acinic cell carcinoma (1), Lymphoma (1) and metastatic renal cell carcinoma (1).

Cytologic studies yielded a correct diagnosis in 80,8% of the cases (113 benign lesions and 14 malignant), diagnosis was close in 6,4% of the cases (10), in 4,5% it was incorrect (7) and 8,3% of the cases the specimen was not assessable (13). There were no complications related to the puncture.. Sensitivity was 87,3 % and specificity was 100%.

**Conclusion:** FNAB can be very useful in salivary gland pathology with a high sensitivity and specificity. It is easy to obtain good specimens and low cost. Deep or small lesions may require the use of imaging techniques.

### O-2309

#### THE CORRELATION BETWEEN CLINICAL PRESENTATION, IMAGING, CYTOLOGY AND HISTOLOGICAL FINDINGS IN SUBMANDIBULAR SALIVARY GLAND EXCISION

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**Introduction:** Submandibular gland excision is the standard treatment for chronic inflammatory disease when conservative measures and minimally invasive surgery have failed. Excision is also indicated in proven or suspected neoplasia.

**Method:** This study analyses retrospectively all cases of submandibular gland excision carried out in our service

from September 2009 until May 2012.

Aspects of clinical presentation, imaging, fine needle cytology examination, surgical technique, histological findings and postoperative complications were correlated for individual cases. The length of hospital stay was also evaluated.

**Results:** A total of 51 cases were identified with an age range from 1 to 79 years old. Thirty eight cases were cared for by maxillofacial surgeons and thirteen by otolaryngologists. Two distinct clinical presentations were identified: 32 with a submandibular mass or enlarged gland and 19 with salivary obstructive symptoms. Thirty seven of the 51 patients (73%) had ultrasound imaging. Whilst of obstructive group 14 patients (74%) underwent sialography. Only 15 cases of the 32 patients (47%) had a fine needle aspiration from their submandibular mass. Computed tomography was employed in 7 cases and another 7 were investigated with magnetic resonance imaging.

Histological diagnosis showed 41 cases (77%) of chronic inflammation, (sialadenitis / sialolithiasis), 1 (1.8%) chronic duct obstruction / mucocele, 6 (11.3%) benign pleomorphic salivary adenoma, 4 (7.5%) lymphomas and 2 (3.8%) necrotising granulomatous lymphadenitis

FNA was performed in 15 patients with only 3 non-diagnostic samples and a good correlation between the FNA and histological diagnoses.

The care pathway for individual patients was scrutinised in view of the final diagnosis.

#### O-2310

### THE INTEREST OF MINOR SALIVARY GLAND BIOPSY IN THE DEVELOPMENT OF SJÖGREN'S SYNDROME: A RETROSPECTIVE STUDY ON 561 PATIENTS

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**Introduction:** Minor salivary gland biopsy (MSGB) is considered the most accurate test in the development of Sjögren's syndrome (SS). However, the sicca syndrome characteristic of SS, is a common symptom in the general population. It is therefore important to identify the patients on whom the MSGB is useful, as well as identifying predictive risk factors of a positive MSGB.

**Materials and Methods:** A retrospective study was made on 561 patients suffering of dry mouth and dry eye, on whom MSGB was performed. The potential risk factors (such as clinical, biological's data and complementary examinations) of a positive MSGB were analysed. Odds ratios were calculated for these risk factors.

**Results:** The serum antibodies SSA proved to be an independent predictor factor of a positive MSGB (p

**Discussion:** When a SS is suspected for a patient with sicca syndrome, a MSGB is not necessary when the SSA are positive. But, negatives SSA do not exclude a MSGB positive.

#### O-2311

### ENDOSCOPIC DIAGNOSTICS AND TREATMENT OF SIALOLITHIASIS

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**Objectives:** The aim of the study was to evaluate the usability of the endoscope in diagnostics and treatment of diseases of main salivary glands.

**Material and methods:** In years 2006-2011 in the Department of Cranio-Maxillofacial Surgery, Medical University of Warsaw in 25 patients duct endoscopies of submandibular or parotid salivary gland were performed. There were 14 female and 11 male patients at age from 23 to 74 years. The mean age of patients was 48.2 years. To perform the endoscopy of salivary ducts an inflexible endoscope of 1.8 mm in diameter with two canals (one calibrated to 0.8 mm for optics and one calibrated to 1.0 mm for surgical instruments) was used. The procedures were performed in outpatients in local anaesthesia. To evacuate the calculus from the duct a basket-ended instrument was used. The images of salivary duct internal view were recorded.

**Results:** There were 11 endoscopies of Stenon's duct and 14 endoscopies of Wharton's duct performed. In three patients the calculus in salivary duct was removed with basket instrument and in one patient it was removed with pliers. In another two patients there was necessity to make an incision of the duct and to perform following endoscopic evaluation of the duct after the stone removal. In the remaining 19 patients no calculus in the salivary duct was found.

**Conclusions:** The preliminary observations and experience result in high usability of sialoendoscopy in diagnostics of diseases of the major salivary glands. Although this technique requires the specialist equipment, it seems to be relatively safe method in diagnostics and treatment of selected diseases of the major salivary glands.

#### O-2312

### SHOCKWAVE LITHOTRIPSY OF SALIVARY DUCT STONES - OUR EXPERIENCE

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We wanted to assess the fragmentation of salivary stones by extracorporeal shockwave lithotripsy. We reviewed the files of patients treated by ESWL between December 2010 and May 2012 for submandibular and parotid gland sialolithiasis. The treatment consisted in 5-7 sessions of ESWL distributed over 2 to 3 months. Ultrasound control examinations were performed regularly and systematically. Following our clinical experiences with that method a differential scheme for managing sialolithiasis is recommended depending on localization of the calculi and their maximal diameters.



## Session 24. MICROSURGICAL RECONSTRUCTION IN HEAD AND NECK I

### O-2401

#### TOTAL FACE, DOUBLE JAW AND TONGUE TRANSPLANTATION: A PARADIGM SHIFT

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**Introduction:** Since the first facial transplantation in France in 2005, multiple centres have performed face transplants consisting of differing amounts of soft and hard tissue. At the R Adams Cowley Shock Trauma Centre, a central face demolition pattern of high energy injury has been repetitively encountered. Based on this necessity, we developed a cadaveric and research procurement model that eventually helped us to perform a total face, double jaw and tongue transplantation.

**Methods:** Mock facial transplants were performed in 10 matched cadaver pairs. The vascularized composite allograft (VCA) consisted of all facial skin, mimetic muscles, the tongue, the midface via a modified Le Fort III osteotomy, and the mandible via bilateral sagittal split osteotomies. Craniofacial computer tomography scans were obtained before and after the mock transplants. Surgical planning was used to virtually plan the osteotomies and a surgical navigation system guided the osteotomies intraoperatively. Following Institutional Review Board (IRB) Approval, a research procurement of the facial VCA model on a brain dead donor was successfully performed.

**Results:** The cadaveric and the research procurement studies performed allowed the facial and solid organ transplant teams to have the necessary training required prior to the first clinical case. Subsequent to IRB approval and registration of our clinical trial, on March 19, 2012 we proceeded to use preoperative computerized planning and intraoperative guidance to assist us with a total face, double jaw and tongue transplantation on a 37 year old male with a central face demolition pattern following ballistic injury.

**Discussion:** Facial transplantation is an evolving field. As centres begin embarking on this endeavour, cadaveric studies and research procurements will be essential for training purposes. The use of computerized planning and intraoperative navigation can greatly assist the surgeons with anatomical placement of the maxillofacial VCA onto the cranial base with respect to cephalometric indices. Here we set forth, a central facial transplantation model that can be used by other centres, scaling up or down, depending on the defect necessary to be constructed.

### O-2402

#### ALLOGENIC SUBMANDIBULAR GLAND TRANSPLANTATION FOLLOWING HEMATOPOETIC STEM CELL TRANSPLANTATION

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**Background:** Autologous submandibular gland transfer for surgical treatment of progressive dry eye has been described before. This procedure requires a functionally intact submandibular gland. We here report the first allogenic transplantations of submandibular glands to treat patients suffering from complete loss of both lacrimal and submandibular gland function due to graft-versus-host-disease (GvHD).

**Methods:** The treatment was carried out in two male patients suffering from severe dry eye caused by GvHD after allogenic stem cell transplantation. For both patients a possible matching donor existed in the presence of the former stem cell donor. The function of the donor submandibular gland and histocompatibility was ascertained preoperatively. Because of complete donor chimerism no immunosuppressive therapy was applied.

**Results:** Post-surgical assessment of the patients revealed primary success of the procedure over seven and 15 months respectively. The ocular surface showed improvement of lubrication and reduction of inflammation but the sialoscintigraphy revealed lower tracer activity as expected and histology of one gland showed inflamed tissue.

**Conclusion:** Allogenic transplantation of the submandibular gland after hematopoietic stem cell transplantation (HSCT) is possible in patients that have access to a gland from their former stem cell donor. A possible immunoreaction is suggested even with histo-compatibility and at least an initial immunosuppression has to be considered.

### O-2403

#### ALGORITHM DIFFERENTIATED APPROACH TO MICROSURGICAL RECONSTRUCTION OF MAXILLO-FACIAL ZONE IN ONCOLOGY.

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**Objective:** Improvement of radical surgical treatment and functional and social rehabilitation in patients with malignant disease in the maxillofacial region, using microsurgical tissue autotransplantation techniques.

**Methods:** Surgical treatment of malignant tumours in the maxillofacial region was performed in 298 patients. Recurrent tumours dominated (47%). 35% of the primary tumours were stage 3 tumours and 60% stage 4. 191 patients (64%) received immediate reconstruction, in 36% reconstruction was postponed because of an unfavourable oncological prognosis. Skull base and dura mater resection was performed in 37 (14%) cases.

322 free flaps was performed for the resection of a combination of 194 (65%) orofacial defects, 41 (14%) craniofacial defects, 57(19%) oro-orbitofacial, 6 (2%) isolated defects of lower jaw and for functional rehabilitation. These consisted of: visceral flaps – 36 gastro-omental, 11 colonomental, 41 omental; skin-muscular-bone flaps: – 8 radial, 18 iliac, 2 scapular, 18 fibular, 120 rib-muscular, 3 rib-scapular, 30 different skin-muscular flaps and 32 skin-fascia radial flaps.

Visceral flaps were used for elimination of tissue defects of the oral cavity floor, oropharynx and cheek, skin-muscular-rib – for oro-orbitofacial and orofacial defects, fibular flap – for isolated defects of lower jaw, iliac autotransplant – for total defects of hard palate, radial – for small defects of oral cavity, cheek and vestibule of mouth, and skin-muscular radial – for alveolar processes reconstruction. Soft large soft tissue defects combining with small facial skeleton defects were reconstructed using skin-muscular and skin-fascial flaps.

**Results:** Total flap necrosis due to microvascular anastomosis thrombosis was seen in 4.7 % and flap necrosis in the bone autotransplants group was seen in 5.7 % cases. In the group with oral cavity and fauces defects, natural nutrition and breathing was restored for 88.6 % patients. 93.2 % of patients were satisfied with the cosmetic results, 32 % returned to their job.

#### O-2404

### CONCEPTS OF MICROSURGICAL RECONSTRUCTION AFTER TUMOUR RESECTION – SURVEY OVER EUROPE IN 2011

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**Background:** The aim of DOESAK scientific groups is the further development of tumour therapy in head and neck oncology. Before the design of prospective multi-centre trials the status quo has to be defined. After the successful evaluation of microsurgical reconstruction concepts in German-speaking countries this evaluation was extended to European countries in 2011 to look for similarities and differences in treatment concepts.

**Patients and Methods:** The questionnaire “microsurgery” developed for German hospitals in 2009 was translated into English and changed from a paper-based version into a web-based version. Subsequently, this questionnaire was sent to 250 European hospitals via “Eurofaces”. Answers were transmitted to a server via web-link. Finally, questionnaires were evaluated via the software system Survey-Gizmo and compared to the results of German-speaking countries.

**Results:** 65 completely filled questionnaires were returned, equivalent to a 32% return rate. When also taking incompletely filled questionnaires into account, return rate was high at 57%. The 65 responding hospitals can be divided into 47 university hospitals (72%), 15 departments of major hospitals (23%) and 3 occupancy sections (5%). The majority of hospitals (35%) treat 20-50 patients with

oral squamous cell carcinoma, 49% perform 20-50 microsurgical reconstructive procedures in tumour patients. There seems to be a homogeneous trend towards optimal soft tissue reconstruction after surgical tumour resection. Soft tissue reconstruction is mostly (61%) performed via free microvascular tissue transfer. The radial forearm flap is the most frequently used flap in Europe (35%), followed by the microvascular fibula transplant (18%). **Results** in Europe do not differ from trends in German speaking countries. In the oral presentation, typical reconstruction concepts and their frequencies are presented.

**Conclusion:** **Results** from German speaking countries can be found to a wide extend all over Europe. Microsurgical reconstruction after oral squamous cell carcinoma therefore follows pan-European standards and is a good base for future multi-centre trials.

#### O-2405

### CONCEALED APPROACHES FOR MICROVASCULAR RECONSTRUCTION

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The main indication for microvascular reconstruction of the face is to achieve the best possible functional and aesthetic outcome. To achieve this goal it is necessary to avoid paralateronasal, translabial and transmandibular approaches. When it is possible, it is easy to use specific hidden approaches to avoid obvious facial scars. Classically at the upper third level of the face, it is preferable to use a coronal dissection to reach the orbital structures.

In the middle third, our choice is to use degloving of the face as much as possible by intraoral maxillary sulcus dissection and also incisions around the nostril to reach the deepest nasal and maxillary structures. At this level, it is easy to perform the anastomosis on the temporalis vessels via a preauricular dissection.

In the lower third level of the face, we prefer the rhithidectomy approach for exposure of the lateral structures of the face with the combined help of an intraoral dissection. This way, in both tumour resection and reconstructive procedures, good access is possible.

Finally, in our hands, degloving the neck is the gold standard for all lower face approaches to expose the anatomical elements properly. This is a very comfortable and a reliable way to perform the dissection, resection and vascular anastomosis. The scar position is well hidden and even more invisible if the intraoral approach and anastomosis of the facial vessels is used.

This concept of concealed approaches (120 cases, 2007-2011) will be illustrated by a series of tumour removal and reconstruction cases with the analysis of both aesthetic and functional outcome. These may be adapted for use in many areas of cancer surgery and reconstructive surgery, either in primary or secondary stages (radionecrosis, recurrence), posttraumatic reconstruction and also congenital abnormality cases requiring complex reconstructive procedures.

**O-2406****RETROSPECTIVE ANALYSIS OF 166 CONSECUTIVE FREE FLAPS**

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**Introduction:** Free flaps are frequently used in the reconstruction of oral and maxillofacial defects. A retrospective analysis of 166 reconstructions with free flaps was performed to score flap survival rate and to assess the relevance of different parameters.

**Materials and methods:** A retrospective study of all 166 free flap transfers, performed in the Department of Oral and Maxillofacial Surgery of the St. John's Hospital in Bruges, focused on flap survival rate. The following parameters were retrieved from the files: age at time of the operation, sex, ASA-score, smoking habit, pre-operative radiotherapy, aetiology of the defect, type of free flap, micro sutures, complications and duration of the hospitalization stay. Analysis was performed by means of the chi-squared test.

**Results:** 58,4% of the reconstructions were performed with a radial free flap, 22,9% with a DCIA flap, 7,8% with a fibular flap, 4,8% with a brachial flap and 6,0% with a latissimus dorsi flap. The overall flap survival rate was 92,8%. The soft tissue flap survival rate was 97,4% and the bone flap survival rate was 82,3%. Flap survival rate was scored as a function of mean age, sex, ASA-score, smoking habit, pre-operative radiotherapy aetiology of the defect and micro sutures.

**Discussion:** Consistencies and inconsistencies with the literature are discussed. The reason for the rather high failure rate in the DCIA group is looked for. (final results not available at the time of abstract submission).

**Conclusion:** The overall flap survival rate of this study group is acceptable. Losses are mainly found in the DCIA group.

**O-2407****FASCIOCUTANEOUS FLAPS IN HEAD AND NECK RECONSTRUCTION**

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**Introduction:** In the field of head and neck oncology and reconstructive surgery, pedicle and free fasciocutaneous flaps are frequently used. **Aim:** The aim of this study was to present our clinical results considering the application of fasciocutaneous pedicle supraclavicular flaps versus free radial forearm flap in reconstruction of extensive soft tissue head and neck defects. **Material and methods:** During the period from 2003 to 2010, 32 patients, age 14-67 years, underwent surgical removal of tumours in the region of head and neck and reconstruction using 12 supraclavicular pedicle island flap and 20 free radial forearm flap. The localization of the defects were: temporoparietooccipitalis, frontoparietalis, parietooccipitalis, orbitalis, buccalis, parotid masseterica and the region of neck. The most frequent skin tumour was basocellular carcinoma 19 (59,4%) and squamocellular carcinoma 5 (15,6%). **Results:**

The overall success rate was 90,6% % The complications were : two total necrosis of one supraclavicular and one radial free flap, and one partial necrosis of the distal part of the radial flap. **Conclusion:** The radial free forearm flap has no limitations considering the localization of the defect on the head and neck, but the supraclavicular flap is limited by the pedicle length and the arc of rotation. The donor site morbidity is less in the supraclavicular region, because it can be sutured directly without need for secondary defect skin transplantation as in radial forearm donor site. Both flaps are thin and flexible and pliable, and present excellent functional and cosmetic results.

**O-2408****FUNCTIONAL AND AESTHETIC REHABILITATION OF PATIENTS WITH COMBINED DEFECTS OF THE FACE AFTER MICROSURGICAL AUTOTRANSPLANTATION.**

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**Purpose:** To improve aesthetic outcomes after operations involving microsurgical autotransplantation.

**Materials and methods:** between 2005 and 2012 operations were performed on 128 patients who underwent microsurgical autotransplantation in the maxillofacial region. They have been monitored repeatedly in order to achieve aesthetic correction of the transplanted autografts.

61 fibula flaps, 27 radial flaps, 12 iliac flaps, 28 thoracodorsal flaps.

The average number of corrective operations was 1.8.

The choice of method for correcting operations depends on the degree of deformation of the shape of the soft tissue graft before transplant, as well as on the deformation of the adjacent structures.

The degree of contraction of the flap was investigated according to data yielded by the ultra-sound analysis.

**Results:** In the first 6 months the soft part of the tissue flap lost up to 20% of its volume. The optimal timing of corrective operations was set at 8-10 months later.

In order to eliminate any residual deformation of the area under reconstruction, it is possible to use previously transplanted tissue flaps and local tissue.

In the formation of the perioral area, as well as the threshold of the oral cavity, the most appropriate tissue is that which includes the oral mucosa.

In order to recreate texture and colour of the skin, rotational flaps are best.

When dealing with residual defects of the nose, it is more efficient to use flaps from the forehead.

Methods of lipofilling and contouring are also widely used, with specially prepared silicone implants for the correction of shape and volume.

**Conclusions:** Synergy practices of local plastic and microsurgical tissue autotransplantation ensure complete functional and aesthetic rehabilitation of patients with combined defects of the face.

**O-2409****STEREOLITHOGRAPHIC MODEL-GUIDED PLANNING FOR HEAD AND NECK MICROSURGICAL RECONSTRUCTION**

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Appropriate three dimensional reconstruction of the head and neck region requires detailed preoperative planning to achieve structural, esthetical and functional goals. Osteotomies and proper bone position remain a challenging aspect of microsurgical reconstruction, and requires high-level experience. The authors outline the possibilities, advantages and clinical application of the preoperative model-based planning of complex head and neck reconstructions after tumour resections.

Between January 2006 and December 2011, 77 consecutive patients underwent a microsurgical reconstructive procedure; 68 patients were reconstructed with an osteomuscular or an osteo-septo-cutaneous fibula flap 9 patients were reconstructed with a deep circumflex iliac artery flap.

In each case, a high-resolution helical computed tomography (CT) scan of the maxillofacial region and mandible was obtained prior to surgery. The CT data was sent on a CD to a modeling company (Villa Sant'Apollonia – Bergamo). The scans were then converted into 3-dimensional models of the maxillofacial skeleton. Good functional and esthetical results were achieved; all the patients have maintained preoperative occlusion and a symmetric bony contour on Panorex study, three-dimensional computed tomography, and clinical examination.

Stereolithographic model-guided planning allows a practical simulation of the surgical operation, gives the opportunity to visualize, verify and modify the resection and/or reconstruction before surgery, consents to choose the ideal flap and to contour the flap into an ideal reconstruction before harvesting, suggest to verify displacement, number, size and form of bone segments, to engineer cutting guides and osteotomies template and the adaptation and pre-bending of reconstruction plates to patient's own anatomy. In addition the model-guided simulation improved communication among surgeons teams and between surgeons and patient.

The authors consider this technology facilitates a reduction in the learning curve associated with bone contouring, with enhanced levels of accuracy and acceleration of a time-consuming intraoperative step and may be particularly useful in secondary corrective surgery when corrective osteotomies to treat facial asymmetry are needed. However added cost and potential delays in treatment have to be considered.

## Session 25. SURGERY FOR FACIAL PARALYSIS

### O-2501

#### DOUBLE INNERVATION IN FREE-FLAP SURGERY FOR LONG STANDING FACIAL PARALYSIS: A PRELIMINARY STUDY.

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**Objective.** One-stage free-flap facial reanimation may be accomplished by using a gracilis muscle flap transfer innervated by the masseteric nerve; however this technique does not restore the patient's ability to smile because of an emotional stimulus. In contrast, the transfer of the latissimus dorsi innervated by the contralateral facial nerve provides the correct nerve stimulus but this technique is limited by variation in the quantity of contraction and a not negligible rate of failures. The authors propose a new one-stage facial reanimation technique with double innervation; a gracilis muscle flap is innervated by the masseteric nerve but a supplementary nerve input is provided by a cross-face sural nerve graft anastomosed end-to-side to the obturator nerve of the gracilis on the paralysed side. By doing so a trigger induced by will occurs, but also emotion is added to the high nervous stimulus guaranteed by masseteric innervation.

**Methods.** Between October 2009 and March 2012, 21 patients affected by long-standing unilateral facial paralysis received gracilis muscle transfers innervated by both the masseteric nerve and the contralateral facial nerve. Currently, 5 patients have a follow-up of 12 months after beginning of flap contraction, therefore only these patients are included in our preliminary study. The aetiology was a complication of skull base surgery in 3 cases, idiopathic in 1 case and traumatic in the last case. The degree of pre-operative facial nerve dysfunction was grade VI following the House-Brackmann scale for all patients.

**Results.** All patients included in the study recovered voluntary and spontaneous smiling abilities. The recovery time to voluntary flap contraction (masseteric nerve) was 3.8 months, while emotional flap activation (cross-face nerve graft) was achieved within 7.2 months after surgery. According to Terzis and Noah's five-stage classification of reanimation outcomes, 3 patients had excellent outcomes (60%), one had a good outcome (20%) and one a moderate outcome (20%). No failures or fair results were recorded.

**Conclusions.** In this preliminary study, the devised double-innervation technique allows achievement of a good grade of flap contraction as well as emotional smiling ability. A wider number of operated patients is needed to confirm those initial findings.

### O-2502

#### CROSS-FACIAL NERVE GRAFTING FOR ONE-STAGE FACIAL REANIMATION: PRINCIPLES, INDICATIONS, AND SURGICAL PROCEDURE

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**Background.** Facial animation represents a difficult challenge for the reconstructive surgeon. A large number of surgical techniques and modifications have been published, and the appropriate approach must be selected based on the kind of facial palsy, its timing, and the patient's age, prognosis, and general condition. A complete grasp of all the approaches that allows for a target surgery represents today an essential assumption for the facial reanimation.

**Methods.** Eighteen patients underwent facial animation using single stage cross-facial nerve grafting. The aetiology of the facial palsy was acoustic neuroma resection in 14 cases and resection of a cerebellopontine angle astrocytoma in the remaining 4 case. The mean duration of facial palsy was 12.2 (range, 8–23) months.

**Results.** The mean follow-up period was 22.2 months. Masseteric nerve coaptation of the paralyzed facial nerve inferior branch was associated in 13 cases. All patients underwent postoperative rehabilitation and spontaneous contraction was achieved in all patients 7–13 (mean, 10.7) months. Cosmetic outcomes were evaluated as moderate in 6 patients, good in 7 patients, and excellent in the remaining 5.

**Conclusions.** The use of the contralateral healthy facial nerve via cross-grafting for reinnervating the paralyzed side of the face in acquired recent unilateral facial palsy provide spontaneity and emotional activation. The association of masseteric nerve coaptation further increases reliability, contraction and cosmetic outcome.

### O-2503

#### CROSS-FACE NERVE GRAFT AND PLATISMA MUSCLE GRAFT TO RESTORE EYELID CLOSURE AND BLINKING IN FACIAL PARALYSES

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**Introduction.** Impairment of eyelid closure in patients with facial palsy is the main functional problem. Most utilized and easy techniques to address it are the insertion of a gold lid weight or the translation of a double strip temporalis muscle flap. Both procedures have the advantage of allowing lid closure, but fail in the correct stimulus to close the eye and do not restore blinking (reflex naturally activated 10-20 times/minute). This may be obtained only utilizing the contralateral facial nerve as motor source. This may be accomplished by using a sural nerve graft anastomosed to a contralateral facial nerve branch for the orbicularis oculi muscle. 8 months later a platysma muscle strip is grafted into the upper lid and directly innervated by the sural

nerve previously grafted. In this study, preliminary results are exposed.

**Materials and Method.** From 2009 to 2012, 20 patients have been operated on by this technique. Six patients have a 12 months follow-up and results are suitable for analyses.

**Results:** All patients recovered eyelid closure. 50% had complete closure, 50% partial closure (2 mm sclera show), none had any movements. Beginning of movements was visible after 30-60 days (average of 45). Spontaneous eyelid blinking, simultaneous to the contralateral side was registered in four patient able to voluntarily close the lids. The quantity of closure during blinking movements was partial compared to that of the health side. Despite this, improvement of eyelid lubrication and status was registered in all patients. They all reported subjective reduction of eye discomfort, with important reduction or no need at all for eye lubricants. One infection of a platysma graft was registered immediately after surgery and solved by antibiotic therapy 2 weeks later. This patient, though without blinking movement, recovered postoperative eyelid closure.

**Conclusions.** Cross-face sural nerve graft followed by platysma transfer seems to be an effective method to recover eyelid closure and partial spontaneous blinking in facial paralysis patients.

#### O-2504

### RESTORATION OF BLINKING REFLEX WITH TEMPORALIS MIOFASCIAL FLAP IN FACIAL PARALYSIS

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**Key words:** Facial paralysis, temporalis muscle, blinking reflex

**Summary:** The Authors describe their experience in restoration of blinking reflex and eyelid function with temporalis myofascial flap in facial paralysis. The surgical technique and the protocol of post surgical rehabilitation are discussed.

**Introduction:** Patients affected by facial palsy are faced with both functional and esthetic impairment. The most problematic dysfunctions are the inability to close eyelids, with asymmetric facial appearance. Paralysis of the orbicularis oculi from the facial nerve results in upper lid elevation due to unopposed action of the levator muscle, lagophthalmos that leads to exposure of the cornea associated with poor tear film movement and increased tear evaporation. This puts the patient at risk of keratitis, corneal abrasion and, in worst cases, blindness.

**Methods** Blink restoration following facial paralysis can be managed with different surgical procedures of varying complexity. The choice of the technique is mainly determined by the cause of facial paralysis, the age and desires of the patient. The techniques most commonly used are dynamic muscle transfers (temporal myoplasty, free muscle transfer, temporalis muscle flap) and static suspensions or gold weight implants. An intensive rehabilitation through specific exercises after all procedures is essential to achieve good results.

**Conclusion:** The authors describe their experience in dynamic restoration and rehabilitation of blinking reflex and eyelid function with the use of Temporalis Miofascial flap (TMF). A close collaboration with Physiotherapists is essential to achieve morphological, aesthetic and functional results.

#### O-2505

### FACIAL ANIMATION IN PATIENTS WITH MOEBIUS AND MOEBIUS-LIKE SYNDROMES

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**Background.** Moebius syndrome, a rare congenital disorder of varying severity, involves multiple cranial nerves and is characterised predominantly by bilateral or unilateral paralysis of the facial and abducens nerves. Congenital facial paralysis often causes bilabial incompetence with speech difficulties, oral incompetence and drooling. Other relevant clinical finding is incomplete eye closure. Furthermore the lack of facial animation in these patients poses a major barrier to interpersonal communication.

**Patients.** 38 patients with Moebius and Moebius-like syndromes were treated surgically for facial animation from 2003 to 2011 at the Maxillofacial Surgery Division, University Hospital of Parma, Italy. To re-animate the impaired side of the face, or both sides of the face in patients with classic Moebius syndrome, we transplanted a segment of the gracilis muscle in all cases. Revascularisation was via the facial vessels in all patients. For unilateral facial paralysis, reconstruction of the ipsilateral motor nerve to the masseter muscle or the contralateral VII nerve, by means of a cross-facial nerve graft, provided the preferred innervation of the muscle transfer. In patients with bilateral facial paralysis we used the motor nerve to the masseter muscle.

**Results.** All the flaps were transplanted successfully, with optimal aesthetical and functional results. We obtained a high degree of patient satisfaction; the majority were happy with the results and reported improvement in self-esteem and social interaction.

**Conclusion.** The restoration of even a small degree of facial movement can be gratifying in terms of function and verbal and nonverbal communication. Gracilis muscle transplants can be considered in our experience as the first choice for facial animation in Moebius Syndrome.

#### O-2506

### MASSETERIC NERVE IN FACIAL ANIMATION TECHNIQUES

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**Background.** Facial paralysis is a severe disabling condition that is nowadays treated in several ways, depending on causes, duration, patients' age and comorbidities and surgeon's experience. The masseteric nerve plays a major role in facial animation techniques and several applications are described in literature including babysitter proce-

dures, single branches coaptations, facial nerve coaptation and reinnervation of muscle transplants.

*Patients.* 34 patients affected by unilateral or bilateral, congenital or acquired facial palsies were treated using masseteric nerve at the Maxillo-Facial Surgery division, University Hospital of Parma, from 2003 to 2011. Masseteric nerve was employed in 21 patients for reinnervation of gracilis muscle transplants (36 transplants) while in 13 cases it was used in association with cross-facial nerve grafting in unilateral palsies for babysitter procedures or direct facial nerve inferior branch coaptation.

*Results.* Reinnervation rate success via masseteric nerve was 100% with a mean contraction time of 3.8 months. Overall cosmetic results were considered satisfactory in 8 patients, good in 15 and optimal in the remaining 11.

*Conclusions.* Masseteric nerve applications in facial animation ensure fast, powerful and reliable reinnervation with good and predictable results and should be therefore considered as one of the main option within the large spectrum of facial animation techniques.

## Session 26. BIPHOSPHONATE RELATED DISEASE

O-2601

### BIPHOSPHONATE RELATED OSTEONECROSIS OF THE JAWS: CLINICAL SERIES AND TREATMENT PROTOCOL

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**Introduction:** Bisphosphonate related osteonecrosis of the jaws (BRONJ) is a recently diagnosed disease that produces a necrosis of the maxillary bones after oral surgery or dental extraction in patients that have been under treatment with oral or IV bisphosphonates.

A 12 patients series and a treatment protocol is presented.

**Clinical series:** 11 out of 12 patients were treated with zoledronic acid (Zometa) for osseous metastases of breast or prostate carcinoma or multiple myeloma and one patient was taking oral bisphosphonates. The treatment protocol varied from conservative measures with chlorhexidine gel and rinses in the first stage to total maxillectomy and reconstruction with myocutaneous flaps in advanced disease.

The follow-up of the patients has been from 2 to 13 months without any case of relapse and one patient died due to his disease.

**Discussion:** BRONJ was first described by Marx in 2003 and since then there has been a controversy in the treatment. The majority of the patients have advanced oncologic disease and there has to be a balance in the treatment depending on the severity of the necrosis of the jaw and the systemic disease.

Another important goal is prevention. Interdisciplinary committees formed by Oncologists, Haematologists, Maxillofacial Surgeons and Dentists have to be created in order to establish protocols for preventing the occurrence of maxillary necrosis in patients under treatment with bisphosphonates.

O-2602

### THE IMPACT OF BIPHOSPHONATE TYPE, LOCAL CONCENTRATION AND ACIDIC MILIEU ON THE PATHOMECHANISM OF BIPHOSPHONATE-RELATED OSTEONECROSIS OF THE JAW

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**Background:** Osteonecrosis of the jaw (ONJ) occurs in patients receiving high doses of intravenous nitrogen-containing bisphosphonates (N-BPs) in the course of their supportive cancer therapy. The exact pathomechanisms are elusive and questions of paramount importance remain unanswered. Recent studies indicate toxic effects of

bisphosphonates on different cell types, apart from osteoclast inhibition. Since multipotent stem cells play an important role in the processes of wound healing and bone regeneration, the aim of this study was to investigate the effects of different bisphosphonate derivatives and dose levels combined with varying pH-levels on mesenchymal stem cells in vitro.

**Material and methods:** The effect of two N-BPs (zoledronate and ibandronate) and one non-N-BP (clodronate) on immortalized mesenchymal stem cells (SCP-1) was tested at different concentrations, equivalent to 1-, 3- and 6-month as well as 1-, 3-, 5- and 10-year exposure times of standard oncology doses of the two N-BPs and equimolar concentrations of clodronate at different pH-values (7.4, 7.0, 6.7 and 6.3). Cell viability and activity was analyzed by WST-assay. Cell motility was investigated by means of scratch wound assays and visualized using time-lapse microscopy.

**Results:** Zoledronate and ibandronate showed a dose- and pH-dependent cellular toxicity. Increasing concentrations of both N-BPs and acidic milieu led to a significant decrease in cell viability and activity.

**Conclusion:** We conclude that high concentrations of N-BPs and local acidic milieu, as commonly present in infections of the jaw, might play a key role in the pathogenesis of ONJ in patients receiving high doses of N-BPs due to malignant diseases. Also the potency for ONJ between N-BPs may be different, suggesting a higher risk for zoledronate.

O-2603

### CHARACTERISTICS, CLINICAL FEATURES, RISK FACTORS AND LOCALIZATION OF BIPHOSPHONATE-RELATED OSTEONECROSIS OF THE JAW

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**Background:** Osteonecrosis of the jaw (ONJ) is a serious side-effect that occurs especially in patients suffering from metastatic bone disease and receiving intravenous administrations of nitrogen-containing bisphosphonates. Despite a rising number of publications detailed investigations into patient characteristics, risk factors, the main localization of ONJ and the impact of ONJ on oncological treatment protocols remain sparse.

**Patients and Methods:** This single-centre study collated medical records (2003-2009) of all patients suffering from bisphosphonate related ONJ within the Department of Oral and Maxillofacial Surgery Ludwig-Maximilians-University of Munich, Germany. In total, 126 patients fulfilled the case criteria of ONJ and were examined clinically. The complete medical history including detailed questionnaires was collected of 66 patients, focussing in particular on the identification of underlying risk factors, clinical features, ONJ localization as well as the impact on the oncological treatment.

**Results:** The vast majority of bisphosphonate related ONJ cases occurred in patients suffering from malignant diseases (n=117, 92.8%), in particular breast cancer (n = 57; 45.2%), multiple myeloma (n = 37; 29.4%) and prostate



cancer (n = 13; 10.3%), all received nitrogen containing bisphosphonates intravenously. ONJ was also diagnosed in 9 patients (7.1%) suffering from osteoporosis or rheumatoid arthritis. The most prevalent clinical feature was exposed necrotic bone (93.9%) in the oral cavity which was accompanied in 78.8% of cases by pain. A predilection for the mandible and in particular for molar and premolar regions in both jaws could be detected. Although no recommendation concerning the oncologic treatment was made, the manifestation of ONJ resulted (in a significant proportion of the patients) in a change of medication and schedule. The most frequent co-medications were steroids and anti-angiogenic drugs, such as thalidomide.

*Conclusion:* The predilection for mandibular molar and premolar regions, and the infectious conditions that often precede the onset of ONJ support recent pathogenesis theories stating that local inflammation and associated pH-changes may trigger the release and activation of nitrogen-containing bisphosphonates leading, ultimately resulting in necrosis. Bisphosphonate related ONJ can not only impair the quality of life but also the treatment of the underlying disease.

#### O-2604

##### INTERNET-BASED DATA COLLECTION FOR BIPHOSPHONATE RELATED OSTEONECROSIS OF THE JAW IN HUNGARY

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*Introduction:* Bisphosphonates are primarily used and effective in the treatment and management of cancer-related conditions, osteolytic lesions and osteoporosis. Bisphosphonate related osteonecrosis of the jaw is considered to be a rare, but severe complication of bisphosphonate therapy. Its pathomechanism, etiologic factors and epidemiology are not fully described. To understand this phenomenon better, data collection is essential. Although several studies assess these questions, in most of these the number of patients reported is low. Only a few multi-centre studies are available in the literature. The aim of this study was to set up a nationwide multicentre study in Hungary and to report our initial results.

*Material and methods:* Following an approval from the Hungarian research ethics committee an online questionnaire and database have been set up and made available for non-profit use to researchers and clinicians in oral and maxillofacial surgery in Hungary. The participation is voluntary. Data have been collected on sex, age, medical and dental history, smoking and alcohol consumption, type of bisphosphonate taken, treatment duration, trigger factors, staging, localisation and size of the necrosis and also the treatment provided. The web based data collection system enables not only detailed data collection but also the analysis of the data gained.

*Results:* Seven clinics have joined the study in the first five months and the data of more than 150 patients have been recorded.

*Conclusions:* This method contributes considerably to fast data entry, processing and analysis and eliminates the difficulties of information transfer. The method is reliable

in terms of data protection as well. The authors consider that web-based data collection is a useful aid in assessment and evaluation of bisphosphonate related osteonecrosis of the jaw. The study, including data collection and statistical analysis is ongoing.

#### O-2605

##### THE INFLUENCE OF CONCOMITANT ADMINISTRATION OF PREDNISOLONE WITH ALENDRONATE ON THE OCCURRENCE RATE OF OSTEONECROSIS OF THE JAWS. OBSERVATIONS FROM A CASE CONTROLLED STUDY FROM THE SOUTH EAST OF SCOTLAND.

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*Aim:* To identify the occurrence rate of alendronate related osteonecrosis of the jaw (AONJ) in the population of the south-east of Scotland (SES) and to compare in two patient groups – those receiving alendronate alone with those receiving concomitant corticosteroids.

*Method:* A prospective case series of patients presenting from the SES, over a 6-year period from June 2004 to December 2010, were studied in relation to the known drug patient years (DPYs) of alendronate and concomitant alendronate and prednisolone administered to this population.

*Results:* Over the 6 year period, 23 sequential cases of AONJ were identified. The cumulative alendronate prescribed to the population of the SES until December 2010 was 73,848 DPYs. This suggests an occurrence rate of 1 in 3210 DPYs.

Nine of the cases were receiving concurrent prednisolone. The mean age at presentation for the corticosteroid group was 67 (range 48 -87) and for the non-corticosteroid group was 77 (range 63-91). This difference in age was statistically significant (p= 0.0417).

The mean duration of drug administration prior to diagnosis of AONJ was 24.1 months (range 6-72months) in the corticosteroid group and 54.4 months (range 13 -120 months) in the non- corticosteroid group. This difference in drug exposure was statistically significant. (p= 0.0227)

Data regarding the number of patients who were dispensed with both alendronate and prednisolone is available from 2009. Prior to this the proportion of patients dispensed with both drugs is unknown. Assuming that the ratio of number of patients on alendronate : number of patients on alendronate and prednisolone has remained constant at 2.4 :1, then the estimated occurrence rate of AONJ in the alendronate only group is 1 in 3723 DPYs and that in the corticosteroid group is 1 in 2413 DPYs.

*Conclusion:* Prednisolone is thought to be a significant co-risk factor in the development of AONJ. In our series, mean age at presentation and mean duration of drug administration prior to development of AONJ, was statistically significantly lower in the corticosteroid group. The occurrence rate of AONJ appears to be much higher in the corticosteroid group.

**O-2606****EXAMINATION OF THE MICROCIRCULATORY CONSEQUENCES OF CHRONIC ZOLEDRONIC ACID TREATMENT IN A RAT MODEL.**

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**Introduction:** The significance of bisphosphonate (BIS) therapeutic modality has been increased due to the elevated incidence of tumour cases with bone metastasis and osteoporosis. Osteonecrosis of the jaw can occur as an adverse-effect, it mainly develops in third-generation bisphosphonate-treated patients after tooth extraction.

**Objective:** We hypothesized that inflammatory processes play a role in the development of BIS-related osteonecrosis. Our aim was to investigate the microcirculatory effects of BIS treatments in the periosteum of the jaw in a clinically relevant chronic animal model.

**Material and Methods:** 30 Sprague-Dawley rats were used; the animals were randomly allotted to one or another of the following groups: vehicle-treated control (n=10), intraperitoneal BIS treatment (n=10, IP) or intravenous BIS treatment (n=10, IV), respectively. BIS (zoledronic acid, Zometa, Novartis Europharm) was used in a dose of 80 µg/kg; ip. injections were given 3 times a week over 6 weeks, while iv. treatments were applied once a week over 8 weeks. In the third week of experiments, first molar extractions were performed at both sides of the mandible. Microcirculatory cellular reactions were examined by intravital microscopy in the periosteum of the mandible corpus and in the tibial periosteum. The NADPH oxidase activity of neutrophil leukocytes was measured by lumimetry, the expression of adhesion molecule CD11b by flow cytometry, and plasma levels of tumour necrosis factor-α (TNF-α, ELISA technique) were assessed.

**Results:** Gingival wound healing disturbances occurred in 55% after both forms of chronic BIS treatments. The ip and iv BIS treatments did not affect the microvascular red blood cell velocity, but the number of rolling and adherent leukocytes was increased in the postcapillary venules of the mandible. The number of firmly adherent leukocytes was increased in the tibial periosteum as well. The expression of adhesion molecule CD11b or plasma levels of TNF-α were not affected by BIS treatments, however the NADPH oxidase activity of leukocytes was lower as compared to the control group.

**Conclusion:** Our data demonstrate that chronic BIS treatment is accompanied by characteristic mandibular periosteal microcirculatory inflammatory reactions. This suggests a potential role for leukocytes in the propagation of jaw osteonecrosis.

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**O-2607****THE ROLE OF ACTINOMYCES IN OSTEOPATHOLOGY OF THE JAWS ASSOCIATED WITH BONE RESORPTION INHIBITORS**

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**Introduction:** In 2003 Robert E. Marx described a series of patients suffering from exposed and non-healing jaw bones after treatment with bisphosphonates, a side effect which was confirmed by several other studies and is now known as bisphosphonate-related osteonecrosis of the jaw (BRONJ). It is a condition with areas of exposed bone in the oral cavity, always associated with a local factor and inflammation of bone and surrounding soft tissue. Actinomyces has often been found in the histological specimen of these lesions.

The role of inflammation and with it Actinomyces in the pathogenetic process of BRONJ is yet unclear and remains to be investigated. Additionally, a clear indication as to whether Actinomyces rather colonizes the previously necrotic bone or plays an active role in the inflammatory process with subsequent bone necrosis is lacking.

The aim of this manuscript is to present a series of patients with BRONJ and investigate clinicopathological features with special regard to the presence of Actinomyces. All patients in this series were surgically treated with subsequent histological analysis of the revised bone area with special regard to the severity of inflammation and role of Actinomyces.

**O-2608****CASE REPORT: BISPHOSPHONATE RELATED OSTEONECROSIS OF THE JAWS AFTER DENTAL IMPLANTATION**

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**Aims:** The number of patients who undergo treatment of osteoporosis by using bisphosphonates is increasing. The risk of these patients developing bisphosphonate related osteonecrosis of the jaws (BRONJ) in combination with dental implantation is described as low. However, a number of cases have been reported worldwide.

**Material and Methods:** We describe a case of a 72-year old woman who developed a bisphosphonate related osteonecrosis of the mandible after dental implantation. Due to osteoporosis the lady was treated with oral bisphosphonates (aledronate) for one year only. At the same time she received a dental implant on the left side of the lower jaw.

Six years later the patient was referred to our department following a resistant infection of the mandible and an acute inflammation of soft tissues close to the implant region. Panoramic radiographs, CT and MRI scans showed acute and chronic infection of hard and soft tissues around the implant area. Histological examinations revealed inflammation. The patient underwent incision, drainage and antibiotics i.v. (sultamycilline and later clindamycine). In addition surgical debridement of necrotic bone was performed. However, the infection persisted and a continuity resection of the left lower jaw had to be

performed.

**Results:** The infection has resolved and the lady underwent reconstruction of mandibular bone by using a microsurgical bone graft.

**Conclusions:** The case shows that implant failure in combination with short-term therapy of oral bisphosphonates (one year only) is possible

#### O-2609

### EXPERIENCE OF BRONJ TREATMENT IN CANCER PATIENTS

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In accordance with literature the incidence of BRONJ in patients receiving IV BPs i.v. ranges from 0.8 to 12%. There are different methods of treatment, including laser surgery and piezo-surgery. There is still no optimal protocol of treatment nowadays. The Aim of our study is to improve efficiency of treatment BRONJ in cancer patients.

**Materials and methods** Since September 2009 we have treated 30 patients with BRONJ (3 patients with stage 1, 8 patients with stage 2 and 19 patients with stage 3). Patients with BRONJ were treated for the following malignancies: breast cancer (n=18), prostate cancer (n=4), kidney cancer (n=2), multiple myeloma (n=6). In all patients in agreement with oncologist IV bisphosphonates treatment was interrupted. Patients with BRONJ stages 1-2 were treated with Er:YAG laser and antibacterial treatment for 3 days before and during 7 days after surgery. Sequestrectomy was performed by Er:YAG laser in an ablation regime followed by soft tissue remodelling. Patients with BRONJ stage 3 were treated conservatively. Treatment included oral antimicrobial rinses combined with antibiotic therapy to control inflammation and ozone-therapy to stimulate sequestrum formation (ten treatment sessions per 3 min, which were repeated after a 3-week interval).

**Results:** In 7 patients treated with Er:YAG laser epithelialization occurred within 10 days after laser sequestrectomy. 3 cases of stage 2 in patients progressed to stage 3 because of cancer progression. Application of ozone-therapy was worthwhile in BRONJ patients with stage III: in 4 cases we observed sequestrum formation. Conservative treatment of stage 3 BRONJ patients (n=16) resulted in stabilization of BRONJ, reduction of pain and pyorrhoea.

**Conclusion:** Surgical treatment with Er:YAG laser is an effective method for stages 1-2 BRONJ, whereas ozone therapy as an adjunct to conservative non-surgical treatment is highly efficient for stage III BRONJ.

#### O-2610

### TREATMENT OUTCOMES OF THE BIPHOSPHONATE-RELATED OSTEONECROSIS OF THE JAW IN PATIENTS WITH OSTEOPOROSIS AND MALIGNANT BONE DISEASE.

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**Background & Objectives:** Bone metabolism in osteone-

crosis of jaw patients with BP therapy for osteoporosis and metastatic bone disease should be regarded separately because cancer patients can be affected by both potential bone metastasis and BP therapy itself. At the same time, treatment results of these two patients could be different because of the route and potency of drug administration. However, the comparative study of these two BRONJ groups has not been suggested objectively.

**Material & Methods:** This study compared treatment outcomes of the two groups; BRONJ patients with malignant bone disease (BRONJ -Cancer, n=24) and with osteoporosis patients.(BRONJ -Porosis, n=129). Number of treatment, initial and final treatment outcomes, bone turnover marker at initial diagnosis of jaw necrosis in the two groups were analyzed. The treatment outcomes were graded by 1 (good), 2 (moderate), 3 (poor), higher value indicated poor bone healing. Radiographic information and its relation with BRONJ staging were analyzed.

**Results:** Number of the lesion was higher in BRONJ - cancer (1.4 sites) than BRONJ -Porosis (1.0 sites)(p

**Conclusion:** The result revealed that BRONJ -Cancer showed poor treatment outcomes after the surgery than BRONJ -Porosis even the bone turnover suppression level was not significantly different. The result implies that these two BRONJ groups needs to be treated differently.

#### O-2611

### REHABILITATION IN PATIENTS AFTER BRONJ - ARE IMPLANTS POSSIBLE OR FORBIDDEN?

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**Background:** Bisphosphonates are indicated in osteoporosis and osseus metastasis. Bisphosphonate-related Osteonecrosis (BRONJ, Marx 2003) became a well-known complication in these medications in the last decade (Sawatari, 2007) and its incidence is still rising (Edwards, 2008). Treatment concepts in prophylaxis and therapy of BRONJ do exist (e. g. Ruggiero, 2009), but they are still under active discussion (Marx, 2008; 2012, Grätz 2012).

There is lack of concepts and case reports about prosthodontic rehabilitation of patients after healing of BRONJ (Al-Nawas, 2007), or leaving the patient without any dental rehabilitation is promoted (Groetz 2006, Al-Nawas, 2007). On the other hand, treatment of spontaneous fracture cases in BRONJ needs to be recorded (Al-Nawas, 2007). Conventional, i. e. classic removable dentures are often impossible in the cases.

**Method:** Structured review regarding prosthodontic and implantologic rehabilitation of BRONJ and BRONJ fracture cases. Cases reports in fracture and implantologic rehabilitation cases. Inauguration of a protocol in implantologic and prosthodontic. Rehabilitation in BRONJ cases.

**Discussion:** Risks, alternatives, and potential of the presumed protocol are discussed. Evaluation in a multi-centre study is proposed.

**O-2612****RESECTION AND MICROVASCULAR RECONSTRUCTION OF BISPHOSPHONATE RELATED OSTEONECROSIS OF THE JAWS – THE ROLE OF MICROVASCULAR RECONSTRUCTION**

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**Objectives:** Bisphosphonates, inhibitors of bone resorption by osteoclasts, are increasingly used in the treatment of bone metastasis, multiple myeloma, Paget's disease, and osteoporosis. Marx in 2003 described the first cases of Bisphosphonates related osteonecrosis of the jaws (BRONJ), with an incidence of up to 12%. Literature supports conservative treatment with use of antibiotics and limited surgical debridement.

We describe a case of segmental resection of the mandible and immediate microvascular reconstruction in a patient with BRONJ.

We discuss the clinical entity, therapeutic challenges, recent literature and the feasibility and controversies around microvascular reconstruction.

**Material and Method:** We present the case of a patient with history of intravenous bisphosphonate therapy in context of bone metastases from lung cancer. He presented with painful bone exposure on the body of the mandible associated with pathological fracture. He had no response to conservative antibiotic therapy and surgical debridement.

The patient underwent segmental mandibulectomy (from angle to symphysis) by a cervical approach. Immediate mandible reconstruction was performed with a microvascular free fibula flap and mandibular reconstruction plate.

**Results:** Histological examination revealed mandible with chronic osteomyelitis, pathological fracture and osteosclerosis.

The patient showed good functional and aesthetic results and remained under clinical and radiological surveillance without signs or symptoms of recurrence.

Bony union was demonstrated clinically and radiographically.

**Summary:** BRONJ is a potential and severe complication of bisphosphonate therapy. The current literature does not advocate microvascular reconstruction in these cases.

This work demonstrates a case of segmental resection and immediate reconstruction with microvascular free fibula flap with good aesthetic and functional results and resolution of the disease.

We believe microvascular reconstruction may be a valid option in specific advanced cases of BRONJ, interrupting the underlying pathophysiology of avascular bone necrosis over-infected. We believe the treatment algorithm of these cases may be redefined in a near future.

**O-2613****EXTRA-PLATYSMATIC FIXATION OF BISPHOSPHONATE-RELATED MANDIBULAR FRACTURES: A SUGGESTED TECHNICAL SOLUTION.**

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Bisphosphonate-related osteonecrosis of the jaws (BRONJ) is an evolving epidemic the maxillofacial surgeon is dealing with.

The causes of this disease are not fully understood; the most widely accepted etiopathological hypothesis is that in certain individuals bisphosphonates increase trabecular bone density to the point of inducing vascular insufficiency with a consequent bone necrosis.

The current focus is on prevention and only conservative symptomatic treatment are advised.

When BRONJ occurs most surgeons agree with the simple removal of the necrotic bone.

Unfortunately sometimes conservative treatments aren't successful, and the disease inexorably evolves to a clinical situation with the need of a more complex management.

The necrosis can evolve and produce an extraoral fistula and osteolysis extending to the inferior border and sometimes a mandibular fracture may occur.

In the literature there are few reports of the treatment of pathological mandibular fracture caused by BRONJ.

This clinical situation usually occurs in oncologic patients in poor general conditions and the aim of the surgical treatment is generally limited to pain control, and allowance of feeding.

The local situation of BRONJ related fractures may prevent traditional open surgery with direct position of stabilization by plates because of the high risk of a further reduction of vascular flow to the bone stumps. Moreover the rigid fixation is likely to fail because of plate and screw infection due to the infection usually present into the surgical field. Under these conditions healing of the fracture is impaired and maintenance of infection almost guaranteed.

We present an useful surgical technique for the stabilization of BRONJ related mandibular fractures applying an extra-platysmatic reconstructive plate.

With this technique the healing of bone fracture is not achieved but the plates fixed with this technique are stable and may not get infected, while patients are pain free and can eat easily, with a great improvement of their quality of life.

**O-2614****MESENCHYMAL STEM CELLS (MSCS) VS. PLATELET-RICH PLASMA (PRP) EFFECTS IN THE TREATMENT OF BISPHOSPHONATE-RELATED OSTEONECROSIS OF THE JAWS - CLINICAL STUDY.**

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Strategies for the treatment of patients with bisphosphonate-related osteonecrosis of the jaws (BRONJ) are still controversial. No effective treatment has been developed and interruption of bisphosphonate therapy does not seem to be beneficial. The purpose of this study was to test and evaluate the effect of mesenchymal stem cells (MSCs) and platelet-rich plasma (PRP) on bone regeneration in cases of BRONJ.

Biostimulant effects of PRP and MSCs reduce the healing time, local pain and improve reparative process and increase anorganic matrix of bone. Treatment increases osteoblasts mitotic index and stimulates lymphatic and blood capillaries growth. Nowadays, MSCs and PRP appear to be a promising modality of BRONJ treatment, being safe and well tolerated and it permits the minimally invasive treatment of early stages of the disease.

**O-2615****ROLE OF OZONE THERAPY IN THE TREATMENT OF BISPHOSPHONATE-RELATED OSTEONECROSIS OF THE JAWS: OUR EXPERIENCE.**

Stefano Riccio<sup>1,\*</sup>, Paolo Formillo<sup>1</sup>, Sarah Colombo<sup>1</sup>, Madia Pompilio<sup>1</sup>, Massimo Maniezzo<sup>1</sup>

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BRONJ is a well-known pathologic entity that is challenging and difficult to manage. In this study we described a new treatment modality of BRONJ using topical O<sub>3</sub> therapy followed by surgery performed at IRCCS Istituto Nazionale Tumori Milano from 2009 till 2012.

The case series consisted in 116 patients with diagnosis of BRONJ related to the assumption of oral or intravenous bisphosphonate. 55 patients were treated with topical O<sub>3</sub> therapy (O<sub>3</sub> oil suspension or O<sub>3</sub> gas insufflation). Surgical resection was performed in 22 cases of advanced disease and consisted in bone sequestrectomy and plastic of the oral mucosa. In 43 cases we found a complete remission while 12 patients didn't complete the treatment due to the progression of the neoplastic disease.

Of 43 patients treated 100% showed a complete wound healing during follow-up. No relapse of the disease was observed (mean follow up 18 months). Our results demonstrated that O<sub>3</sub> therapy is an effective therapy in all patients with BRONJ.

## Session 27. MEDICAL ONCOLOGY

O-2701

### THE ROLE OF THE HEPARANASE GENE IN ORAL CANCER DIFFERENTIATION

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**Background:** Numerous studies have shown that metastases formation depends on the ability of tumour cells to invade basement membranes and tissue barriers in a process involving enzymes capable of degrading extracellular matrix (ECM) components. One of these enzymes is heparanase, an endoglycosidase which degrades heparan sulfate.

**Purpose:** Examine the expression of heparanase in oral carcinomas and establish whether its extent, intensity and cellular localization can be of prognostic value in predicting the outcome of oral cancer patients and explore its role during cellular differentiation.

**Methods:** Biopsy specimens from 50 oral carcinoma patients were immunohistochemically analyzed for the expression and cellular localization of heparanase, PC12 (pheochromocytoma) cultures were used as an in-vitro model of cellular differentiation induced by NGF. **Results:** Nuclear localization of heparanase was observed in all oral verrucous carcinomas, a very well differentiated tumour that rarely metastasize, as opposed to only 28% of nuclear localization detected in oral squamous cell carcinomas. Heparanase expression level also significantly correlated with the degree of tumour differentiation. Moreover, while cytoplasmic localization of heparanase was associated with high grade carcinomas, nuclear localization of the enzyme was found primarily in low grade, well differentiated tumours. Heparanase was suggested to be involved in the differentiation of PC12 cell and was up regulated 6.5 fold during NGF induced cellular differentiation. Furthermore, NGF receptor TrkA seems to be involved in heparanase up regulation in PC12. **Conclusion:** In rarely metastasizing verrucous carcinomas, heparanase was expressed in the cell nucleus, as opposed to metastasizing oral squamous cell carcinomas which exhibited mostly cytoplasmic localization of the enzyme. Expression level and cellular localization of heparanase could serve as reliable predictive indicators of oral carcinoma development, metastatic potential and patient prognosis

O-2702

### ANALYSIS OF ONCOGENES AND TUMOUR SUPPRESSOR GENES ALTERATIONS IN HISTOPATHOLOGICAL TUMOUR FREE SURGICAL MARGINS IN PATIENTS WITH ORAL SQUAMOUS CELL CARCINOMA AND COMPARISON WITH SURVIVAL AND RECURRENCE RATE

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**Introduction:** Oral squamous cell carcinoma (OSCC) is an invasive epithelial pathological lesion with various de-

grees of squamous differentiation. This type of carcinoma has a possibility for early and extensive lymph node metastasis. There is much scientific based evidence that microscopic presence of carcinoma in surgical margins reduces local control of disease and survival rate. Until now, there are no unique criteria which define what are "clear" surgical margins in these patient.

**Aim:** To evaluate the status of p53, c-Myc and c-Erb genes in histologically free tumour margins in patients with OSCC and to correlate with survival rate and recurrence rate as well as TNM classification, histological grade, patient's bad habits.

**Patients and methods:** 50 specimens were collected from patients diagnosed with OSCC who underwent surgery at the Clinic of Maxillofacial surgery, School of Dentistry, University of Belgrade in the period March 2007 - April 2008. DNA extraction for molecular analysis was done on tumour margins, previously confirmed by a pathologist as histologically free. P53 mutations were studied by PCR-SSCP, while differential PCR and method of relative quantification by PCR (using house -keeping gene) was used for the detection of c-Myc and c-Erb B2 amplification.

**Results:** Distribution of mutations are: C-erbB2 (11/50)-22%; C-Myc (15/50) - 30%; p53 (12/50) - 24%. 5-year survival estimation was carried out by Kaplan-Meier analysis. Differences in the curves were evaluated by log-rank test. Statistical significance was set at  $p < 0.05$ .

**Conclusion:** Molecular analysis of free surgical margins, targeting cancer genes, could enable the selection of OSCC patients at higher risk for tumour recurrence as important prognostic factor. As p53,c-Erb and c-Myc mutations have been considered as selective and sensitive DNA markers of cancer cells, their identification in histopathological tumour free margins could be of great importance for genetic therapy in the future.

O-2703

### PARAOXONASE-2 (PON-2) EXPRESSION IN FOUR HEAD AND NECK CARCINOMA CELL LINES AS POTENTIAL PREDICTOR OF RESISTANCE AGAINST RADIOTHERAPY - A PILOT STUDY

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**Background:** Apoptosis induction is a key mechanism of radio- and chemotherapy. Unfortunately, carcinomas try to undergo apoptosis induction by upregulation of antiapoptotic proteins. Also, changes in redox-potential of tumours has a critical influence on the intrinsic apoptotic pathway. Recent studies showed a protective effect against ROS (reactive oxygen species) for cells of the vascular system by Paraoxonase-2 (PON-2). PON-2 is mainly localized at nuclear lamina, endoplasmatic reticulum (ER) and mitochondria in these cells and shows the potential to prevent mitochondrial induced apoptosis.

Since irradiation typically induces elevated levels of ROS and subsequent oxidative damage in nucleus, mitochondria and ER, elevated expression of PON-2 could also protect squamous cell carcinoma against oxidative stress. Our study is the first to examine expression pattern and

potential functional influence of PON-2 in squamous cell carcinoma of the head and neck.

**Methods:** Basal PON-2 expression was determined in vitro in four squamous cell carcinoma cell lines by western blot analysis. Further visualisation of PON-2 utilized immunofluorescence staining. We also examined induction of PON-2 protein expression after singular radiation with 7 Gray 24, 48 and 72 hours after irradiation. Simultaneously, activity of caspase 3/7 was examined for apoptosis detection. Finally expression of PON-2 was tested in 5 patients with oral carcinoma within tumour tissue compared to normal mucosa.

**Results:** The present study revealed regular expression of PON-2 in carcinoma of the head and neck region for the first time. Furthermore, the basal PON-2 expression pattern varies in different individuals. We found that irradiation leads to a general upregulation of PON-2 expression. Intriguingly, higher basal levels of PON-2 seem to protect cells against radiation-induced apoptosis.

**Discussion:** The pilot study showed regular but variable expression of PON-2 in head and neck carcinoma. Furthermore, the in vitro model revealed elevated levels of PON-2 in head and neck carcinoma possibly protect the tumour against radiation-induced apoptosis. Thus, characterization of PON-2 expression might serve as clinical prediction marker for irradiation response and patient outcome. Since the distinct molecular mechanism remains still unclear, further experiments are needed to unveil the biological role of PON-2 in head and neck cancer.

#### O-2704

##### MUTATION IN PIK3CA ONCOGENE IN ORAL SQUAMOUS CELL CARCINOMA: OUR RESULTS IN A SERIES OF 99 PATIENTS

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Oral squamous cell carcinoma is an important cause of death worldwide. The 5-year survival rate is approximately 50 % and has almost not changed in the last years. It is associated, among other factors, with the consumption of tobacco and alcohol. The treatment of patients with oral squamous cell carcinoma consists of a combination of surgery, radiotherapy and chemotherapy. There are no direct antitumour therapies in clinical practice, although it is known that there are genetic changes which affect oncogenic signaling pathways of p53, EGFR, TGF $\beta$ , STAT3 and NF $\kappa$ B. Recently, we have described that Akt oncogene activation and p53 deletion induces oral tumours in transgenic mice, which represent a phenocopy of human tumours. The PIK3CA is a known oncogene that activates Akt-dependent signaling, and it is frequently mutated or amplified in different human cancers. Approximately 75% of somatic mutations in PIK3CA are clustered at exons 9 and 20. The goal of this study is to determine the frequency of mutations or amplifications in PIK3 CA gene in oral

squamous cell carcinoma in our population, and investigate if there are some statistically significant relations between this fact and other patient or tumour-related factors.

We included 99 specimens from leukoplakias, lichen and squamous cell carcinomas from oral cavity. 52 were men and 47 women. DNA was extracted and we analyzed by real-time quantitative PCR: i) the existence of the E542K, E545K / D and H1047R mutations, using the commercial kit DxSPI3K Mutation Test Kit (Qiagen), ii) the number of gene copies, using the Taqman copy NumberAssays kit (Applied Biosystems).

The results showed a high frequency of genetic changes in the PIK3CA oncogene in our patients. The mutation is an early event, which appears in non-carcinoma lesions, while the amplification is a late event which happens mainly in carcinomas. Amplification of PIK3CA is associated with tobacco history, while mutation is associated with alcohol consumption. Drugs inhibiting PIK3CA could be used as a target therapy in patients with oral squamous cell carcinoma with changes in the gene.

#### O-2705

##### TUMOUR MOLECULAR BIOLOGY ASSOCIATED TO THE DIAGNOSIS IN LATE STAGE ORAL CANCER: A TISSUE MICROARRAY STUDY

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**Introduction:** Oral cancer is mainly detected in advanced stages, which is a prognosis factor. The objective of this study is to identify patient and clinical factors, as well as those related to the molecular biology of the tumour that can influence treatment outcome.

**Material and methods:** An observational retrospective study was designed with a cohort of 88 patients with the diagnosis of oral squamous cell carcinoma treated in the Department of Oral and Maxillofacial surgery of the University Hospital of La Coruña between the years 1998-2003. The inclusion criteria were: OSCC primary tumour, any oral site and any TNM stage. The clinical variables studied were the following: age, gender, smoking history, alcohol usage, diagnostic delay and TNM stage. Using microarray technology immunohistochemical studies were carried out (cell cycle and apoptosis markers, ki-67 and EGFR). SPSS + 17.0 was used for the statistical analysis and included Kaplan- Meier survival curves and Cox regression.

**Results:** Univariate analysis revealed a strong association between advanced stages and moderate-poor differentiation (OR= 4.2, 95% CI= 1.6-10.9) or tumour site (floor of the mouth (OR= 3.6; 95% CI= 1.2-11.1); gingivae (OR= 8.8 ; 95%CI= 2.0-38.2); and retromolar trigone (OR=8.8, 95%CI= 1.5-49.1)). Regression analysis identified the location and differentiation of the tumour as significant risk factors for the diagnosis of OSCC in advanced stages. The over-expression of EGFR enabled the identification of those patients with more aggressive tumours.

**Conclusions:** The knowledge of clinico-molecular charac-

teristics of oral squamous cell carcinoma associated to the late stage diagnosis is a key for designing strategies that will facilitate the early diagnosis of this disease.

**O-2706****THE USE OF QUANTITATIVE GENE EXPRESSION FOR DIAGNOSIS OF ORAL LESIONS BY MOLECULAR BIOMARKERS**

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Since oral cancer is a global health issue and the stage of the disease has a high impact on prognosis, the early diagnosis of oral cancer is of extraordinary importance. The minimally invasive oral brush biopsy has been shown to be a diagnostic instrument with limited efficiency to distinguish early cancer stages from suspicious, but not malignant oral lesions. As an additional diagnostic tool, quantitative gene expression analysis has been established by our research group allowing the quantitative evaluation of several biomarkers in a single brush biopsy sample.

**Methods:** Gene expression of Bub3, Sox4, AKT, Rb1, p21 and GSTp1 was quantified in 38 oral squamous cell carcinoma and 22 benign lesions including oral lichenoid lesion, lichen planus and dysplasia by oral brush biopsy. All lesions underwent a confirmatory diagnosis by incision biopsy and histopathological evaluation.

The gene expression of the oral lesions was normalized to the gene expression in each patients' normal-appearing contralateral mucosa, which was underwent minimally invasive oral brush biopsy as well. These normalized gene expression results of the malignant lesions were compared with those of the benign lesions by the Wilcoxon-test.

**Results:** Higher gene expression levels of AKT ( $p=0.012$ ) and Sox4 ( $p=0.085$ ) were found in malignant lesions compared to the contralateral normal mucosa. Comparing the normalized gene expressions of cancer lesions to benign and dysplastic lesions, Sox4 showed the most significant difference ( $p=0.28$ ). Applying the ROC analysis and the area under the curve for evaluation of the diagnostic test efficiency, Sox4 (58%), Rb1 (57%) and Bub3(56%) turned out to be most effective.

In conclusion, Sox4, Rb1 and Bub3 gene expression analysis in brush biopsy specimens seem to be the most promising markers to differentiate cancerous and minimally suspicious and suspicious oral lesions. However, as a single diagnostic tool, without conventional cytopathology the gene expression analysis of these candidate genes seems to be presently suboptimal for clinical use.

**O-2707****EXPRESSION PROFILE OF ANGIOGENESIS RELATED GENES IN HEAD AND NECK SQUAMOUS CELL CARCINOMA**

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**Introduction** The molecular patterns of tumorigenesis of head and neck squamous cell carcinoma are mostly unknown to date. The concept of our investigation was to expose a genetic fingerprint of angiogenesis in HNSCC with special regard to VEGF as the outstanding mediator of neo-angiogenesis.

**Material and Methods** We established a panel of significant transcriptional alterations of VEGF related genes in 83 cancer samples compared to healthy mucosa with microarray technique. RT-PCR was performed to confirm our microarray results.

**Results** In four selected marker genes (VEGFA, RAC2, IL8, PLA2G10) we detected a highly significant transcriptional alteration; three of the genes (VEGFA, RAC2, IL8) showed up-regulation in 88% to 100% of the samples, PLA2G10 down-regulation in 99% of the analyzed tissue samples.

Additionally we found significant transcription alteration in angio-miRNAs: miR-21 and miR-31 were over-expressed in 56% to 89 % of the analyzed samples. MiR-20a, miR-126, miR-378, miR-17, miR-19a, miR-27b and miR let-7f were down-regulated in 83% to 95% of the specimens. A specific pattern subject to the different tumour types could not be verified.

**Conclusion** An expression profile of VEGF related genes was established and selective angio-miRNAs were identified as potential biomarkers on the basis of 83 HNSCC samples.

Identification of new relevant oncogenes and insight into the process of tumour vasculogenesis with a highly sensitive method opens new vistas in cancer biology.

**O-2708****IN VIVO AND IN VITRO STUDIES OF ACRIFLAVINE IN TUMOUR PROGRESSION OF NASAL SQUAMOUS CELL CARCINOMA**

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Tumours of the nasal region are encompassed within the head and neck tumours. Its biological behaviour and clinical study and diagnosis are similar in different locations and, therefore, the treatment is applicable to similar concepts and principles.

The tumour growth, both primary and secondary, from a certain diameter (of only 2-3 mm<sup>3</sup>), requires vascularization. Without it, the tumour cells die from lack of nutrients and oxygen, and lack of disposal of waste substances. Angiogenesis is therefore essential for tumour progression.

In this work, we study the anti-angiogenic effect and



apoptogenic properties of a compound called Acriflavine against tumour cells of rat nasal squamous-cell carcinoma or FAT-7. The Acriflavine, tested in vitro studies, has antiproliferative effects against this cell line that are directly proportional to the administered dose. In the in vivo test, we subcutaneously implanted tumour cells in the abdominal region of 19 Fisher rats, 13 males and 6 females. The rats developed macroscopic tumours after four days and progressive tumour growth on subsequent days. The Acriflavine was injected daily intraperitoneally and after one week of the implantation of FAT-7 cells, was safe for the experimental animals and is capable of inhibiting tumour progression, reaching complete tumour remission after two weeks treatment. In addition, the Acriflavine inhibits angiogenesis of this cell line implanted in Fisher rats, as the histological sections of these tumours shows a decrease in the number of blood vessels and apoptogenic properties by TUNEL technic.

#### O-2709

### A FURTHER STEP IN PERSONALIZED MEDICINE OF HEAD AND NECK CANCER PATIENTS: EXPRESSION OF Y-BOX-BINDING PROTEIN YB-1 ALLOWS STRATIFICATION INTO LONG- AND SHORT-TERM SURVIVORS

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**Purpose:** The transcription/translation Y-box-binding factor YB-1 is an important integral part of various signal transduction pathways. The clinical significance of YB-1 expression and localization within the tumour in the progression of head and neck squamous cell carcinoma (HNSCC) was evaluated. In addition YB-1 in combination with the current TNM classification was analysed for a therapeutic decision making process. Experimental Design: Tissue microarrays (TMA) representing 365 cases of HNSCC patients who underwent standardized resection were graded by histological analysis and stained immunohistochemically for YB-1 protein expression. Due to the important role of YB-1 in cancer, expression and localization of YB-1 within the tumour tissue and its invasion front were determined and compared with clinicopathological features.

**Results:** Compared to control tissue from healthy patients, significantly increased YB-1 protein expression was observed in high-grade HNSCC ( $P < 0.01$ ) and correlated with tumour grade (Chi-square test;  $P < 0.01$ ). By univariate survival data analysis, HNSCC patients with elevated YB-1 protein expression displayed significantly decreased ( $P < 0.01$ ) disease-specific survival (DSS). By multivariate Cox regression analysis, nuclear YB-1 protein expression retained its significance as a statistically independent prognostic marker for disease-specific survival (hazard ratio = 2.172,  $P = 0.002$  for tumour invasion front). For a subset of patients with grade 2 HNSCC, high nuclear and cytoplasmic YB-1 protein expression (co-expression pattern) within the tumour invasion front was indicative of a significantly poor 5-year DSS rate of only 38 % (hazard

ratio = 2.75,  $P = 0.014$  for tumour invasion front). Vice versa, DSS of cancer patients with low YB-1 protein expression was strongly increased to 74 %.

**Conclusions:** This study demonstrates that elevated YB-1 protein expression and localization within the tumour tissue of HNSCC patients combined with established histological criteria in a double stratification strategy predicts poor prognosis in these patients. According to our findings, YB-1 protein expression might be useful as a predictive cancer biomarker in HNSCC, helping to discriminate long- from short-term survivor patients. Thus, implementation of YB-1 protein expression in the histological evaluation might improve the therapeutic decision making process in the clinical setting and in identifying those HNSCC patients who would benefit from novel YB-1 based targeted therapy opportunities.

#### O-2710

### TARGETED THERAPIES IN HEAD AND NECK CARCINOMAS : COMBINING CETUXIMAB WITH SORAFENIB

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Head and neck carcinoma (HNC) are invasive tumours that often present with locally advanced disease. Antibodies targeting EGFR were the first protein-directed agents which showed clinical benefit, and are a standard component of clinical strategies for management of these diseases. Nevertheless, many patients display either intrinsic or acquired resistance to these drugs. Cetuximab is a targeted therapy directed against the Epidermal Growth factor Receptor (EGFR) and that prevents the activation of the oncogenic RAS-RAF-MEK-ERK cascade, which is a main oncogenic kinase cascade in HNC cells. Therapeutic associations with other targeted therapies might help to prevent resistances. In order to explore possible strategies along this line, we have examined the effect of cetuximab in association with sorafenib, an inhibitor of the RAF kinases, in the human HNC cell line PE/CA-PJ 41. We tested the effect of both inhibitors in cell culture and in tumours established as xenografts in nude mice. We find that sorafenib exerts a marked anti-oncogenic activity that can be increased by the addition of cetuximab. Surprisingly, we report that sorafenib alone induces the paradoxical activation of the EGFR and the phosphorylation of its residue Y1068, a key regulator of EGFR downstream signalling. Cetuximab and erlotinib, a chemical inhibitor of EGFR, prevent this paradoxical activation of EGFR and present additional anti-oncogenic activity on PE/CA-PJ 41. Our findings suggest that cetuximab or other EGFR inhibitor could be combined with a blocker of the downstream effector RAF kinase in order to control these important oncogenic kinases. We are currently applying a strategy of short term culture of tumour fragments derived from primary tumours obtained from surgical resections. Our findings might provide new ways to improve the clinical efficacy of cetuximab on HNC.

**O-2711****DETERMINATION OF CONTAMINATION OF SURGICAL FIELD IN HEAD AND NECK ONCOLOGICAL SURGERY**

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*Aim:* To determine the amount and type of surgical field contamination and during resection of advanced tumour of head and neck with one stage reconstruction and to assess relationship between contamination of surgical site infection (SSI).

*Materials and methods:* This prospective study was approved by the local ethical committee. We took swabs from surgical field and surgical drapes near the field during surgical resections and reconstructions performed with standards of asepsis (ISO certificate 18001:2009, 9001 14001:2009). Samples were taken at every 0, 2, 4, 6 hours and delivered immediately for microbiological analysis. Microbiological examination was performed with standard microbiological diagnostic protocol. Standard criteria for SSI were used.

*Results:* Preliminary results showed that 220 of 312 swabs (70.5%) obtained in 47 procedures were contaminated. 141 of these 220 (64%) samples were contamination by more than one strain and total of 26 microorganism species were identified. Samples which were taken at 0 h from draped surgical field (skin) were contaminated in 30 cases, from drapes in 19 cases. In all groups no statistically significant rising trend of the number of contaminated samples was observed.

*Conclusion:* In spite of observing standard asepsis rules, contamination of the surgical field with natural microbial inhabitants of the skin and oral cavity occurs frequently. With standard antibiotic prophylaxis SSI is rare and much larger study would be necessary to demonstrate correlation between contamination and SSI or lack of such correlation.

## Session 28. CUSTOM-MADE IMPLANTS

### O-2801

#### THE WORLD'S FIRST 3D PRINTED FULL JAW REPLACEMENT

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**Introduction and background:** An 83 year old patient suffered from a long lasting and rapidly progressive infection of almost the entire mandible with a large soft tissue defect of her face. Surgical removal of the entire mandible was necessary in order to cure the patient. Classical treatment, where only the damaged bone is removed, would result in a small mandible without any support and function that would easily break under load. In view of the age of the patient, complicated and complex microsurgical reconstruction with prolonged hospital stay was not an option. Therefore the choice was made to reconstruct the entire mandible with a custom built implant by using additive manufacturing. To our knowledge, this is the first patient in the world where additive manufacturing was used to reconstruct an entire mandible.

**Material and method** The data of the CT scan of the patient were imported in image processing software (Mimics; Materialise, Belgium). After segmentation the mandible could be visualized. The data were exported and the mandibular implant was designed in a 3D environment based on the data and anatomy of the diseased mandible (Xilloc Medical BV, Maastricht, The Netherlands). Modifications were applied in order to facilitate surgery, ingrowth of soft tissue and restoration of form. The design data were used to manufacture a one piece implant in medical grade titanium alloy by Selective Laser Melting (LayerWise, Leuven, Belgium). The implant was coated with plasma sprayed hydroxy-apatite bone substitute compound (Cambioceramics, Leiden, The Netherlands). Some anatomical parts, such as the condylar heads and the rims for the mandibular nerves were polished. Fixture sites for future prosthetic superstructures were incorporated.

**Result** In a one stage surgical procedure, the diseased mandible was removed and replaced by the custom implant without any problem. The function was checked during operation and closure of the wound was achieved. The patient showed normal function already on the first day after operation with adequate speech, swallowing and unrestricted mandibular movement. The technical development as well as the clinical procedure in this patient will be demonstrated in the presentation. We also aim to present a follow-up of the patient and the progress of the recovery.

### O-2802

#### CAD-ASSISTED MANDIBULAR RECONSTRUCTION USING CUSTOM-MADE TITANIUM MESH TRAY AND PARTICULATE CANCELLOUS BONE AND MARROW HARVESTED FROM BILATERAL POSTERIOR ILIA

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**Objective:** This study reports on 8 computer-aided design (CAD)-assisted mandibular reconstructions using custom-made titanium mesh (Ti-mesh) tray and particulate cancellous bone and marrow (PCBM) harvested from bilateral posterior ilia.

**Patients and methods:** All surgeries were performed between 2010 and 2012. Subjects comprised 4 men and 4 women with a mean age of 58.0 years (range, 11-82 years). Causes of mandibular defects were malignant tumour in 5 cases, and benign tumour in 3 cases. One of the 5 patients with malignant tumour had received irradiation of 30 Gy. Seven patients underwent segmental mandibulectomy and 1 patient had a marginal resection. Reconstructions were performed immediately in 3 patients and secondarily in the remaining 5 patients. Three-dimensional (3-D) skull models for each patient were fabricated based on the preoperative CT data by rapid prototyping method.

A custom-made Ti-mesh tray was made from a Ti-mesh sheet bent to adapt the model. After PCBM was harvested from bilateral posterior ilia, the Ti-mesh tray was fixed to each side of the host bone using monocortical screws. The PCBM was loaded into the mesh and densely condensed to increase graft density. In each patient, operation time, blood loss, and perioperative complications were retrospectively examined. New bone formation and configuration of the reconstructed mandible were assessed radiologically. Furthermore, postoperative facial contour was evaluated by the patient.

**Results:** All surgical procedures of reconstruction were successful. Mean of total operation time was 484 min (range, 356-688 min) and that of blood loss was 1028 g (range, 225-2510 g). Five of the 8 reconstructions were completed without complications. The other 3 patients encountered complications of osteomyelitis, exposure of Ti-mesh tray in the oral cavity, and insufficiency of new bone formation. Finally, in 7 patients, expected results were radiologically achieved, and postoperative facial contour was acceptable for all patients.

**Conclusions:** CAD-assisted mandibular reconstruction using custom-made titanium mesh tray and PCBM was successfully conducted with reproduction of the individual original configuration of mandible in all cases. Although the data is preliminary, our results suggest that this method is clinically feasible.

**O-2803****RECONSTRUCTION OF MANDIBULAR DEFECTS USING "DIRECT" CAD CAM TECHNOLOGY**

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**Purpose:** A new protocol for mandibular reconstruction is presented. Direct CAD/CAM technology has been used to manufacture custom-made cutting guides for tumour ablation and reconstructive plates to support fibula/iliac free flaps in ten patients presenting oral tumour involving the mandibular bone.

**Methods:** CT scan data from the patients were elaborated to produce a virtual surgical plan of mandibular osteotomy in safe tissue for complete ramus/body resection. The CAD/CAM procedure was used to construct using DLMS (Direct Laser Metal Sintering) a customized surgical device composed of a cutting guide and a titanium reconstructive bone plate. The cutting guide allowed the surgeon to precisely transfer the virtual planned osteotomy into the surgical environment. The bone plate (including in two cases a custom-made anatomical condylar prosthesis) was designed using the outer surface of the healthy side of the mandible to obtain an ideal contour and avoid the bone deformities present on the side affected by the tumour.

To evaluate the accuracy of the CAD-CAM direct method a postoperative CT scan was obtained and the pre- and postoperative datasets were compared to evaluate the discrepancy between the actual and virtually planned positions of the reconstructive bone plate.

The study group results were also compared with a control group of five patients who underwent mandibular reconstruction with the assistance of indirect CAD-CAM standard procedure (prebent reconstructive plate on stereolithographic models).

Using the pre and postoperative CT datasets we have assessed:

- 1) Surface deviation of the neo-mandible versus the pre-operative one
- 2) Position of the condyles and mandibular body segment
- 3) Contour of the reconstructive plate compared with the original patient's mandibular profile

**Results:** In the study group operation time was reduced in the demolition and reconstruction phases. Surgical outcomes will be presented in order to validate the facial appearance and mandibular functionality.

**Conclusions:** This protocol for mandibular reconstruction using Direct CAD/CAM to construct custom-made surgical guides and plates may represent a viable way to reproduce the patient's anatomical contour, give the surgeon better procedural control and reduce operation time.

**O-2804****PATIENT SPECIFIC IMPLANTS: STATE-OF-THE-ART**

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**Introduction:** There's an ongoing trend towards the personalization of medical care in general, and medical instrumentation and implants in particular, supported by the advances in 3D medical imaging and medical engineering. Over the last few years, the use of custom surgical guides has grown exponentially both in the Cranio Maxillo Facial (CMF) and orthopaedic industry, evidenced by the many recent papers and conference lectures. The CMF industry is ahead in the use of patient-specific implants (PSI's), mainly for cranioplasty procedures, as aesthetics are of paramount importance for a patient with a skull defect or deformity. Besides aesthetics, the benefits of PSI's are plentiful for both patient and surgeon and the impact on the life of the patient is considerable.

**Materials and methods:** We produced our first milled, titanium implant in 2003, which was fully tailored to the anatomy of the patient. Since then, the development of PSI's has progressed significantly in terms of design, materials and manufacturing methods: In 2006, we deployed additive manufacturing (or 3D printing) for the first time in the production of a patient-specific titanium skull implant for the successful treatment of a patient with a large skull defect. From there, the design of skull implants has evolved to take full advantage of the possibilities of this "new" manufacturing method that is ideal for the production of unique, individual parts. In 2011, we collaborated with a multidisciplinary team to design and 3D print a complete mandible, fully customized for an elderly patient that was successfully implanted to replace the largely infected lower jaw.

**Results and discussion:** We describe the use of 3D medical image information of individual patients, as well as innovative design and manufacturing tools for the engineering of PSI's. Furthermore, the challenges in the worldwide adoption of PSI's are highlighted and a future outlook is discussed.

**O-2805****NOVEL JAWBONE RECONSTRUCTION USING TAILOR-MADE TITANIUM DEVICES**

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Augmentation and reconstruction of jawbone defects is challenging for oral surgeons. After the treatment of patients with oral cancer, most of them missed some teeth and jawbone. However, sometimes it is difficult to reconstruct the occlusal condition, especially in case of large defects that require an equally large graft for the reconstruction. The purpose of this study was to examine the feasibility of tailor-made jawbone reconstruction using a titanium device. Bone augmentation was performed for small and large defects of the jawbone. Computed tomography (CT) images and the FreeForm (Sensable) and BioNa (Bionic) softwares were used to obtain three-dimensional (3D) designs of the device. First, the CT-3D

image was constructed. Then, the important anatomical structure was superimposed on the image. Using computer-aided-design (CAD), a process of drafting and designing models using a computer software, virtual designs of the implant device were obtained. The 3D model of the device was generated using rapid prototyping (RP). RP processes CAD data; transforms them into sliced, horizontal cross-sections; and constructs the 3D model layer by layer by using selective laser melting method. In this study, the CAD/RP technique for reconstructing small and large defects of the jawbone, and some associated clinical cases are described. All patients had a good clinical course, with no serious complications. Titanium powder, and autologous and artificial bone grafts were used for RP and augmentation, respectively. The operation was safe, and because the implant device was prepared beforehand, it took less time. Therefore, a tailor-made implant device may be a good clinical choice for augmentation and reconstruction of the jawbone.

#### O-2806

### THE ROLE OF COMPUTER ASSISTED DESIGN AND MANUFACTURING IN CONGENITAL CRANIOFACIAL RECONSTRUCTION

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**Background:** Perioperative and long-term outcomes following open craniostylosis surgery have steadily improved over the last three decades. Nevertheless, craniofacial surgeons continue to expend considerable operative time planning, shaping, and reconfiguring the cranial vault in the pursuit of symmetry. Computer-aided design and manufacturing (CAD/CAM) has recently been implemented in orthognathic surgery and complex craniomaxillofacial reconstruction as a means of optimizing operative accuracy and efficiency. In this report, we highlight our growing experience with this promising modality for the preoperative planning and intraoperative execution of cranial vault remodelling in patients with both simple and complex forms of craniostylosis.

**Methods:** Computer-assisted surgical planning begins with acquisition of high-resolution computed tomography (CT) scans of the craniofacial skeleton. An internet-based teleconference, is then held between the craniofacial and biomedical engineering teams and provides a forum for virtual manipulation of the patient's preoperative 3D-CT with real-time changes and feedback. Through virtual surgical planning, osteotomies are designed and calvarial bones reconfigured to achieve the desired cranial vault appearance. Cutting and positioning guides are manufactured to transform the virtual plan into a reality.

**Results:** From February to March 2012, three infants (ages 9 months – 6 years) with craniostylosis underwent computer-assisted simulation and surgery. Diagnoses included metopic, left unicoronal, and multisutural synostoses (sagittal and left unicoronal; Crouzon syndrome). Open craniofacial repairs were performed as virtually planned, including fronto-orbital remodelling, fronto-orbital advancement, and anterior 2/3 calvarial remodelling procedures, respectively. Cutting and final positioning guides demonstrated excellent fidelity and ease of use.

**Conclusions:** Computer-aided design and manufacturing may offer a platform for optimizing operative efficiency,

precision, and accuracy in craniostylosis surgery, while accelerating the learning curve for future trainees. Future efforts should be made toward quantification of benefits and a formal cost-to-benefit analysis.

#### O-2807

### PEEK-CUSTOM MADE IMPLANTS FOR FACIAL RECONSTRUCTION OF COMPLEX CRANIOFACIAL MALFORMATIONS

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PEEK-custom made implants have been widely used for cranial vault reconstruction with constant good biomechanical and aesthetic results. Although autologous bone is preferred in many cases, its usefulness may be limited by difficulty with contouring, resorption, and donor site availability and morbidity. We report our initial clinical experience with this technique for facial augmentation and obtaining symmetry in 4 patients with sequelae of complex congenital craniofacial malformations.

Four adult patients were examined during the previous 12 months in our centre in Toulouse and included in the protocol. Indications were hemifacial microsomia in one case, Nagger syndrom in another one and orbito-facial clefts in two cases. All patients had prior surgery in different centres. Implants were created from CT-scan data with computer-aided design and surface modelling techniques. The implants were designed for midface augmentation in all cases, bilateral for the Nagger syndrome and including another mandibular piece for the hemifacial microsomia case.

The operative procedure was performed in a standardized manner exclusively by an external approach in three cases and with the help of an intra-oral incision in one case. The follow-up was uneventful in all cases, a good cosmetic outcome was achieved and the patients showed no sign of discomfort or rejection.

We believe that PEEK-custom made implants for complex disfiguring facial defects are an interesting method, minimizing operative time and combining bony and soft contour remodelling. Preliminary results from these first cases gave in our hands better cosmetic results than previously reported techniques and encourage us to carry on with this method.

We are waiting for further results.

#### O-2808

### CRANIOFACIAL BONE RECONSTRUCTION WITH A NOVEL BIOACTIVE COMPOSITE IMPLANT

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**Introduction:** Large skull bone defects cause both functional and aesthetic problems to patients. A novel bioactive fibre reinforced composite is presented to address some of the problems faced in current options for cranio-

facial bone reconstruction. Synthetic, osteoconductive and antimicrobial, bioactive glass S53P4 (BAG) with E-glass fibers in a new custom made composite implant for craniofacial reconstructions.

**Material and methods:** A retrospective series of 20 patients operated on for craniofacial deformity during 2007-2011 were studied. The bone defects were the consequence of craniotomies performed due to traumatic and spontaneous intra-cranial bleeding as well as infections to primary reconstruction materials. After the skull defect had been characterized with three-dimensional computer tomography, a rapid prototype model of the skull was made from polyamide with a selective laser sintering method. This model was then used to manufacture a customized implant. The implant material consisted of a supporting fibre reinforced framework, porous inner layers and bioactive glass filling. The framework and the porous layers were made of a pBisGMA-pTEGDMA resin matrix, which was reinforced with E-glass. The composite structure of the implant allowed the biomechanical excellence of the fibre reinforced structure to be coupled with the properties of BAG.

**Results:** The aesthetic and functional outcomes of all patients were good and the patients were happy with the reconstructions. No infections, skin problems or hair growth distortions were reported and no other clinical complications were found. Post operative PET CT studies revealed new bone formation one year after surgery and individual implants were integrated in the skull.

**Conclusions:** Reconstruction of difficult skull defects with the novel bioactive composite implant is a promising solution compared to previously use conventional materials. In addition, that non metallic custom made composite implant does not disturb clinical imaging follow-up with MRI and CT. Furthermore that implant increases the quality of individual outcome.

#### O-2809

##### USE OF CUSTOM MADE IMPLANTS IN THE RECONSTRUCTION OF COMPLEX CRANIO-ORBITO-ZYGOMATIC DEFECTS: TEN YEARS EXPERIENCE.

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**Introduction:** Since 1995, different computer-aided prefabricated patient-specific implants (PSIs) for cranio-orbital reconstruction have been used. In this study we report our results using different prosthesis produced by computer-aided design/computer-aided manufacturing (CAD-CAM) for single step (primary) resection and reconstruction procedures or delayed (secondary) reconstruction, in patients with complex cranio-maxillofacial defects.

**Patients and Methods:** In this study ten patients who underwent a cranio-orbito-zygomatic reconstruction with Custom Made implants were included. Five patients underwent primary resection and reconstruction (four sphenoid-orbital meningiomas, one fronto-orbital osteoma); five patients underwent delayed reconstruction (two orbito-zygomatic deformity resulting from tumour resection; two cranio-orbital deformity resulting from cranio-facial injuries and one from frontal sinus infection). Four of the ten computer-designed prostheses were made in HTR-PMI, one in Polyethylene, one in PMMA and four in PEEK.

Aesthetic, ophthalmological and radiological evaluations were recorded at follow up.

The main outcome measures were aesthetic and functional evaluation and analysis of complications.

**Results:** PSIs enables excellent functional and cosmetic results with reduced operating time. Both the immediate and long-term aesthetic and functional results were good. In primary reconstruction procedures, the use of PSIs requires accurate planning and the ability to transfer a treatment plan carefully into an intraoperative site. One patient, who underwent secondary reconstruction with an HTR-PMI implant placed in continuity with frontal sinus, developed an infection. The implant was removed and substituted with a titanium mesh with a satisfactory result.

**Conclusions:** Reconstruction of complex cranio-maxillofacial defects with Custom Made implants is a safe and easy technique that allows reduction of operating time and morbidity. Furthermore the implants adequately restore an anatomically complex area with excellent postoperative cosmetic and functional results. PSIs definitively have a place in the reconstruction of cranio-orbito-zygomatic defects. They are indicated in difficult and selected cases because of economic reasons.

#### O-2810

##### COMPUTER-AIDED ORBITAL WALL DEFECTS TREATMENT BY PATIENT SPECIFIC POLYETHYLENE IMPLANTS

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Despite the well-known advantages of high molecular weight polyethylene (Medpor) in orbital reconstructions, the thickness of these implants is much more than 0.5mm, and the precise modifications of the thickness are limited. The aim of this study was to present a method of treatment of orbital wall fracture with a custom implant made of ultrahigh molecular weight polyethylene (UHMW-PE) which we have developed.

**Material and method:** 10 cases of delayed surgical treatment of orbital fracture were included into this study (7 males, 3 females). Based on CT scan and the mirroring technique, a CAD model of virtual implant for repair orbital wall was done. Next, the implant was manufactured with a computer numerical controlled milling machine from UHMW-PE block, sterilized and used during the surgical procedure. Clinically used implants had thickness from 0.2 to 4.0 mm.

**Results:** In this series of delayed surgical cases, functional results of orbital surgery are worse than in simpler, early treated cases, but long-term resolution of diplopia is noticeable [10% poor results]. **Results** of treatment depend on the initial level of diplopia, and severe initial diplopia required thicker implants to be corrected.

**Conclusion:** Ultrahigh molecular weight polyethylene implants prepared by CNC milling seems to be an interesting material for precise reconstruction of orbital wall defects. The implants are durable in the long-term and reconstruct the anatomy of the thin orbital wall, avoiding the morbidity of autogenous bone grafts, and make possible resolution of posttraumatic diplopia.

**O-2811****RECONSTRUCTION OF LARGE SKULL FULL-THICKNESS DEFECTS WITH PATIENT-SPECIFIC COMPUTER-AIDED DESIGNED POROUS TITANIUM IMPLANTS**

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**Background:** Depending on the size, location and aetiology of the defect, skull reconstruction can be realized either with bone grafts or synthetic materials. Patient-specific computer-aided designed porous titanium implants can be a solution.

**Methods:** All patients having undergone skull reconstruction with such devices since January 2010 in our department were included.

Implants were designed individually from the patient CT-scan and manufactured by Selective Laser Melting. The porous titanium structure gave them elastic properties similar to cortical bone. Moreover they were supposed to act as scaffolds to stimulate osseointegration from the defect margins.

The study analyzed the clinical outcomes, the accuracy of the implant positioning and the postoperative symmetry with a 3D-models superimposition method.

**Results:** Four male patients, 42-58 years, presenting frontal or parietal bone defects from 14.47 to 50.13 cm<sup>2</sup>, secondary to trauma or surgery, were included. Implants were placed through a coronal approach and fixed with titanium screws.

No major complications were observed within a 10 to 18 months follow-up. Accuracy of implant positioning went from 98 to 100%. Postoperative symmetry in the implant area went from 72 to 100%.

**Discussion:** These implants seem to be as well biotolerated as other titanium devices. The excellent reliability of preoperative planning allows their precise placement without any surgical guide. So, the postoperative symmetry mostly depends on the accuracy of the preoperative simulation.

**O-2812****RESECTION AND RECONSTRUCTION OF LARGE FRONTO-ORBITAL LESIONS IN A SINGLE STEP PROCEDURE WITH CUSTOM MADE IMPLANTS.**

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Resection of large osseous cranial lesions often requires reconstruction at the same time of the resection. However large cranial defects or complex anatomical regions (such as fronto-orbital region) remain difficult to accurately reconstruct with bone graft or other biomaterial preoperatively shaped. Initially developed for cranial reconstruction, custom-made implants are particularly useful in orbital reconstruction.

5 cases illustrate our single step procedure with PEEK

implants and navigated resection. All cases were benign lesions (such as osteomeningioma) and « virtual surgery » was achieved preoperatively to design the prosthesis adapted to the planned resection. Navigation was used during the surgery to reproduce accurately the planned resection. Implants fitted properly to the defect during the surgery even if sometimes a few adjustments were necessary during the surgery,

Accurate reconstruction with excellent symmetry of osseous contour, orbital volume and correction of exophthalmos was achieved in each case. A simple, easy and reproducible procedure is described to obtain optimal morphologic and functional results.

**O-2813****A NEW BIOACTIVE PROSTHESIS FOR HARD TISSUE AUGMENTATION OF THE FACIAL SKELETON: HISTOLOGICAL RESULTS.**

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**Purpose:** Recontouring of the craniomaxillofacial region is required for many aesthetic and reconstructive procedures. This paper describes the use of "custom made" prosthesis made of porous hydroxyapatite granules (Interpore 200) for reconstruction of congenital, post-traumatic and post-resection deformities and for purely aesthetic purpose. This study evaluates the long term maintenance of the augmented bony projection, the biological behaviour and the safety profile of this material.

**Patients and Methods:** Porous hydroxyapatite granules are mixed with fibrillar collagen and saline to create an adaptable paste that can be moulded easily to a desired shape.

From 2006 to 2011, skeletal recontouring has been performed on 141 patients. This retrospective study reviews the patients' medical history by a clinical, radiologic and histological follow up.

**Results:** For 98 percent of the procedures the surgical indication was congenital deformities, in 2 percent the indications were post-traumatic, post-resective and cosmetic. The complication rate was 2 percent (n = 3 of 141), with infections being responsible for 1,4 percent (n = 2 of 141). Only one prosthesis resorbed in a few months.

Postoperative conic-beam CTs have shown neither dislocation nor resorption. A comparison between the short and the long term CT images shows an increasing of the radiodensity and a reduction of the granular texture of the grafts.

The result of histological studies shows prominent ossification preceded by the formation of fibrovascular tissue. Giant cell reaction is present in all case suggesting a micro-remodelling process. There is no inflammatory response.

**Conclusions:** This technique has shown considerable efficacy and versatility in craniofacial skeleton recontouring. Biological response of this material is favourable because of his stability, biocompatibility and safety. The projection is maintained and there is no evidence of re-

sorption. HA implants lead to the formation of long lasting bone ensuring a perfect integration with the underlying skeleton.



## Session 29. MICROSURGICAL RECONSTRUCTION IN HEAD AND NECK II

O-2901

### MANDIBULAR RECONSTRUCTION WITH VASCULARIZED ILIAC CREST FLAP: IS PREOPERATIVE STEREO SIMULATION NECESSARY?

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In the field of reconstructive surgery, management of the mandibular shape is increasingly being performed using computer simulation and the industry has developed devoted software to “perfectly” control the shape of the fibula free flap by cutting and shaping it exactly on the donor site using numerical 3D data.

This procedure can be efficient but there is no more adaptation, no inventiveness or possibility for the surgeon to decide to modify, to adapt the shape during the operation if the need to extend the resection arises, for example, or for complicated cases. There is obviously a lack of freedom and it is essentially developed for fibula flap, but the fibula is not always the best choice for mandibular reconstruction. The technologic means and the cost effectiveness are not negligible

For thirty years, in our department, the choice of the flap has been more linked to the topography and the type of tissue required. For the mandible, we preferably use the iliac crest with its great advantage of precise bony modelability and perfect adaptation in terms of height and shape. The procedure of harvesting for modelling is very easy and based on a simple design using three paper sheets, one for each surface of the removal piece, or calculated on a stereolithographic model duplication in case of complex secondary reconstruction.

There is a short per-operative time, completely personalised, which needs only a few minutes with no extra cost.

The authors review here the last 30 cases of mandibular reconstruction by vascularized iliac crest flap in terms of procedure, feasibility, accuracy and assessment of functional and morphological outcomes.

In this period of economic stress it may be interesting to discuss the relevance and efficiency of this method.

O-2902

### SURGICAL PLANNING OF ORO - MANDIBULAR RECONSTRUCTION WITH AN ASIS SPARED DCIA FLAP

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Reconstruction of the mandible continues to challenge reconstructive surgeons. Continuity defects of the mandible

resulting from a variety of causes including trauma, congenital deformities, osteonecrosis and benign and malignant tumours can be difficult to manage. The reconstructive goals of mandible reconstruction include achieving mandibular continuity, reconstruction of any soft tissue deficits and restoration of mastication swallowing and phonation. The advent of microvascular surgery in the 1980’s revolutionized oro – mandibular reconstruction. Today, osseous and osteocutaneous free flaps represent the gold standard for mandibular reconstruction. Since its advent, microvascular transfer has been refined, leading to high rate of reproducibility and success rate of 100%. Many options for mandibular reconstruction have been suggested, based on different defect classification systems. In this paper the Authors present their guidelines for surgical planning of mandible reconstruction with anterior superior iliac spine (ASIS) spared DCIA free flap without skin paddle based on a new classification defect. The Authors have developed important refinements in DCIA harvesting surgical technique and preoperative planning that make the DCIA flap as successful as a fibula flap for segmental and wide oro mandibular reconstruction.

O-2903

### FIBULA FREE FLAP RECONSTRUCTION FOR SEGMENTAL MANDIBULAR DEFECTS

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**Introduction.** This work documents our experience over the previous 8 years using fibula free flap for reconstruction of large mandibular defects. The aetiology of the bone defects included benign and malignant tumours, trauma and osteomyelitis.

**Materials and Methods.** Between January 2002 and July 2010, a total of 32 free osteocutaneous fibula flaps have been used in an equal number of patients for reconstruction of the mandible, at the Division of Maxillofacial Surgery, San Giovanni Battista Hospital, University of Turin. Malignant pathology was the most common indication for segmental mandibulectomy (69%). As expected, most were squamous cell carcinomas. Demographics, surgical indication, location of tumour, adjuvant therapies, complications and dental implants were analyzed in all cases.

Complications were categorized as major and minor. The data were reviewed to identify flap, donor-site and systemic complications. Clinical and quality of life outcomes were assessed by clinical examination and a questionnaire.

**Results.** All flaps were harvested and transplanted successfully. For the free flaps examined in this work, the complication rate was 29% including major and minor complications. In the questionnaire 26 patients responded that they had a regular deglutition. In cases in which vertical dimension was not sufficient distraction osteogenesis was offered. Most of the patients were satisfied with their speech function (n = 27) as well as their aesthetic appearance, since it was judged to be good by 24 patients. Ten patients (32%) received dental implants.

**Conclusions.** In our experience the fibula free flap is the most versatile and reliable option for surgical reconstruction of large mandibular defects. It provides a straight and

bicortical bone, allows osteotomies and the bone height is suitable for an implant-based prosthetic restoration. The morbidity of lower leg donor site is moderate.

**O-2904****ORAL REHABILITATION AFTER JAW RECONSTRUCTION USING AN OSTEOCUTANEOUS FIBULA FREE FLAP AND ENDOSSEOUS IMPLANTS**

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**Introduction:** Ablative oncologic surgery of the head and neck often requires bone reconstruction of maxilla or mandible. Modern surgical procedures using free flaps have permitted surgeons to obtain acceptable results in restoring bony and soft tissue defects. The fibula free flap is one of the preferable free flaps due to the considerable bone length and the possibility for a two team approach. The aim of this study was to evaluate the survival and success rate of the dental implants placed in the reconstructed fibula flap. Additionally the success rate of the fibula free flap and the oral rehabilitation is reported.

**Material and methods:** In between 01.01.2000 and 31.12.2011 all patients who underwent ablative tumour surgery and jaw reconstruction by means of an osteocutaneous fibula free flap were included in this study. To enhance the oral rehabilitation including functional as well as aesthetic results, all these patients were treated subsequently with dental implants (Straumann®, Xive® and BEGO®). In the follow-up examination clinical and radiological findings of the implants were evaluated. Complications including mucositis, periimplantitis and explantation were recorded. The functional and aesthetic outcome of speech intelligibility, deglutition, mandibular contour and cosmetic were documented by using a standardized questionnaire.

**Results:** The total of 34 patients (11 female, 23 male; mean age 53.47 years) were included in this study. Most of the patients (23) were diagnosed with Squamous cell carcinoma. The cumulative survival rate (Kaplan-Meier) of the inserted dental implants in the fibular bone (n=134) over 11 years resulted in 86.2%. The clinical examination showed mucositis in 6 and periimplantitis in 7 dental implants. The success rate of the 34 transplanted fibula flaps (observation time range from 1 - 11 years) is 97%. Functional and aesthetic results are mostly good to acceptable.

**Summary:** The application of endosseous implants after vascularized free bone flaps has developed increased possibilities of jaw reconstruction in patients with oral cancer. Among the different flaps used for jaw reconstruction, the fibula flap has many advantages and can be considered as standard therapy.

This study was supported by the organization for Cancer

Research in Giessen (registered society)

**O-2905****EVALUATION OF MANDIBULAR MOVEMENTS AND GAIT ANALYSIS AFTER FREE FIBULA FLAP FOR RECONSTRUCTION IN HEAD AND NECK DEFECTS.**

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**Objectives:** The fibula free flap has been widely used for reconstruction of segmental long bone and head and neck defects. The low rate of severe complications of the donor site make the free fibula flap the first choice in reconstructive surgery of head and neck. The reconstruction of the jaws with fibula free flap must satisfy both aesthetic and functional criteria. Despite its wide use in reconstructive surgery, the recipient-site functional restoration has not been studied in detail. The purpose of this study was to investigate functional deficits after fibular flap harvest of the donor site and the restoration of mandibular movements.

**Material and methods:** 9 patients undergoing free fibular flap surgery for mandible or maxilla reconstruction (3 maxilla and 6 mandible) were included in this study. An optoelectronic three-dimensional motion analyzer (SMART system, E-motion) was used to evaluate gait and free mandibular border movements.

Donor site functional defects were evaluated through analysis of alterations of Centre of Mass (CoM), velocity and step length during a normal walk and on stairs. The results were compared with a healthy control subject with similar anthropometric data.

Data of free mandibular border movement analysis were compared to those collected in a group of healthy subjects.

**Results:** the analysis of velocity and step length did not show significant differences between patients and control subjects ( $p > 0.05$ ). The analysis of the Centre of Mass data showed only patients with a significant CoM's shift toward the side of fibula flap harvest.

Analysis of jaw movements showed excellent functional results and preservation of all border movements.

**Summary:** The functional and aesthetic result was excellent in all 9 patients. The biological cost of free fibula flap harvest is acceptable for a good restoration of the oral function. A careful design and the preservation of important anatomic structures through a minimally invasive surgical approach allowed improvement of the quality of life and a reduction in the time of convalescence for our patients.

**O-2906****MAGNETIC RESONANCE ANGIOGRAPHY FOR PREOPERATIVE ASSESSMENT OF OSTEOFASCIOCUTANEOUS FIBULAR FLAP**

*Alena Kulyapina<sup>1,\*</sup>, Santiago Ochandiano Caycoia<sup>1</sup>, Manel Coll Anglada<sup>1</sup>, Veronica Pérez García<sup>1</sup>, Julio Acero Sanz<sup>1</sup>, Carlos Navarro Vila<sup>1</sup>*  
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**Introduction** In harvesting free fibula composite flaps, preoperative knowledge of the lower limb vascular anatomy is essential to prevent ischemic complications or flap failure. Magnetic resonance angiography (MRA) accomplishes all the goals anticipated with conventional angiography and gives important data concerning the fasciocutaneous perforators. It provides images for the operating surgeon demonstrating detailed perforator anatomy in an easily accessible form.

**Material and methods** We present analysis of 17 cases of patients being candidates for mandibular reconstruction with osteocutaneous fibular flap. The average age was 63 (range from 30 to 83). The diagnosis were: 2 salivary ductal carcinomas, 11 squamous cell carcinomas of the oral cavity, one sarcomatoid carcinoma of jaw bone, 2 osteoradionecrosis of jaw bone, one ameloblastoma. All the patients underwent preoperative MRA as part of surgical planning for fibula free flap tissue transfer for head and neck reconstruction. We evaluated the final surgical planning for head and neck reconstruction (flap choice). The MRA data about number of perforators was reviewed and compared to intraoperative findings. We also evaluated the survival rate of the flaps and ischemic complications in donor site.

**Results:** Fibular flap was discarded in one of the cases after MRA study due to extensive obstructive disease of peripheral arteries of lower limbs. All perforators identified on MRA could be exposed in the proximal half of the lower leg and most had a septocutaneous course. The microanastomosis were performed successfully in all cases during surgery. We observed skin flap survival in 14 of 16 cases of mandibular reconstruction. Fibular flap necrosis was observed in two of sixteen cases of mandibular reconstruction in early postoperative period due to venous thrombosis. The donor site morbidity was low. Only one patient suffered severe infection of the donor site (left lower limb) in association with immunodepression (HIV positive) which resulted in amputation, sepsis and fatal outcome

**Discussion:** MRA study is useful for the choice of flap for reconstruction and contributes to its major safety. Its main limitation is the availability of the MRI facilities.

#### O-2907

### FACTORS INFLUENCING MANDIBLE RECONSTRUCTION AND REHABILITATION BY MEANS OF FIBULA FREE FLAP.

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**Purpose:** To evaluate our experience in mandible reconstruction and functional restoration of the fibular flap, after wide resections for oral cavity malignancy.

**Methods:** Since 2002 we performed 176 head and neck microvascular reconstructions. We used the free fibular flap 55 times and in 52 cases we reconstructed the mandible. During the last six-years, 12 cases were selected for the functional rehabilitation of the jaws. All of these 12

cases were treated only with implants overcoming the fibular height deficiency by orthopaedic prosthodontic structures. The fibular/mandibular height discrepancy and maxillary/mandibular relationships were recorded. The evaluation criteria included x-rays and clinical measurement of bone and gingival perimplant level, the quality of oral feeding recovery, the need of speech therapy and for how long, the intelligibility of the speech, the morphologic feature.

**Results:** All prosthetic rehabilitations were obtained by screw retained fixed prosthesis. The average age was 57; the male/female ratio was 5/7. The average number of implants placed into the fibula was 3 and 5 in the new mandible. The maximum observation follow-up period after loading was 62 months. There were no reports of surgical complications. No implant loss was recorded, the mean peri-implant bone loss was 1,8 mm, the oral feed and speech recovery, measured with the close collaboration of ENT colleagues and speech therapists, was satisfactory.

**Conclusion:** The fibular osteocutaneous free flap in our hands is the workhorse reconstructive flap in oral malignancy involving the mandible. We use it as a "single strut flap", in order to preserve the whole length of the pedicle. Orthopaedic dental prosthesis, anchored on implants, is a good solution to overcome the fibular height deficiency, even in presence of good conditions of the residual dentition in the healthy portion of the reconstructed mandible.

It is of fundamental importance to develop a correct alignment of both the maxillary/mandibular relations and the implant insertion and load, based on biomechanical considerations and on a proper control of the occlusion. The surgical and prosthetic keynotes of this procedure are reviewed.

#### O-2908

### ASSESSMENT OF DYNAMIC BALANCE AND ANKLE INSTABILITY IN PATIENTS FOLLOWING FIBULA FREE FLAP HARVEST USING THE STAR EXCURSION TEST

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**Introduction:** The fibula free flap is frequently used in Head and Neck surgery for mandibular and maxillary reconstruction. The reported morbidities of the donor site include chronic pain, gait abnormality, ankle instability and limited range of movement of the ankle.

Ankle instability is defined as an abnormal tendency of a joint to subluxate or dislocate with normal activity and stresses. The fibula is a dynamic component of the lower limb and accounts for 10-16% of total load bearing and load transfer during gait. It depends on the integrity of the interosseous membrane which tethers the tibia and fibula together and hence allows load transfer from ankle to knee joint. Loss of the interosseous membrane during harvest of the fibula flap results in altered joint contact pressures and potentially instability at ankle and foot. Overall balance is maintained by strategies at hip, knee and ankle and when disturbed the postural feedback is not executed in a coordinated fashion

The STAR Excursion Balance Test is a simple, quick clinical test to evaluate ankle instability which is depend-

ent on various factors that can be affected by fibula flap harvest. This test assesses ankle movement, strength, proprioception and neuromuscular control.

**Aims:** The aim of this study is to evaluate the STAR Excursion balance test as a tool to determine function in patients post fibula flap harvest.

**Methods and Results:** The STAR test is described and illustrated. Twelve patients post fibula flap harvest were assessed using the STAR Balance test. All patients had undergone a major Head and Neck reconstructive procedure using a fibula free flap. Comparison was made between the operated and non operated leg and the outcomes fully described.

**Conclusion:** The STAR test appears to be a promising and easy to perform clinical test to evaluate patients post fibula flap harvest. It helps to identify patients whom following flap harvest may benefit from intensive physiotherapy to optimise function.

#### O-2909

### FULLY 3D DIGITALLY PLANNED RECONSTRUCTION OF CRANIOFACIAL DEFECTS WITH FREE VASCULARISED FIBULA AND DENTAL IMPLANTS FOR IMMEDIATE PROSTHETIC LOADING

Max Witjes<sup>1,\*</sup>, Gerry Raghoobar<sup>1</sup>, Jan Roodenburg<sup>1</sup>, Harry Reintsema<sup>1</sup>, Lars Lahoda<sup>1</sup>, Rutger Schepers<sup>1</sup>  
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**Introduction:** Prefabrication of fibulas in cases of secondary reconstruction allows planning of implant insertion in the fibula. The first 5 cases are described of fully 3D digitally planned implant placement and immediate prosthetic reconstruction of craniofacial defects using free vascularised fibulas in a two-step surgical approach.

**Methods:** Five patients with mandibular (3) and maxillary (2) defects underwent secondary reconstruction with prefabricated fibulas. Reconstruction was digitally planned from CT-angio and CBCT scans. The dentition and new dental prostheses were imported into the software. This allowed virtual backward planning of the placement of dental implants and of the fibula graft. Drilling guides were printed from the software to fit on the actual fibula.

**First operation:** the drilling guide was used to insert the dental implants in the fibula bone. The position of the dental implants was digitized using an optical scanner. A skin graft was placed which serves as soft tissue around the implants. The optical data were imported in the 3D planning software. Superstructures and dental bridges were 3D designed and milled. A cutting guide for the fibula which fitted on the dental implants was 3D printed. To transfer the digital planning during the real surgical procedure, templates of the planned reconstructed were printed as well from the 3D data.

**Second operation (after 6 weeks):** The fibula was approached and osteotomies performed according to the cutting guide with intact vascularisation. The superstructure with denture was fixed on the implants after which the fibula was harvested and positioned in the defect followed by the vascular anastomosis. After reconstruction, the actual placement of implants and fibula graft was compared to the virtual planning by pre and post op CBCT. It shows that accuracy of implant and fibula placement was within 0.3 mm of the virtual planning.

**Conclusion:** It was possible to digitally plan backward from the desired occlusion of the dental prosthesis/bridge to the necessary implant position in the fibula. This new and exciting approach yields an optimal placement of the fibula bone in the jaw and immediate loading of the implant supported denture inserted in fibula bone.

#### O-2910

### SPECIAL ASPECTS REGARDING FUNCTIONAL REHABILITATION FOLLOWING MANDIBLE RECONSTRUCTION USING OSSEUS AND OSTEOCUTANEOUS FIBULA TRANSPLANT

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Mandibular reconstruction using various variations of microvascular fibula transplants has drawn special interest and currently represents a standard surgical method.

Multimodal oncologic therapies lead to a crucial improvement of survival and maintenance of general aspects of quality of life.

Oncologic patients are now aware of their masticatory insufficiency and require masticatory rehabilitation.

In this presentation we show special anatomic variations in harvesting techniques and remodelling methods as well as functional considerations to reconstruct the mandible and enable endossal implant insertion for oral rehabilitation in view of anatomic and biomechanic features of the fibular bone.

Refinements in techniques of soft tissue management following reconstruction with osseous and osteocutaneous fibula graft are described and presented in case series.

## Session 30. SKULL BASE SURGERY

### O-3001

#### EVOLUTION OF THE INNER EAR AND ITS INFLUENCE ON THE CRANIAL BASE

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**Introduction:** The human labyrinth appeared 1.9 million years ago in the hominid species, *Homo erectus*. This derived system, built on a reorganizing cranial base, packaged the basic mechanism for unconscious perception and movement.

**Methods:** This paper explores the labyrinth's development allowing function, amplification, and structure to be conserved, for nearly 2 million years.

**Results/Discussion:** Sensory information controls the vestibular system's orthogonal semicircular canals' (SCC) angular rotation of balance and navigation; their planes, anterior (ASC), posterior (PSC), and lateral (LSC), are designed for optimum perceptible response; phylogenetically, SCC's sensitivity increased proportionally to the arc size (mm) of each SCC's radius: ASC, PSC, LSC, respectively, Pan: 2.7, 2.8, 2.5; Gorilla: 2.9, 3.0, 3.0; Australopithecus: 2.4, 2.6, 2.2; Paranthropus: 2.6, 2.7, 2.5; *Homo erectus*: 3.2, 3.2, 2.1; *Homo sapiens*: 3.2, 3.2, 2.3. This functional constraint gave *Homo erectus* enhanced ability to detect movement.

The labyrinth's cochlea, with specialized hair cells (HC), evolved independently for maximum frequency range and amplification of sound responses, its 350Mya basilar papilla auditory receptor the basis of parallel divergence for organ size/sound amplification (Hz) in 4 lineages: turtles, 0.5mm/0.8Hz; lizards, 2mm/8Hz; birds, 11mm/12Hz; mammals, 104mm/ >100Hz. Only in mammals is the cochlea coiled, varying 1.5-4.5 turns, its length proportional to audible octave ranges; primates have the highest cochlear volume, p

*Homo erectus*' petrous bone encased labyrinth exhibited a derived and distinct petrous-tympanic angular relationship, foramen rotundum to LSC, exemplifying phylogenetic change (degrees): mammals, 5-30; great apes, 44-46; *Homo erectus*/humans, 90 (orthogonal). The derived petrous bone's new structural constraints influenced significant morphological changes in the cranial base (CB); its differential growth may have played a part in producing CB species specific synchondroses asymmetries.

**Conclusion:** The human labyrinth appeared 1.9 million years ago in the *Homo erectus* species, enabling the most significant migration to shape human genetic diversity; these derived functional, amplification, and structural constraints are a legacy to our *Homo sapiens* species.

### O-3002

#### SURGICAL TREATMENT IN EXTENSIVE SKULL BASE TUMOURS

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**Introduction:** The complexity of the surgical treatment of skull base tumours derives from the proximity to vital elements, the profound area that the surgeon has to operate in. Most of the times these operations are considered borderline, the surgical team is consisted of an ENT surgeon, maxillo-facial surgeon, neurosurgeon, ophthalmologist, plastic surgeon.

**Material and method:** We analyzed a group of 7 patients that were operated in our clinic between 2010-2011, diagnosed with skull base tumours, divided as : one infra temporal fossa tumour (a recurrent medial cerebral fossa meningioma), 2 nasal and ethmoid carcinomas with extension in the pterygoid fossa and anterior cerebral fossa, 3 orbital carcinomas with extension to the medial cerebral fossa, and one internal ear carcinoma extending to the petros and cavernous sinuses. The patients were predominantly males (5), their ages ranging from 52 to 75 years.

Their postoperative evolution was satisfactory.

**Results:** When dealing with tumours that extend to the base of the skull, tumour resection can be very difficult due to the proximity of very important elements and the profoundness of the surgical field. The preoperative preparation must be rigorous requiring CT, MRI, PET scans. They often require a complex surgical team with neurosurgeon and plastic surgeon.

These tumours were all secondary tumours deriving from the orbit, internal ear, ethmoid sinus, infratemporal fossa.

The surgical approach varied in regard to the specific area involved, elements that were in close relation to the tumour, the histological pattern.

The resulting defect was covered with regional flaps : rotated, translated, advanced but also free flaps (latissimus dorsi).

**Conclusion:** When reconstructing the extensive skull base defects the pediculated scalp flaps that we used were very large, covering multiple regions, and often bending the rules of plastic surgery regarding the length/width ration, the middle line, but they prove to be viable in respect to the individual cases.

### O-3003

#### SINONASAL TUMOURS WITH ORBITAL INVOLVEMENT: THE COMBINED APPROACH

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Advanced sinonasal tumours often present with orbital involvement. Surgical treatment and radical excision are also possible, preserving the eye. Oncological safety and functional outcome of the preserved eye are the counterpart in orbital preservation surgery. Irrespective of the orbital invasion, tumour histology influences the progn-

sis. Surgical approaches to the orbit in sinonasal tumour are divided in anterior and posterolateral procedures. The combined transfacial and transcranial surgical approaches have been well described in the literature for craniofacial resection, when the anterior or medium skull base are involved. Multidisciplinary collaboration with microscopic and/or endoscopic control have improved surgical technique to extirpate tumours extended to dura, sphenopalatine area and pterygomaxillary fissure, infratemporal fossa, roof of nasopharynx and apex of orbit. We describe the multiphase combined surgical approach with maxillofacial, otolaryngology and neurosurgical collaboration in sinonasal tumour treatment.

#### O-3004

##### EXTERNAL APPROACHES TO THE NOSE AND PARANASAL SINUSES TUMOURS

*Maria Jose Nieto Fernandez-Pacheco<sup>1, \*</sup>, Jose Luis Cebrián<sup>1</sup>, Eduard Mirada<sup>1</sup>, Daniel García Molina<sup>1</sup>, Javier González<sup>1</sup>, Miguel Burgeño<sup>1</sup>*

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**Objectives:** To emphasize the importance of the craniofacial approaches in the treatment of paranasal sinuses tumours with cranial base extension and to describe the main complications of these approaches and their treatment.

**Materials and methods:** We performed a retrospective and descriptive analysis of twenty-two patients with extensive tumours of the nose and paranasal sinuses that were surgically treated at La Paz University Hospital (LPUH) over a ten year period ( January 2002 to January 2012). We classified them attending to age, sex, and type of tumour, surgical approach, recurrence and complications.

**Results:** A total of twenty-two patients with twenty-two tumours were surgically treated in the last ten years. The tumours were classified as follows: 6 squamous cell carcinoma, 8 adenocarcinoma, 4 adenoid-cystic carcinoma, one sarcoma and three meningioma. The main approaches used were extended lateral rhinotomy, coronal approach with frontal bone bar, subcranial extended approach, transfronto-nasal approach and trans-naso-maxillary approach.

**Conclusions:** Extensive tumours of the nose and paranasal sinuses with suspected intracranial extension require a combined transfacial and transcranial approach to achieve successful resection of the tumour.

#### O-3005

##### REGIONAL PEDICLED FLAP RECONSTRUCTION OF ANTERIOR AND ANTERO-LATERAL CRANIAL BASE DEFECTS WITH ORBITAL EXENTERATION

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**Introduction:** Multiple variants of orbital reconstruction following orbital exenteration are described. Menon et al described the use of temporalis muscle based on Deep Temporal artery via a bony fenestration in the lateral orbital wall, using the term 'Transorbital Temporal Muscle Flap' (TTMF).

**Aim:** To evaluate the results of various techniques used for reconstructing craniofacial resection with Orbital Exenteration (OE) carried out by the Skull Base Team in Sheffield between 2006-2012.

**Method:** Retrospective review of clinical case notes of all qualifying cases during the study period, identified from operation records. 20 cases identified, 1 excluded.

**Results:** 9 male / 10 female patients. Age range 37- 81yrs. Diagnoses treated were various with primary lesion resected ranging from 15-140mm with median of 60 mm.

Defects filled using:

- temporalis muscle / pericranium pedicled flaps - 13 ( 1 failure),
- pericranium / galeal pedicled flap – 1,
- pericranium / Rectus abdominus free flap – 4 (1 failure),
- pericranium / Latissimus dorsi free flap – 1.

Most commonly used reconstruction was TTMF (Temporalis muscle), augmented with pericranium to interpose a further barrier between cranial cavity and the environment.

This flap provided effective seal, protective bulk, and could extend, with modification, to up to 1 cm beyond the midline.

Leakage and infection, flap failure rates in this limited series favoured TTMF as choice of reconstruction.

**Conclusions:** In reconstruction of skull base and OE cases, all techniques used achieved success. The Temporalis flap was most used with least failures.

#### O-3006

##### NAVIGATION-ASSISTED TRANS-ORAL APPROACH USING LE FORT I OSTEOTOMY WITH MIDPALATAL SPLIT TO TREAT COMPRESSIVE PATHOLOGIES OF THE CRANIOVERTEBRAL JUNCTION.

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The Le Fort I level osteotomy is a procedure well known to oral and maxillofacial surgeons, who routinely use it to correct midfacial skeletal deformities and alter the dental occlusion. This osteotomy has also been used as a maxillotomy for access to more superiorly and posteriorly situated structures. The downfracture technique provides the surgeon with a safe approach that allows visualization of the maxillary sinuses, nasal cavity, nasopharynx, base of the skull and upper cervical spine. This approach can also be combined with a midline lip split, mandibulotomy and glosotomy to give access to retropharyngeal structures. By modifying the combined Le Fort I and transmandibular approach utilizing a midline split of the hard and soft palate, the access to the clivus and skull base can be improved considerably. Navigation assists by providing data regarding optimum approach and pathway especially in pediatric cases where developing structures are easily damaged. The clinical applications of transmaxillary approaches in the treatment of compressive pathologies of

the craniovertebral junction such as basilar invagination and tumours of the nasopharynx are presented and discussed.

**O-3007**

**TRANS-ORAL POSTERIOR MAXILLARY CRANIOFACIAL SURGERY TO PLACE A SPHENOPALATINE GANGLION (SPG) NEUROSTIMULATOR FOR TREATMENT OF CHRONIC CLUSTER HEADACHE (CCH): PATHWAY CH-1 STUDY SURGICAL EXPERIENCE.**

*Søren Hillerup<sup>1</sup>, Alain Wilmont<sup>2</sup>, Miguel Puche<sup>3</sup>, Philipp Pohlenz<sup>4</sup>, Oliver Müller<sup>5</sup>, Denys Fontaine<sup>6</sup>, Marco Blessmann<sup>4</sup>, Anthony Caparso<sup>7</sup>, Frank Papay<sup>8</sup>\**

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**Aim:** The pain and autonomic symptoms of cluster headache may result from activation of the trigeminal parasympathetic reflex, mediated through the SPG. We aimed to investigate the efficacy and surgical safety of SPG stimulation for the acute treatment of CCH.

**Methods:** In a multi-centre study subjects are implanted with a miniaturized neurostimulator using a minimally invasive trans-oral technique. The neurostimulator, which consists of an integral lead with 6 electrodes, a body and fixation plate is implanted such that the electrodes are placed in close proximity to the SPG. The body of the neurostimulator is placed on the lateral posterior maxilla and the fixation plate is used to anchor the neurostimulator on the superior lateral zygomaticomaxillary buttress. The procedure is performed under general anaesthesia and utilizes fluoroscopic or CT imaging.

**Results:** 43 subjects have undergone the implantation procedure for the ATITM Neurostimulator. In open label use, 81% of subjects have achieved pain relief in > 50% of acute headaches and/or have experienced a >50% reduction in headache frequency with SPG stimulation. Three subjects (7%) were explanted due to early lead migrations or misplacement of the neurostimulator and 4 subjects (9%) underwent a revision procedure due to lack of efficacy and incorrect electrode locations. In 1 subject (2%) the procedure was not completed due to anatomical limitations. Within the first 30 days post surgery, 20 subjects (47%) reported mild to moderate numbness in the second division of the trigeminal nerve. 62% of these events, in 12 subjects, resolved within 90 days of onset on average. 38% are currently un-resolved, in 8 subjects, with an average duration of 163 days. Advancements in surgical instruments and additional surgical experience yielded a 25% decrease in surgical time, a 23% decrease in number of adverse events and the rate of explants or revisions has decreased by 83% with these improvements. Additionally, no infections resulting in explant have occurred.

**Summary:** The initial experience using the minimal inva-

sive implantation procedure for the ATITM Neurostimulator has shown an acceptable safety profile that is comparable to standard trans-oral surgery. Advancements in surgical instruments and further surgical experience has had a positive impact in overall subject experiences.

**O-3008**

**TRANS-ORAL POSTERIOR MAXILLARY CRANIOFACIAL SURGERY TO PLACE A SPHENOPALATINE GANGLION (SPG) NEUROSTIMULATOR FOR TREATMENT OF CHRONIC CLUSTER HEADACHE (CCH): PATHWAY CH-1 STUDY - HAMBURG, GERMANY SURGICAL EXPERIENCE.**

*Marco Blessmann<sup>1</sup>\*, Alexander Assaf<sup>1</sup>, Jan Klatt<sup>1</sup>, Philipp Pohlenz<sup>1</sup>, Tim Jürgens<sup>2</sup>, Max Heiland<sup>1</sup>, Arne May<sup>2</sup>*

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**Aim:** A new trans-oral surgical approach to the SPG has gained importance due to a new neurostimulation therapy for the treatment of CCH, which is in clinical trials currently. In our centre, we have evaluated the morbidity of this approach for the treatment of CCH.

**Methods:** 8 subjects, 7 male and 1 female, with a mean age of 43 years of age, ranged 22 to 53 years of age with CCH were implanted with a miniaturized neurostimulator using a minimally invasive trans-oral technique in the dorsal mid facial region. All subjects were implanted under general anaesthesia with the use of intraoperative 3D CT imaging. Surgical follow-up examinations were performed to assess adverse events related to the surgical procedure for implanting the neurostimulator.

**Results:** None of the subjects experienced any post-surgical infections leading to removal of the neurostimulator. A significant number of subjects (7 of 8) experienced post-surgical numbness and swelling with average time to resolution of 74 days, range 37 to 198 days, and 53 days, range 3 to 220 days, respectively, all of which resolved. Two subjects experienced neurostimulation revision procedures, one due to misplacement of the Neurostimulator lead and one due to lack of efficacy. In these two subjects, numbness and swelling post re-operation are ongoing, range 26 to 63 days as well as ongoing pain and paraesthesia for 146 days. These sensory dysfunctions are limited to specific regions of the second division of the trigeminal nerve and are mild to moderate in severity. Additionally, of the 5 subjects that are currently in the open label period of the study all have responded to SPG stimulation. Four have achieved pain relief in > 50% of acute headaches and 3 have also experienced a >50% reduction in headache frequency with SPG stimulation.

**Conclusion:** The trans-oral surgical approach for implantation of the neurostimulator for SPG stimulation to treat CCH has surgical morbidity consistent with the morbidity reported for other trans-oral procedures. In the future, the possibility of performing this implantation under local anaesthesia is very promising and will add to the long term acceptance for patients suffering from cluster headache.

**O-3009****A CASE OF METALLIC FOREIGN BODY IN THE INFRATEMPORAL FOSSA**

*Orlando Cipriani<sup>1,\*</sup>, Flavia Maria Graziana Fatone<sup>1</sup>, Giulia Amodeo<sup>2</sup>, Stefano Righini<sup>3</sup>, Piero Papi<sup>1</sup>, Domenico Scopelliti<sup>1</sup>*

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A 30-year old patient came to our department in February 2012 for the removal of a metallic foreign body located in the right infratemporal fossa, at the base of the skull, a result of an incident during the Lybian Civil war. The patient presented with a limitation of the mandibular opening (34 mm) following a previous surgical attempt, performed in another department, to remove the metallic foreign body intraorally. The patient presented with a right maxillary sinusitis and painful symptoms at the entrance wound located in the right cheek region. Patient was submitted to surgery: a right pre-auricular pretragal incision elongated below over the border of the sternocleidomastoid muscle was performed and the great vessels of the neck were exposed. In particular, the internal carotid artery and the internal jugular vein were preserved and the metallic foreign body was located, situated laterally and lying over the internal carotid artery. After the removal of the metallic foreign body, the internal carotid artery reestablished its normal pulsatility.

In the post-operative period patient had no minor or major complications and at 1 month follow-up patient showed an improvement of the mouth opening and the disappearance of the painful symptoms.

**O-3010****VIRTUAL VERSUS FLEXIBLE NASOENDOSCOPY: AN ALTERNATIVE AIRWAY ASSESSMENT TOOL IN HEAD AND NECK SURGERY?**

*Natalie Tabares<sup>1,\*</sup>, Kavin Andi<sup>1</sup>, Richard Oakley<sup>1</sup>*  
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*Introduction:* The development of capsule endoscopy in gastroenterology has led to applications in other body regions including the head and neck. Recent advances in computer tomography scanning and software have increased the resolution of reconstruction to the level of detail required for head and neck surgery.

The aim of this study was to ascertain whether virtual nasoendoscopy could replace traditional techniques for preoperative airway assessment.

*Methods:* Patients requiring preoperative percutaneous endoscopic gastrostomy tube placement were identified and assessed using flexible nasoendoscopy.

Endoscopic findings relating to the post nasal space, tongue base, valleculae, epiglottis, aryepiglottic folds, arytenoids, true and false vocal cords, piriform fossae and subglottic region were recorded in the two groups.

The patients experience of the procedure was also recorded using a questionnaire after the procedure.

*Results:* The majority of patients found flexible nasoendoscopy uncomfortable and preferred not to undergo the investigation.

Virtual nasoendoscopy yielded an equivalent amount of information in comparison to flexible nasoendoscopy.

*Clinical Relevance:* Virtual nasoendoscopy is a safe tool for preoperative airway assessment. The enhanced anatomical information provided may in future provide the basis for augmented reality applications using endoscopes.



## Session 31. SURGERY OF THE ORAL CAVITY

### O-3101

#### APPLICATION OF MODERN HIGH-ENERGY LASERS IN PEDIATRIC DENTAL SURGERY

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**Introduction.** The present level of pediatric dentistry requires the use of high technology and minimally invasive surgical techniques. A new generation of dental lasers correspond these requirements.

**Purpose.** Improve the quality of dental care for children during surgery in the oral cavity through the use of modern laser technology.

**Materials and Methods.** 118 children from 4 to 17 years old were treated from September 2010 to January 2012. 80% of operations were conducted for the short frenulum of the tongue and upper lip, 20%-for the small vestibule of the mouth, nonmalignant tumours of the soft tissues of the mouth, retention and dystopia of the permanent teeth. In 71 patients (study group) the operation was carried out using a universal dental laser system "Opus Duo" (CO<sub>2</sub> laser with power of 1.5-3W). In 47 children (control group) the operation was carried out using traditional methods. The clinical research methods and psychological tests used to assess the effectiveness of treatment.

**Results.** Analysis of data from clinical research methods showed that in the study group using a laser during the operation required fewer anaesthetic, the duration of operation is 40-45% lower due to the lack of bleeding and the need for stitches. In the postoperative period in the study group of collateral oedema is practically not observed, pain was less pronounced and in 16% of the children created a need for analgesics. In the control group of postoperative oedema was observed in all patients and lasted up to four days and in 42% of the children created a need for analgesics. We also noted that the terms of epithelialization in the study group was less than two days and the aesthetic result of the surgery is much better. **Results** of psychological testing showed levels of anxiety, fear and stress in children during surgery with a laser.

**Conclusion.** Surgery using a laser reduces the level of negative emotional experiences in the child, reduces the time of surgery, blood loss, the amount of anaesthetic, minimize postoperative oedema and pain. Time of epithelialization reduced, scars are formed more subtle and inconspicuous.

### O-3102

#### THE APPLICATION OF ER:YAG AND CO<sub>2</sub> LASERS WHILE TREATMENT OF THE PATIENTS WITH PYOINFLAMMATORY DISEASES OF THE MAXILLOFACIAL AREA.

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**Introduction.** The treatment problem of patients with pyoinflammatory diseases of the maxillofacial area is one of the latest in dentistry. The application of surgical laser technology allows opening up new possibilities in optimizing the treatment.

**Aim.** Improving the efficiency of surgical treatment of the patients with pyoinflammatory diseases using the laser technology and methods of microbiological and immunological monitoring. Assessing the impact of the radiation of the erbium and carbon dioxide lasers on the immune protection mechanisms in the oral cavity.

**Materials and methods.** We have treated 60 patients with this pathology, among which 15 patients underwent conventional treatment, 25 patients were treated using the erbium laser and 20 with carbon dioxide laser. Dental laser systems OpusDuo Aqualite EC was used for the laser operations.

**Results.** Patients reported reduced pain reaction, reduction of postsurgical collateral oedema that provided a shorter healing period. Regeneration processes were quicker. Inflammation abated more rapidly. According to X-ray of the postsurgical area (in case of chronic odontogenic osteomyelitis) there was identified a much earlier formation of bone trabeculae than under the conventional treatment.

Upon application of carbon dioxide and erbium lasers for the treatment in the region of surgical area reduction of bacterial content with the representatives of virulent and resident flora was observed both immediately following the surgery and in 3d day of post-operative period that fundamentally distinguished laser technologies from the traditional surgical procedure. Bacterial content further continued to reduce authentically.

**Discussion.** Thus, laser radiation has a beneficial impact on the regeneration and resolution of the infection, accelerates the sanitation process of the postsurgical wound from microorganisms, its healing, reducing the risk of secondary infections and complications. The application of erbium and carbon dioxide lasers among the patients with pyoinflammatory diseases of the maxillofacial area favors to the normalization of the secretory, humoral and cellular protective mechanisms in the oral cavity.

### O-3103

#### OUR EXPERIENCE WITH PIEZOSURGERY

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Piezosurgery represents a well know system for bone cutting, based on ultrasonic microvibrations mainly used in oral surgery.

There are several advantages deriving from the adoption of these devices. Soft tissue protection represents of the main characteristic that are particularly useful in maxillofacial surgery.

In addition there is optimal visibility in the surgical field and blood loss is limited.

Dealing with maxillofacial peculiar issues it has to be underlined how noble structures such as nerves and artery are more easily preserved with the adoption of this device. Its original indications were oral and maxillofacial surgery, otorhinolaryngology, neurosurgery, ophthalmology, traumatology and orthopaedics. The main indications in oral surgery are sinus lift, bone graft harvesting, osteogenic distraction, ridge expansion, endodontic surgery, periodontal surgery, inferior alveolar nerve decompression, cyst removal, dental extraction and impacted tooth removal.

However, in our department, we operated on craniofacial paediatric malformations, orthognathic surgery, TMJ surgery and oncology.

What we observed is the shortening of the post-operative swelling and more comfort for the patients.

In conclusion, piezosurgery is a promising technical modality for different aspects of bone surgery with a rapidly increasing number of indications throughout the whole field of surgery.

We report our experience with the use of Piezosurgery.

#### **O-3104** **HAS PIEZOSURGERY BECOME INDISPENSABLE FROM NOW IN ORALMAXILLOFACIAL SURGERY ?**

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In the Maxillofacial Surgery Department of Maria Cecilia Hospital in Cotignola (Italy) we have chosen to use the piezosurgery device for almost all the operations.

The piezosurgery instrument uses a modulated ultrasonic frequency that permits highly precise and safe cutting of hard tissues. Nerves, vessels, and soft tissue are not injured by the micro vibrations, which are optimally adjusted to target only mineralized tissue.

The Piezosurgery device is intended for use in bone cutting, osteotomy, osteoplasty and drilling in a great variety of surgical procedures (General orthopaedic trauma, Hand and foot; Oral/Maxillofacial; Neurosurgical; Otolaryngology; Plastic/Reconstructive; Spine surgery)

The Piezosurgery cutting action characteristics are precision, selective cut, blood free surgical site, minimum surgical stress and favourable osseous healing.

At last we can have a safe technique in our hand that we usually use everyday in oral surgery, orthognathic surgery, orbital surgery, preprosthetic surgery, oncologic surgery .

We suggest that piezosurgery is a real revolution in oral-maxillofacial surgery

#### **O-3105** **PEDERSON SCALE IS RELIABLE PREDICTOR FOR DIFFICULT EXTRACTION OF LOWER THIRD MOLARS REGARDING THE DURATION OF OPERATION**

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**Introduction:** The extraction of impacted lower third molar is frequent in oral surgery practice. Various methods have been proposed for the preoperative evaluation of difficult extractions and potential postoperative complications.

**Objectives:** The purpose of this study was to reconsider the reliability of Pederson scale in surgical extraction of impacted lower third molars and to assess risk factors related to the difficulties during and after the surgical intervention.

**Study Design:** A prospective study undertaken by an oral surgeon and a maxillofacial surgeon who removed 112 lower third molars under local anaesthesia over the 6-months period.

**Material and methods:** Data relating to patient, dental and surgical variables were collected for six months as the patients were treated. Preoperatively difficulty was predicted from the panoramic radiographs, using the Pederson scale. Postoperatively, difficulty was assessed using pain visual analogue scale (VAS), operation time and complications (bleeding, infection, trismus, dry socket, surgical wound dehiscence). Multivariate analysis was used to compare a range of variables representing patient, dental and surgical factors.

**Results:** Significant correlation was found between duration of operation and Pederson scale (p<0.001). Multivariate logistic regression model showed that increasing age (odds ratio, OR= 1.03, p=0.07), deep occlusal crown position (odds ratio, OR= 1.04, p=0.03), spatial relationship (odds ratio, OR= 1.27, p=0.002), were associated with an increased risk for difficult extraction.

**Conclusion:** The Pederson scale is a reliable tool to predict the potential difficulties during lower third molar extraction in regard to duration of operation.

**Key words:** Pederson scale, third molar extraction, post-operative complications

#### **O-3106** **INTRAOPERATIVE EXAMINATION OF THE "HIGH-RISK SIGN" DARKENING OF THE ROOT CORRELATED TO MANDIBULAR THIRD MOLAR SURGERY.**

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**Objective.** Darkening of third molar roots on panoramic radiographs frequently means direct anatomical relationship between the inferior alveolar neurovascular bundle and third molars' roots and may indicate inferior alveolar nerve (IAN) exposure or injury. The aim of the study was to determine the intra-alveolar aetiology of darkening of the third molar root sign.

**Study design.** Mandibular third molar surgical removals

were included in that prospective study representing dark band on third molars roots on preoperative radiographs. Exposures of the IAN, third molar's root morphology (e.g. groove or hook formation) and the integrity of the mandibular canal or lingual cortical wall was observed. Differences between single (increased radiolucency alone) and multiple darkening cases (increased radiolucency with accompanying "high-risk" signs, like narrowing or deflection of the canal, interruption of the superior cortical line) and between IAN exposure or groove formation were performed by bivariate analysis.

**Results.** In 38 cases of the 83 surgical third molar removals (45.8%) the IAN was visible during operation. Groove or hook formation of the root was present in 37.4% of the cases. In 26.5% of the cases lingual cortical thickening while in further 9.6% specious root conformation explained the formation of darkening on panoramic images. IAN exposure ( $P < 0.001$ ) and groove formation ( $P$

**Conclusion.** According to our findings darkening of third molar roots is rather the result of fenestration of the IAC wall or groove formation of the root, than lingual cortical thickening; moreover groove formation or nerve exposure is much more frequent in multiple darkening cases.

#### O-3107

### HAS THE INTRODUCTION OF UK CLINICAL GUIDELINES CHANGED THE UPTAKE OF THIRD MOLAR REMOVAL? A NATIONAL 10 YEAR AUDIT

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**Background:** Third molar removal is one of the most common surgical procedures in the UK. In the past the prophylactic removal of third molars was common practice

however due to the associated risks guidelines were introduced by the national clinical guidance body NICE in 2000. They recommended that the removal of pathology-free third molars should no longer be performed. This audit examines whether implementation of guidance has changed uptake on a national level.

**Aims and objectives:** To audit the effect of the introduction of national guidelines on the number of cases of third molar removal in England and Wales.

**Method:** A retrospective study was undertaken using national procedure code databases for the period 1999 to 2010. Extraction of 3rd molars was identified using the OPCS4 code F091. Change in completion of 3rd molar extraction following guideline introduction was assessed using chi square and trend change over time was assessed using linear regression analysis.

**Results:** 331,788 3rd molar extractions were undertaken over the study period. A statistically significant gender bias was noted with females more likely to undergo extraction than males ( $p < 0.0001$ ). 15-59 year olds were more likely to undergo surgery than other age groups ( $p < 0.05$ ). Chi square testing showed a statistical change in rate ( $p < 0.05$ ) followed by a gradually increasing percentage population uptake ( $p < 0.004$ ). The trend pattern for England and Wales separately were similar (Spearman's Rho 0.77  $p < 0.01$ ).

**Conclusion:** The implementation of national guidelines has statistically changed the percentage population uptake of 3rd molar extraction in England and Wales. There was a marked effect on operative numbers in the short term followed by a significant increase - this potentially suggests the Hawthorne effect with clinicians returning to previous practices. Further studies are required to evaluate these findings.

#### O-3108

### ODONTOGENIC INFECTION - IS THERE ANY CLINICAL VALUE IN ROUTINELY SENDING OFF PUS SWABS FOLLOWING I&D OF ABSCESSES?

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**Introduction:** Current practice is to send off a pus swab for culture and sensitivity following an incision and drainage of an odontogenic abscess. Does this offer any clinical benefit? A large retrospective study attempts to answer that question.

**Methods:** A retrospective analysis of all patients admitted to Northwick Park Hospital for dental infections over a six-year period was carried out. Of those admitted, 222 required an incision and drainage and had a pus swab sent for MC&S. The Electronic Patient Record was used to determine the results of culture and sensitivities, if any.

**Results:** Of the 222 patients with a swab processed by the microbiology department, only 55 (24.8%) have grown any specific bacteria. The vast majority gave rise to 'no growth' or 'oral flora'. Of those bacterial growths, the commonest cultured were staphylococci (9%), streptococci (8%) and anaerobes (5%).

Approximately 90% of those with growth had antibiotic sensitivities available. All identified were antibiotics routinely used in treatment of odontogenic infection including amoxicillin, penicillin V and metronidazole. Patient management was not altered by any of these results.

**Discussion:** Only a quarter of swabs gave rise to identifiable bacteria, and these were entirely in keeping with the literature. Antibiotic sensitivities were predictable: broad-spectrum penicillins and metronidazole are still extremely effective as first-line drugs, with resistance seen only for those antibiotics rarely prescribed initially (clarithromycin, tetracyclines). Investigations are requested to aid diagnosis, and to effect a change in patient care. This was not the case here. There are additional cost implications, with swabs costing upwards of £30 each to process. Given our findings, we argue that it is hard to justify sending off pus swabs routinely for dental infections in the otherwise fit well patient.

#### O-3109

### DIFFERENT CLINICAL PRESENTATIONS OF MUCORMYCOSIS IN ORAL AND MAXILLOFACIAL REGIONS

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**Background :** Mucormycosis, is an aggressive, rare and

opportunistic fungal infection usually encountered in patients with immune compromised condition. Nevertheless the literature well documented the existence of mucormycosis in immunocompetent patients. From introduction of mucormycosis by Paltauf in 1885 till now, it is frequently fatal in immunocompromised patients and also known to produce significant problems in an immunocompetent individual. The clinical presentation of mucormycosis in oral and maxillofacial regions and the necessity for the condition to be considered in a differential diagnosis make it an important point for all clinicians who works in this field.

**Objective :** The aim of the this article is to present outcomes of different clinical signs and symptoms and its management with review of the literature .

**Methods and Materials :** This clinical study included 4 patients with Mucormycosis in orofacial regions. 2 cases occurred in young healthy patients with unusual presentations., one primary cutaneous in the nasolabial fold area and other presented in the lower jaw mimicking malignancy. 2 cases occurred in immunocompromised patients.

**Findings:** Unusual clinical manifestations of 2 cases of mucormycosis in immunocompetent host were presented. A17 year –old boy with. primary cutaneous mucormycosis in nasolabial fold area without invasion to the bone and resistant to treatment which was managed successfully with radical surgery and long term medication.. The other presented in the lower jaw mimicking malignancy in 45 year- old man . 2 cases occurred in diabetic patients with necrosis of the palate, invasion to the sinus and orbital involvement with functional nerve impairment. Both cases had FESS before the definitive diagnosis of mucormycosis.

**Conclusion:** Radical surgery accompanied by anti fungal medication was the corner stone of treatment of mucormycosis . and may be successful in healthy patients but it is still difficult with high morbidity and mortality in immunocompromised patients.

#### **O-3110** **BLINDNESS IN LESS THAN 24 HOURS FROM ORBITAL CELLULITIS IN AN IMMUNOCOMPROMISED PATIENT**

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This case report describes the case of a 34 year old immunocompromised African-Caribbean female patient with orbital cellulitis and underlines the importance of an early diagnosis and treatment to avoid severe complications often present in this disease. Orbital cellulitis is an acute infection and can lead to potentially serious complications from blindness to cavernous sinus thrombosis. It is often caused by bacteria (*Haemophilus Influenzae*, *Staphylococcus Aureus* and etc) from a sinus infection or eye injury for example. The following patient was admitted in Northampton General Hospital with orbital swelling of the left eye caused by a simple scratch. The patient underwent an ultrasound, CT, MRI scan and serum exams which demonstrated elevation of ESR, CRP and WCC with massive oedema noted in the orbital tissues. Almost overnight since admission, the orbital cellulitis progressed causing severe exophthalmos in the left eye and blindness. It also gradually spread to the right eye including down the

left neck. After nine days of intravenous antibiotics, the oedema resolved but the blindness remained. The aim of the case report is to highlight the need for an early warning detection tool for immunocompromised patients with orbital cellulitis.

#### **O-3111** **FLUORESCIN FLUORESCENCE IMAGING AS A GUIDE FOR MAXILLECTOMY AND IMMEDIATE ILIAC FREE FLAP IN A CASE WITH CHRONIC MAXILLARY SINUSITIS RESISTANT TO CALDWELL-LUC OPERATIONS**

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<sup>1</sup>*Department of Oral, Craniomaxillofacial and Facial Plastic Surgery, Faculty of Medicine, University Hospital of Leipzig, Germany*

**Purpose:** During Caldwell-Luc operation, inferior meatal antrostomy is performed to promote sinus drainage, and almost all maxillary sinus mucosa is removed. Pain, chronic relapsing inflammation and loss of volume are typical sequelae after this intervention. However, not all sinusitis heals after Caldwell-Luc operation, partial maxillectomy and immediate iliac free flap can be a therapeutic option.

**Patient and methods:** A 64-year-old female Caucasian patient underwent several unilateral antral surgeries, but the treatments were unsuccessful. Indocyanine green fluorescence imaging was used to detect low-blood-perfusion areas within the sinus bony walls. All affected bone and granulation tissue was removed via partial maxillectomy. After the resection, immediate iliac free flap was performed to reconstruct the maxillary defect.

**Results:** Postoperative computed tomography and scintigraphic imaging revealed vitality of the flap. After 10-month follow-up, there was no sign of sinusitis: inflammation and chronic pain.

**Conclusions:** The results of this case demonstrate that maxillectomy and immediate iliac free flap can be a treatment option for patients with chronic sinusitis. Further well-designed studies are required to confirm the advantage of this technique.

#### **O-3112** **HOW TO USE HYPERBARIC OXYGEN THERAPY IN MAXILLOFACIAL SURGERY?**

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Hyperbaric oxygen therapy (HBOT) is a method of treatment based on inhalation of pure oxygen in a hyperbaric environment, i.e., at a higher ambient pressure than atmospheric pressure measured at sea level.

Inhalation of pure O<sub>2</sub> in a hyperbaric environment leads to an increase of alveolar O<sub>2</sub> partial pressures, resulting in a greater diffusion of O<sub>2</sub> molecules to the pulmonary capillary blood. Erythrocyte haemoglobin quickly reaches saturation, so O<sub>2</sub> starts being transported dissolved in plasma in progressively higher amounts, reaching territo-

ries inaccessible to red blood cells, providing oxygenation to all tissues in whole body. Hyperbaric O<sub>2</sub> has anti-ischemic, anti-oedematous, pro-healing and anti-infectious effect.

Maxillofacial surgery may benefit from these properties in the treatment of necrotizing soft tissue infections, refractory osteomyelitis, bisphosphonates-associated osteonecrosis, osteoradionecrosis, delays in wound healing (eg. compromised grafts and flaps) and dental implant rehabilitation in irradiated cancer patients.

HBOT sessions are held inside hyperbaric chambers in specialized centres. There are few contraindications and rare side effects, that's why HBOT is a safe bet and should be increasingly used in our clinical practice.

The purpose of the present presentation is to clarify the action mechanisms of hyperbaric oxygen, its effects on tissues, therapeutic methodology, and its current applications in the field of Maxillofacial Surgery.

### O-3113

#### **SURGICAL SITE INFECTION ACCORDING TO OPERATION TIME IN MAJOR MAXILLOFACIAL SURGERY: A COHORT STUDY**

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The surgical site infection (SSI) continues to generate high morbidity and mortality among our patients, despite advances in infection control, infection treatment and surgical techniques. The aim of this study was to determine if there is a risk association between operation time and surgical site infection in major Maxillofacial surgery such as orthognathic surgery, mandibular reconstruction surgery and resection of maxillary or mandibular cysts and tumours. A retrospective cohort observational study was made in 522 ASA I patients(ASA physical status classification system ), who underwent major Maxillofacial surgery between 1997 and 2010 at the San Borja Arriarán Hospital . The variables measured were: gender, age, surgical time, SSI and T time (Amount of time established to set the risk of SSI associated with the 75 percentile of surgical procedure extension). Statistical analysis was performed using chi-square test, Student t tests and linear regression, with 95% CI. 522 patients were analysed and 36 of them (6.9%) had SSI. When comparing both groups (with and without SSI), no significant differences by gender (p = 0.319) and age (p =0.238) were found, but when the operation time (p = 0.046) and T time (p = 0.012) were analysed, a significant difference was found. When this last two variables were statistically studied an Odd Ratio =1,003 (95% CI = 1000-1006) was established. In conclusion, there is a risk association between operation time and surgical site infection in major Maxillofacial surgery performed in clean-contaminated site; however, this association is not clinically significant.

## Session 32. MICROSURGICAL RECONSTRUCTION IN HEAD AND NECK III

### O-3201

#### MICROVASCULAR RECONSTRUCTION OF THE MAXILLA AND MIDFACE - OUR EXPERIENCE WITH 53 PATIENTS

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**Background:** Large defects of the upper jaw and midface present functional and aesthetic problem for the patient and rehabilitative challenge for the physician. Patients with such defects were for centuries rehabilitated with prostheses. Microvascular tissue transfer brought new possibilities to the rehabilitation of these patients.

**Patients & methods:** Database of the free flap reconstructions of the Clinical Department of Maxillofacial and Oral Surgery, University Clinical Centre Ljubljana, Slovenia, was searched for patients with microvascular reconstruction of the midface and upper jaw.

**Results:** From 8/2002, when the first such reconstruction was identified until 4/2012, we found 53 reconstructions, representing 19% (53/281) of all free flap reconstructions done during that period. Radial forearm 23/53 (43%), latissimus dorsi/scapula 17/53 (32%), fibula 6/53 (11%), anterolateral thigh 4/53 (8%) and iliac crest 3/53 (6%) were the used donor sites. In 31/53 (58%) flaps the bone was transferred, and in 22/53 (42%) patients only soft tissues were used. 39/53 (73%) reconstructions were done immediately, and 14/53 (27%) secondarily. One flap was lost. In another patient reconstruction was not completed because of intraoperative circulatory instability and no reflow phenomenon. Additional operations were performed due to the neck hematoma in two patients and hematoma on the donor site in one patient. Three revisions were needed because of the venous congestion of the flap, and one because of the arterial insufficiency. All revisions were successful. In one agitated patient, the donor site radius had fractured immediately after operation, before the arm was immobilized. There were no other major complications. In patients with muscle used for palatal closure, the debulking of the muscle was needed. Patients are able to speak intelligibly to non-members of the family.

6/31 patients with bone reconstruction have implants for dental rehabilitation. Aesthetically they are all, except for a patient with midline midface defect (nose, eye, zygoma, class VI defect, Brown 2010 classification), acceptable for their environment and have benefited from the reconstruction. In the cases of secondary reconstruction their aesthetics was further improved. The patient with unsuccessful reconstruction was supplied with bone implants to anchor facial epithesis.

### O-3202

#### MAXILLARY RECONSTRUCTION AFTER ONCOLOGIC RESECTION: INDICATION FOR BONE CONTAINING FREE FLAPS

*Massimiliano Loporati<sup>1,\*</sup>, Bernardo Bianchi<sup>1</sup>, Silvano Ferrari<sup>1</sup>, Andrea Ferri<sup>1</sup>, Chiara Copelli<sup>1</sup>, Pietro Boni<sup>1</sup>, Enrico Sesenna<sup>1</sup>*

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Reconstruction of complex midfacial defects can be approached with different surgical techniques.

The goal of maxillary reconstruction is both aesthetic and functional.

An ideal maxillary reconstruction should achieve an effective separation between the floor of the nose and the oral cavity and an adequate support of the soft tissues, in particular the floor of the orbit, the upper lip and the nasal tip.

Another important aspect of maxillary reconstruction is represented by the restoration of the oral lining and the prosthetic rehabilitation in order to achieve a satisfactory function in terms of feedings.

Owing to the improvement in microvascular anastomosis techniques, the best choice for maxillary reconstruction is represented by bone containing free flaps.

Based on the characteristics of the defect we can choose between three ideal free flaps which are represented by the DCIM free flap, the fibula free flap and the scapular system of free flaps.

With this work we present ten years experience in immediate reconstruction for complex 3-D maxillary defects after surgical resection, showing the characteristics of each reconstructive technique.

### O-3203

#### MORPHOLOGIC AND FUNCTIONAL REHABILITATION OF MAXILLARY DEFECTS USING MICROSURGICAL FLAPS: THE CLUJ EXPERIENCE

*Cristian Dinu<sup>1,\*</sup>, Grigore Băciu<sup>1</sup>, Iuliu Moldovan<sup>1</sup>, Horatiu Rotar<sup>1</sup>, Mihaela Băciu<sup>1</sup>, Ileana Mitre<sup>1</sup>*

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Extended tissue defects in oral and maxillofacial area following tumour resections, trauma or cranio-facial malformations are a continuous challenge for morphologic and functional rehabilitation of these patients.

For partial and total maxillary defect reconstruction we used free flaps: scapula flaps, subscapular complex and fibula flaps. Dental implants were used for functional rehabilitation.

Morphologic, functional and aesthetic results were satisfying.

Microsurgical flaps have the advantage of furnishing a sufficient quantity and quality of bone, muscular tissue, mucosa and skin to reconstruct three dimensionally the maxillary defects.

**O-3204****ANGULAR SCAPULAR OSTEO-MUSCULAR FLAP IN MAXILLARY RECONSTRUCTION**

Chiara Copelli<sup>1,\*</sup>, Silvano Ferrari<sup>1</sup>, Bernardo Bianchi<sup>1</sup>,  
Andrea Ferri<sup>1</sup>, Enrico Sesenna<sup>1</sup>

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**Purpose:** in this presentation the investigators report on their experience with the angular scapular osteo-muscular flap, focusing on the surgical technique, the clinical indications and the results obtained.

**Methods:** a retrospective study was performed on post-maxillectomy defects reconstructed using the angular scapular flap from 2010, the year of introduction of this technique in our Department. The sample was composed of 9 patients. Seven underwent reconstruction primarily and two secondary. Five had low defects and the remaining four patients had a high defect. Post-operative complications and functional and aesthetical results were reviewed.

**Results:** all the flaps survived the transplant and no major complications were observed. One patient had a plate exposure that was treated with removal under local anaesthesia. In all cases the results were satisfactory both under the aesthetic and functional point of view.

**Conclusion:** the angular scapular flap, even if of recent introduction and considered for many years a second choice with respect to the fibula, the iliac crest and the classical scapular flaps, have to be reevaluated thanks to its low morbidity and its peculiar tissue characteristics. It should be reconsidered as a primary reconstructive option in particular in presence of: low defects involving more than 1/2 of the palate, vertical defects without involvement of the orbital floor, older patients, and patients not needing implant rehabilitation.

**O-3205****TOTAL MAXILLECTOMY RECONSTRUCTION WITH PREFABRICATED TITANIUM MESH AND SOFT TISSUE FREE FLAP**

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**Background:** Midface reconstruction is one of the most challenging tasks for the reconstructive surgeon. We present a technique for reconstruction of midface after total maxillectomy with preservation of orbital contents.

**Methods:** Skeletal reconstruction was achieved with a titanium sheet mesh bent preoperatively on a universal skeletal model. Alveolar ridge, anterior wall of the maxillary sinus, zygomatic prominence, lower orbital rim and orbital floor were reconstructed with a titanium mesh. A soft tissue free flap, preferably an anterolateral thigh free flap, was harvested as well. Part of the flap was

deepithelized and put in front of the mesh to prevent exposure and the other part was used for palatal reconstruction.

**Results:** Five male and one female patients were reconstructed with titanium mesh, five free flaps were raised, four anterolateral thigh and one latissimus dorsi, all free flaps survived. All patients received postoperative irradiation

with 64Gy. Median follow up was 12 months, no major complications occurred. Mesh was exposed in only one case which was managed successfully with resuspension of the heavy latissimus dorsi myocutaneous flap. Mid-face projection and height, globe position, ocular movements and vision were satisfactory in all cases.

**Conclusions:** Midface reconstruction with titanium mesh and a soft tissue free flap is a reliable and safe method for functional and aesthetic reconstruction after maxillectomy.

**O-3206****SURGICAL ALGORITHM OF MAXILLARY RECONSTRUCTION WITH PEDICLE AND FREE FLAP: 20 YEARS EXPERIENCE OF A SINGLE INSTITUTION**

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Valentina Terenzi<sup>1</sup>, Paolo Priore<sup>1</sup>, Marco Capriotti<sup>1</sup>,  
Marco Della Monaca<sup>1</sup>

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Loss of the maxilla due to tumour ablation has both functional and aesthetic consequences. The variable loss of soft tissue, bone, or both, leading to collapse of the lip, cheek, periorbital soft tissues and palatal competence present a challenge for reconstructive surgery. Efforts have been made to classify these defects and provide appropriate algorithms for optimum reconstruction. Several authors have suggested their own classification of the defects and their algorithms for reconstruction. Based on a critical review of the literature, the Authors believe that Brown's classification suggested in 2000 and reviewed in 2010 may represent the gold standard for a classification system of the maxillary defect. Based on this classification system and on their own experience of more than 20 years and almost 200 hundred cases of maxillectomies and reconstruction procedures, the Authors suggest a new reconstructive algorithm for midface reconstruction

**O-3207****RECONSTRUCTION OF THE MANDIBULAR AND MAXILLARY DEFECTS BY MEANS OF THE REVASCULARIZED RIB GRAFTS**

Ilya Tsiklin<sup>1,\*</sup>, Alexander Nikitin<sup>1</sup>, Dmitry Nikitin<sup>1</sup>,  
Vladimir Stuchilov<sup>1</sup>, Alexey Harkin<sup>1</sup>, Alexey Grishin<sup>1</sup>

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Reconstruction of the mandible and maxillary defects is supposed to be one of the most complicated problems in up-to-date maxillofacial surgery. International surgical experience of last decades has significantly demonstrated high efficiency and predictability of the free tissue transfer technique. In spite of significant complications and duration, microvascular reconstructions are considered to be the best method of the one-stage bone and soft tissue reconstructions.

Revascularized rib is a rather rarely used graft in bone reconstructive surgery. However this donor site has certain advantages in lower and midface reconstructions: anatomical correspondence with the mandible, sufficient length of the bone fragment and vascular pedicle, stable anatomy and rare atherosclerotic lesions of the posterior intercostal vessels. The authors present 3-years experience, including early and long-term results, of 10 revascularized rib grafts

transfer in bony mandibular and maxillary reconstructions. At the same time 4 patients had posttraumatic defects (including 3 gunshot injuries and 1 car accident trauma). 6 patients underwent resection of benign mandibular tumours with a one-stage reconstruction (ameloblastoma - 4; osteoblastoclastoma - 2).

Anatomical research has been performed to confirm the possibility of using revascularized rib graft for the simultaneous reconstruction of the mandible and maxillary defect as well as the bilateral defect of the mandible by harvesting of the two-component osteomuscular flap fed by the posterior intercostal vascular pedicle. First, based on the three-dimensional CT-scanning, computer simulation and stereolithographic modeling of the donor and recipient sites, the single-stage reconstruction of the combined mandible and maxilla defect was accomplished in 2 patients with gunshot injuries of the face by using of the revascularized two-component rib grafts. 1 patient underwent bilateral reconstruction of the mandible defect caused by posttraumatic osteomyelitis.

The consistency of the microvascular reconstructions had been evaluated by means of duplex scanning of the micro-anastomoses. The bone graft vitality had been confirmed by means of radionuclide scintigraphy. Consequently good functional and esthetic result had been achieved in all cases.

#### O-3208

##### HARVESTING OF MULTIPLE FLAPS BASED ON THE SUBSCAPULAR VASCULAR SYSTEM IN A SUPINE POSITION: OUR EXPERIENCE

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Vascularized free flap transfer is an ideal method for reconstructing large surgical defects resulting from head and neck cancer ablation. Flaps harvested from the subscapular vascular system have been reported as a versatile tool for the reconstruction of the maxilla or mandible. These flaps can provide a moderate amount of bone of good quality associated with a wide skin paddle(s) and/or muscle, but it is usually necessary to reposition the patient intraoperatively from a supine to a decubitus position for successful harvest. This repositioning is time consuming and not only extends an already lengthy reconstructive procedure but also increases the dangers of decubitus ulcers, brachial plexus neuropathy, and axillary vascular compression. For these reasons the scapular bone flap became less popular. To overcome this disadvantage, we harvest the scapular bone with the patient in the supine position, based on the fact that the lateral border of the scapula is accessible. Recently, the latissimus dorsi (LD) muscle flap was reported as a flow-through type of flap, which can be used as a perforator flap depending on the thoracodorsal artery and vein. This enhances the versatility of the thoracodorsalis flap, which is harvested at the same time as the scapular bone flap (chimeric flaps).

From 2006 to 2012 we harvested 15 flaps from the subscapular system in supine position, 4 of them were chimeric ones.

Using this harvesting method not only is operation time reduced but also two-team approach is allowed and safer vascular pedicle dissection is possible because the vascular

pedicle is secured at an early stage

#### O-3209

##### FACTORS INFLUENCING AESTHETIC AND FUNCTIONAL OUTCOMES OF INTRAORAL RECONSTRUCTIONS WITH ALT FREE FLAP.

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*Purpose:* To evaluate the morphological and functional results in oral reconstructions with ALT flap.

*Methods:* Review of 38 cases of intraoral reconstructions using ALT flap for tongue (19) with a range of defects from hemiglossectomy to near total glossectomy, oral floor (8), soft palate (5), cheek (3: plate + flap option), oropharynx (5), starting from 2004. Of these patients we recorded the timing and quality of oral feeding recovery, the need of speech therapy and for how long, the timing of tracheostomy removal, the intelligibility of the speech, the morphologic feature, the donor site morbidity.

*Results:* In this series of flaps we had no flap loss, either partial or total, one donor site complication (seroma). Every thigh was closed without need of skin graft, leaving an even linear scar. The flap showed the best qualities in tongue reconstruction, but we have achieved good functional and morphological results even in those anatomic regions in which the RFF was the workhorse reconstructive flap, like the soft palate and the oral floor, so that the RFF/ALT ratio 14/0 in 2004 nowadays is nearly reversed. In few months the skin of the thigh changes to match the oral mucosa in color and softness, especially in women's tongue reconstructions. If part of the base of the tongue can be spared, we observe quick recovery of speech and swallowing even in cases such as a double flap case with huge resection of the mandible and tongue.

*Summary:* The ALT flap (Song, 1984) has become the gold standard reconstructive fasciocutaneous flap in head and neck microvascular reconstruction because it is easy to harvest, it has low donor site morbidity, it provides good aesthetic and functional results. Its versatility allows its utilization even when thin and three-dimensional shapes are needed like in most of the defects of the oral cavity. We utilize the RFF when a very long pedicle is required as in high and 3D reconstructions (total, soft and hard, palate) and in a poor donor vessels cases.

#### O-3210

##### PREFABRICATION OF A PECTORALIS MAJOR MUSCULOCUTANEOUS FLAP WITH A LATISSIMUS DORSI MUSCULOCUTANEOUS FLAP IN A RAT MODEL

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After repeated or unsuccessful microvascular reconstruc-



tions, possible donor regions are exhausted, or the vascular situation in the connection area is unsatisfactory (radiation), so that local rotation flaps are often the only chance for a satisfactory reconstruction. Pedicled flaps often have a vascular pedicle that is too short to reach the existing defect. The working hypothesis of the proposed study is that after adaptation and suturing together of the two rotation flaps (pedicled muscles), it will be possible for the vascular pedicle to elongate with adhesion of the two muscle bellies. This prefabrication of an extended vessel pedicle - the vascular pedicle of the pectoralis major and latissimus dorsi muscles - should allow a sufficient soft tissue covering in the facial and cervical areas, both ipsi- and contralaterally.

The aim of the study is the development of a surgical technique to lengthen the vascular pedicle of rotation flaps. It should be made possible to transfer the pedicled tissue over long distances in such a way as to guarantee functionally and aesthetically pleasing reconstructions in the face and neck region. This would be a new method of reconstruction for patients for whom microvascular tissue transfer is not an option. The experiment is done with adult male Wistar rats (200-300g). The duration of the study is one month, with 15 rats in the group (first intervention). One rat serves as control. The muscle perfusion in the nonoperated animal provides the target value for the degree of perfusion to be achieved in the prefabricated musculocutaneous pedicle rotation flap (overlap of the latissimus dorsi muscle with the pectoralis major muscle). The control animal is euthanized once this value has been determined. All the other rats are operated under anaesthesia. All rats undergo a second intervention after one month. During the second intervention an intraoperative video fluorescence angiography (ICG) visualises the blood circulation and necrotic surfaces.

#### O-3211

### **SURGICAL AND ANATOMY-THOPOGRAPHICAL REASONING OF THE USE OF REVASCULARISED CORTICO-PERIOSTEAL FEMUR FLAP IN MAXILLO-FACIAL DEFECTS AND DEFORMATIONS TREATMENT.**

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The choice of donor site for the treatment of massive combined bone defects is resolved but there is still a problem in choosing a donor site for the closure of smaller defects

*Material and methods;* 61 cadavers aged 21 to 81 were studied. Anatomical preparation with vessel contrast – liquid non Rg- contrast colorant, was performed on 24 lower extremities for vascular anatomical study of the donor site on the fronto-medial surface of the lower third of the femoral bone.

On 20 cadavers the topography of the external carotid artery and its branches was studied for the intraoral approach to recipient vessels.

In 20 patients' spectral analysis determining flow parameters in perforator vessels based on Doppler Effect USG of facial and donor region vessels was performed.

7 bone-reconstructive interventions were performed in

lower and midface defects. Three were posttraumatic defects, one shot defect and 3 following resection intervention due to tumour process.

An optimal method of harvesting cortico-periosteal femoral flap and identification of the optimal recipient vessels from branches of the facial artery by vessel diameter and localization was proposed.

*Results:* Blood supply of fronto-medial surface of the lower third of the femoral bone body was shown to be from two sources: a bony-diaphyseal branch of the femoral artery and bony branch of the descending elbow artery, that permits harvesting few types of vascularised bone grafts in the lower third of femoral bone sized 2-12cm length, 1,5-4 cm width, 0,6-2 thick. The length of vessel pedicle of the transplant is 4-8 cm. The diameter of the arteries and veins of this flap was determined as 1,2±0,4 mm using microscopy of the pedicle, deviation determined by the type of perforators and harvesting level.

In treating bone defects in the maxillo-facial area, the optimal choice of recipient vessels in the mandible is the facial artery and vein, in the maxilla the labial superior artery and angular vein and in the mid-lateral and upper facial region the superficial temporal artery and vein.

Proposed intraoral approaches for recipient vessels from the external carotid artery are the facial artery and labial superior artery, which allows bone defect closure as well as a good aesthetic result.

*Conclusion:* Revascularised cortico-periosteal auto transplant of the lower third of diaphysis of the femoral bone can be a useful donor material for reconstruction of smaller defects of facial bones with low donor site morbidity.

#### O-3212

### **ORAL RECONSTRUCTION WITH NAKED BONE FREE FLAPS**

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Since the 1970's bone free flaps have been used to reconstruct the maxilla and the mandible. The vascular pedicle, through the supply of nutritional substances and drugs from the bloodstream, ensures the vitality of the flap, rapid bone integration and reduced risk of infection.

However, due to many surgeons' concerns about orocervical and orosinus fistulas and infections, bone flaps are usually buried and protected by mucosal flaps or a second skin flap whenever it is not possible to harvest a skin paddle together with the bone flap.

The authors, convinced that naked bone free flaps, if well vascularized, are capable of healing and repairing the osteomucosal deficit on their own, with no risk of infection or fistulas, began to harvest, for oral reconstructions, naked bone flaps, i.e. bone flaps covered only by a muscle layer 5 to 20 mm thick and without skin paddle.

In this study the authors present a review of their experience in oral cavity reconstructions by harvesting naked and covered bone free flaps, retrospectively evaluating the occurrence of major and minor, early and late complications, associated with the different reconstructive tech-

nique.

### O-3213

#### TOWARDS AN OSTEOGENIC PERIOSTEAL FREE FLAP FOR MANDIBULAR RADIONECCROSIS

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**Objectives:** Osteoradionecrosis (ORN) of the mandible is a serious complication following radiotherapy of head and neck cancers. Various bone or composite free flaps have been used to reconstruct mandibular defects in severe cases. The medial femoral periosteal flap has attractive properties in this indication as it provides osteogenic vascularized tissue. It has been used in various recalcitrant nonunions of the extremities. However, it is not routinely used in mandibular ORN. Through an anatomic study and a 10 cases clinical experience we propose to better codify the surgical technique and to demonstrate the place of this flap in mandibular ORN treatment.

**Methods:** 25 fresh legs were dissected in order to observe the variation of the descending genicular pedicle after a selective injection of coloured latex. The flap was used in 9 patients with mandibular ORN at various stages.

**Results:** The anatomic study showed a constant arteriovenous pedicle with 3 major variations. The diameter increases sharply upstream to the vastus medialis branch and allows a comfortable microsurgical anastomosis. The clinical study showed a complete intraoral healing in 8 cases and an intense bone production in 6 cases. The flap failed in 2 cases. The mean follow-up was 17 months.

**Conclusion:** The medial femoral periosteal flap must be considered as a good alternative in the treatment of mandibular ORN. We emphasize the different anatomical vascular subtypes. The interest of preoperative computed tomography angiography is discussed. We propose this flap as a conservative technique in complete agreement with the pathogenesis of the disease. Its thin and pliable nature gives it a further advantage over other vascularized bone grafting techniques, allowing it to conform well to the recipient site or to be effectively wrapped around nonunion sites with a minimum of excess bulk. Its osteogenic properties should be confirmed by a larger clinical study.

### O-3214

#### MONITORING BONE FREE FLAPS WITH A MICRODIALYSIS CATHETER DIRECTLY POSITIONED IN BONE TISSUE. PRELIMINARY RESULTS

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**Introduction :** The failure rate of facial reconstructive surgery with bony microanastomosed flaps varies between 11 and 25%. In the case of bony buried flaps, the follow up is more difficult. Monitoring methods, such as doppler system, near-infrared spectroscopy, laser Doppler flowmetry and microdialysis have been developed in the last 15

years. Ferguson showed a rate of false positive at 31% with implantable doppler follow up for buried flaps. Microdialysis is said to be reliable by numerous surgeons for buried flaps. Nevertheless, a few authors reported monitoring with microdialysis in bony flaps, and they all described the position of the catheter in the surrounding soft tissue muscle. This surrounding soft tissue does not always reflect the degree of bone vascularisation.

**Purpose:** the aim is to study the feasibility of the monitoring of microanastomosed bony flaps with microdialysis . To reach this goal, we performed a prospective research clinical project, entitled MTM project, which began in April 2011.

**Material and method:** until now, 16 patients out of 30 were included in the MTM project. In addition to our classical clinical monitoring, bone microanastomosed flaps for reconstructive facial surgery have been monitored with CMA 70 catheter directly positioned in the bone tissue. Glucose, lactate, pyruvate, glycerol rate were analysed every hour at day 1, every two hours at day 2, every three hours at day 3,4,5. The monitoring was recorded for 5 days. Data were managed with Labpilot software.

**Results and Discussion:** First results are presented. No thrombosis was noticed during the first five days of the follow up. 12 /16 patients were monitored for 5 days. For 3 patients the curves lowered to 0 prematurely, the possible reasons of the decreasing are discussed. Involvement and possibility for a paramedical team to collect and analyze the microvials in time are good. The common rate known for microdialysis in soft tissue could not be strictly applied. Flush out period is longer, rate of Lactate/Pyruvate is higher than in soft tissue. In two cases, a long term follow up shows bad viability of the flaps. Their shape of the metabolites curves are similar and could perhaps be predictive of a poor outcome.

### O-3215

#### FLAP SURVIVAL AFTER LIGATION OF ARTERIAL PEDICLE 12 DAYS POST OPERATIVELY

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**Introduction:** There have been reports of microvascular flaps surviving following division of the vascular pedicle. It is not known how long the flow in the pedicle must persist for the flap to survive and develop its independent blood supply. We present a case involving a radial forearm free flap for reconstruction of a buccal mucosa defect which survived despite the loss of its arterial pedicle on the 12th postoperative day.

**Case report:** A 55 year old man presented with an extensive poorly differentiated squamous cell carcinoma (SCC) of the left buccal mucosa. He underwent resection of the tumour and a left supraomohyoid neck dissection. The defect was reconstructed with a left radial forearm free flap. However, on the 10th post operative day, he developed massive haemorrhage from the left pterygoid region which was controlled by packing the area with surgicel®. Further haemorrhage re-occurred 2 days later necessitating ligation of the external carotid artery proximal to the anastomosis between the facial and radial arteries.

**Discussion:** There is no definitive time in the literature

that states how long a flap remains dependent on its pedicle. It has been described that after free tissue transfer, a flap can still depend on its vascular pedicle at 10 years. Other experimental studies and clinical reports state partial and complete flap survival is still possible even if the vascular blood supply is interrupted as early as 3 to 9 days postoperatively. Nevertheless, division of the vascular pedicle has been known to cause flap loss even 5 to 8 years after free tissue transfer.

Neovascularisation of the flap may be generated by ischaemic insults to the flap. In our patient, he had several episodes of hypoxia to the flap from repeated haemorrhages. Additionally, fasciocutaneous flaps confer an advantage compared to those without a cutaneous component. This is due to the extra dermal and subdermal tissue and associated vascular plexuses with fasciocutaneous flaps. Consequently, a free flap with a cutaneous portion and a good marginal inset is more likely to survive.

## Session 33. TISSUE ENGINEERING AND CELL THERAPY

### O-3301

#### IN-VIVO MICRO TOMOGRAPHY IN ASSESSMENT OF BONE- FORMATION IN BIOACTIVE SCAFFOLDS.

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**Purpose:** Biomaterials are commonly used in bone reconstruction in cranio-maxillo-facial surgery. In this study PCL scaffolds colonised with rat ADSC reconstructing critical defects of tibia were examined. To observe the microstructure changes in the scaffold and in the surrounding tissues it is essential to conduct regular x-ray and micro CT examinations.

**Materials and Methods:** The experiment was conducted on male and female WAG rats with critical bone defects of tibia, reconstructed with PCL scaffolds. Half of the scaffolds were colonised with rat ADSC. Micro CT examination was performed in the operation day, 6 weeks post op, and post mortem 3 months postoperatively. All animals underwent the examination in general anaesthesia. The lower extremities were immobilized in a repetitive position, settings of the tomography were also constant. In each examination 3D reconstructions were made and analyzed. After the last CT, scans of the same animal were compared to evaluate changes of the microstructure in time.

**The Aim:** The aim of this study was to evaluate usage of micro tomography as a method of bone formation assessment in bioactive scaffolds.

**Results:** the presentation will encompass current phase of the research and the achieved milestones

**Conclusion:** Micro tomography is a promising non-invasive method of in-vivo examination of bone formation in the PCL scaffold and in the surrounding tissues.

### O-3302

#### CLINICAL STUDY OF HAP/AGAROSE COMPOSITE GELS (HAP GEL) USED AS A BONE REGENERATIVE BIOMECHANICAL MATERIAL IN JAWBONE DEFECTS

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**Background.** We have reported that HAP/agarose composite gel (HAP gel) prepared by an alternate immersion technique is useful as a bone grafting material for bone defects. We previously investigated the biological behaviour of this material in an animal model and confirmed its potential as a bone substitute by several kinds of analyses.

Furthermore, we performed biological safety studies in accordance with the ISO 10993.

**Purpose.** To evaluate the biological behaviour of HAP gel and confirm that this material is promptly absorbed and is replaced by bone in jaw defects, with no adverse events clinically.

**Material and Methods.** HAP gel disks were prepared by an alternate immersion technique, homogenized, transferred to a 1-mL syringe, and injected in aliquots of about 0.5 mL each. HAP gel alone or mixed with autologous bone was filled into the jaw defect. Candidate patients had the following conditions: bone defects after the extirpation or resection of jaw cysts or tumours, alveolar clefts associated with cleft lip and palate, and insufficient bone volume for dental implant placement. Osteogenesis was evaluated radiographically before and 1, 3, and 6 months after operation. The presence or absence of postoperative infection, prolonged inflammation, and inadequate wound healing was also evaluated.

**Results.** In all 12 patients, bone regeneration was confirmed 3 months postoperatively at the most apical region of the defect. No patient had postoperative infection, prolonged inflammation, or inadequate wound healing.

**Conclusions.** Evaluation of the characteristics of regenerated bone, such as quality, density, and hardness, is a topic for future studies. However, in patients who underwent bone grafting to the alveolar cleft, a sufficient quantity of bone was obtained by filling the defect with a mixture of bone obtained from the chin and HAP gel. This technique minimized surgical invasion in children and shortened the hospital stay. The indication range will be extended in the future.

### O-3303

#### CHARACTERIZATION AND OSTEOGENIC CAPACITY OF WHARTON-JELLY MESENCHYMAL STROMAL/STEM CELLS

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**Introduction** Craniofacial malformations are frequently detected by ultrasound prenatally and could thus be treated by using autologous mesenchymal stromal/stem cells (MSCs) from the umbilical cord. We therefore isolated and expanded MSCs from human Wharton Jelly (WJ-MSCs) and tested their osteogenic differentiation potential in vitro and in vivo.

**Material and Methods** WJ-MSCs were isolated from human umbilical cords by punch biopsies and in vitro-expanded as monolayer with defined serum-free media. MSCs' phenotype were then tested by cytofluorimetry, while their osteoblastic differentiation capacity in vitro was tested after culture of WJ-MSCs with osteogenic medium for 3 weeks. WJ-MSCs were included into ceramic granules-fibrin constructs and their in vivo bone forming capacity was tested after ectopic implantation in immune-incompetent mice for 8 weeks. Constructs with bone morphogenetic protein-2 (BMP-2, 2.5 microgram per cm<sup>3</sup>

of construct) or acellular constructs were used as controls.

**Results** The serum-free isolation and expansion was possible from every umbilical cords tested (n=54). WJ-MSCs expressed standard MSC markers (CD13, CD29, CD 105, CD73, CD90, CD44, CD166 and Stro-1) and were negative for CD 31, CD34, CD15 and CD45. After in vitro osteoblastic differentiation, WJ-MSCs exhibited an upregulation of osteocalcin (7-fold), bone sialoprotein (4-fold), alkaline phosphatase (4-fold), osteonyx (18-fold), Runx-2 (5-fold), BMP-2 (2-fold) and BMP-5 (5-fold), as tested by RT-PCR and as compared to cells cultured with expansion medium. WJ-MSCs also produced a mineralized extracellular matrix, as confirmed by positive alizarin red and OsteoImage staining, assessing calcium and apatite, respectively. Histological analysis of subcutaneously implanted constructs showed no mature bone tissue formation after 8 weeks. However, a very dense collagenous matrix with osteoid-like tissue was observed, independent of BMP-2 addition. In situ hybridization for human-specific Alu sequences identified human (donor) cells inside the constructs.

**Discussion / Conclusions** After serum-free isolation and expansion, WJ-MSCs displayed the capacity to differentiate in vitro towards the osteogenic lineage but failed to demonstrate full osteogenicity in an ectopic mouse model, even when BMP-2 was added. A more thorough pre-differentiation of WJ-MSCs before implantation and longer in vivo test periods will therefore be considered in a next step.

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#### O-3304

##### USE OF MESENCHYMAL BONE MARROW STEM CELLS (BMMSC) IN ORAL AND MAXILLOFACIAL SURGERY: NEWS AND PERSPECTIVES

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Mesenchymal stem cells are pluripotent cells capable of giving rise to cells of mesodermal origin, including bone, cartilage, fat, tendon and muscle making these cells promising candidates for cell-based tissue engineering for the repair of lost or damaged maxillofacial tissues. To date, mesenchymal stem cells have been isolated and characterized from embryonic (E), fetal (F) and adult (A) tissues. The therapeutic and clinical application of E and F stem cells is challenging due to the many ethical and political controversies concerning their tissue. Consequently, progenitor cells harbored by the adult organism have been examined. In particular, Italian laws and ethics committees do not allow genetic manipulation associated with stem cells such as the expansion and culture of the cell line. In this work we explain our technique for use of mesenchymal bone marrow stem cells (bmMSC) in oral and maxillofacial surgery. In particular from May 2011 to April 2012 we applied this technique to 29 cases: 14 cases of trauma (primary and secondary), 9 cases of alveolar cleft defects (primary and secondary), 4 cases of preprosthetic surgery, 2 cases of orthognatic surgery. We used the Regen Kit Glue system® with Regen Lab® method for all cases with a disposable kit for collection, separation and concentration of stem cells from bone marrow. From

peripheral venous blood (15cc) we derived autologous platelet rich plasma (aPRP) mixed with an activator, autologous thrombin, and from bone marrow aspirate (from anterior iliac crest) we obtained bmMSC. The autologous PRP was mixed with the scaffold seeded with bmMSC, then transferred to the defect and closed with a water thigh suture. In view of the heterogeneity of the sample and considering the different pathologies to which has been applied the surgical technique, our results can only be considered as preliminary result. A combination of human derived mesenchymal bone marrow stem cells combined with platelet growth factors may enhance the capabilities of the cells in the clinical situation but it is clear that further study are needed to find a predictable way to ensure success.

#### O-3305

##### ISOLATION AND CHARACTERIZATION OF A POPULATION OF DENTAL PULP DERIVED STEM CELLS

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**Background** Mesenchymal stem cells (MSC) are an attractive population for clinical studies, since they can differentiate into cartilage and bone as well as fat, and have intrinsic immunosuppressive properties. The dental pulp is a source of unique MSC-like stem cells, which are thought to be derived from the neural crest and may have a broader range of cell fates.

Harvesting dental pulp stem cells is potentially less intrusive for recovery of MSC than bone marrow extraction or liposuction and may be more practical for patient-specific stem cell therapies. We attempted to extract stem cells from viable pulp tissue and to characterise this cell population.

**Method:** Dental pulp was harvested from extracted caries free wisdom teeth from healthy volunteers. The pulp was cultured and passaged over a six week period. The resultant cell population was immunostained with CD105 (endoglin), a relatively specific marker for identifying MSC.

Reverse transcriptase PCR was carried out to analyse the expression in the cultures of the following genes: CD105, CD73, CD90, CD74, MMP1, Col15A1, ApoD, Oct4, Sox2, Klf4 and cMyc. These were chosen in order to characterise cells as: MSC, fibroblasts or pluripotent stem cells.

The MSC were cultured under osteogenic, adipogenic and chondrogenic conditions to assess their differentiation potential. Neurogenic potential of the stem cells was also investigated.

**Results:** Immunostaining with CD105 proved to be positive. RT-PCR showed the expression of MSC markers, but not fibroblast or pluripotency markers. The results of investigations to determine the neurogenic potential of the cells will be presented.

**Conclusion:** We successfully isolated a population of MSC from the dental pulp. The ability to culture cells of diverse lineage including neural cells directly from dental pulp derived stem cells is highly desirable. This provides an alternative to induced pluripotency for patient-specific

cell therapies in this area; significant further work is required before clinical application of this research.

#### O-3306

### BONE REGENERATION THROUGH AUTOLOGOUS MESENCHYMAL STEM-CELLS CULTIVATED DENATURED PROTEIN MATRIX AND MEMBRANES. AN EXPERIMENTAL PROJECT OF BONE ENGINEERING IN SHEEP.

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**Introduction:** In oral and maxillofacial surgery we very often find bone defects due to trauma, malformations, tumours, cysts and infections. These might be a problem as, depending on size, they cannot resolve spontaneously. These defects need a reconstruction for an optimal functional and aesthetic result. Therefore we have to search for new materials and new procedures to restore them. Great efforts have been made in investigation and clinical application of stem cells as they can differentiate into a wide variety of cells. Bone engineering has, additionally, invested in a huge development in the last few years to establish new methods to regenerate bone.

**Objectives:** To study whether a bone engineered protein matrix with mesenchymal stem cells in combination with the osteoconductive property of membranes can improve the regenerative ability of mandibular bone defects.

**Material and methods:** Seven sheep have been operated on both mandibular angles, performing a 15mm diameter defect, that was posteriorly filled with the protein matrix embedded with mesenchymal stem cells in one side and without stem cells in the other one. In both sides the defect was closed with a polyglycolic/polylactic membrane. Animals were sacrificed 3 months later and mandibles were both radiologically and histologically analysed.

**Results** We found statistically significant radiologic and histological evidence showing that there is much more regeneration in the side with stem cells.

**Discussion:** Stem cell bone regeneration is proving to be very effective to treat bone defects. This project has been made in a large mammal in order to see how it might work in a future clinical application in patients. The bone defect has no critical size for the purpose of recreating the functional masticatory conditions of the sheep. Regeneration only took 3 weeks to show the speed and volume of bone regeneration at the beginning and not if it had spontaneously occurred.

#### O-3307

### RECONSTRUCTION OF CRITICAL SIZE MANDIBULAR DEFECTS OF THE ATHYMIC RAT WITH HUMAN ADIPOSE DERIVED STROMAL CELLS (ADSC)

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**Introduction:** In cases of bone defects, autologous bone grafts are the “gold standard” in grafting procedures. In children autologous bone harvesting for the reconstruction of extended bony defects is limited. Tissue engineering offers an alternative. Next to bone marrow, adipose tissue is a source for multipotent stromal cells. Adipose derived stromal cells (ADSC) are able to differentiate into osteocytes.

**Aim of the study:** The purpose of our study was to evaluate the efficacy of bioactive implants (ADSC in fibrin glue) in repairing critical sized mandibular defects in athymic rats.

**Material and Methods:** Human adult ADSC embedded in fibrin glue were implanted into a critical size defect placed at the rat mandible and tested against protected bone healing (pbh), autologous bone graft and empty defect. To quantify the newly formed bone volume the rats were scanned at different observation times in vivo in a high-resolution flat-panel volumetric CT (fpvCT). After eight weeks the specimens were assessed histologically and by microcomputertomography.

**Results.** The in vivo radiographic examination demonstrated a significantly higher level of newly formed bone of ADSC embedded in fibrin glue side, compared with pbh side. The autologous bone graft side had a significantly higher bone formation than all other groups. The histological findings in the specimens with ADSC showed a bony bridging of the defect without inflammatory reactions.

**Conclusion:** ADSC were able to reconstruct the defect in this experimental setting, however, autologous bone proved to be superior. Further studies should evaluate the combination of ADSC with autologous bone to overcome the limitations of bone harvesting in children.

#### O-3308

### MODIFIED SILK MEMBRANES: A NEW TOOL IN GUIDED-TISSUE REGENERATION

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**Introduction:** Guided tissue regeneration (GTR) is well established for different types of barrier membranes. Here we report a novel ST-silk membrane which offers advantages compared to established animal derived collagen membranes. ST-silk membranes can be surface functionalised, are free from any potentially infective pathogens and have excellent mechanical properties. In this study we achieved functionalisation of the ST-silk membranes with hydroxyapatite (HA) and the proliferative effects of the membranes were evaluated on osteoprogenitor cells e.g. rat mesenchymal stromal cells (MSC) in vitro.

**Methods:** First, native ST-silk membranes were tested regarding their effects on proliferation rates of L929 fibroblasts and dysplastic oral keratinocytes (DOK cell line). Possible cytotoxic effects were analysed by monitoring LDH activity. Thereafter, HA-functionalized ST-silk membranes were seeded with rat MSCs and the effects on osteogenic differentiation were evaluated for 7 days. Additionally the membranes were scanned via different imaging modalities: Reflection electron microscopy (REM),  $\mu$ -CT and digital microscopy VHX-600.

**Results:** ST-silk membranes demonstrated good biocompatibility without negative effect in terms of vitality/proliferation of L929 and DOK cells over 22 days. The membranes showed osteoinductive effects (increase in alkaline phosphatase activity) on rat MSCs after 7 days. Biomechanical tests of the membranes result in elongation values of up to 170% with collagen compared to 440% with silk and tear-off of 8,5MPa using collagen compared to 11,6MPa for silk.

**Conclusions:** Functionalization of ST-silk membranes with hydroxyapatite seems to have an osteoinductive effect on MSCs in vitro with biocompatibility and mechanical stability superior to membranes based on collagen. These innovative devices open promising avenues for any application in guided tissue regeneration and as scaffold material in tissue engineering for dental applications.

### O-3309

#### BIOLOGICAL MEMBRANES FOR BONE REPAIR IN MAXILLOFACIAL SURGERY

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**The technique of induced membranes:** Reconstructing maxillofacial defects represent a formidable challenge to achieve both functional and aesthetic goals. To succeed numerous parameters must be taken into account: patient's general conditions, defect location, width and type of the defect and eventual donor sites which can provide the tissues.

We evaluated two-stage mandibular reconstruction in rabbits and present preliminary results in humans. 21 rabbits underwent bilateral segmental mandibulectomy and the defect was filled with methylmethacrylate. The cement was removed after 4 weeks and an iliac autograft performed on the right-hand side and an autogenous graft with hydroxyapatite and triphasic calcium phosphate on the left-hand side. Four patients with severe mandibular osteoradionecrosis underwent a two-stage reconstruction. No clinical or paraclinical complications were noted. Hematoxylin-eosin-saffron staining revealed an induced membrane lining the cavity of all samples with dense vascularity. Decalcified, undecalcified and histomorphometric analysis showed new bone formation in the bio-material and the autograft. CT scans at 6 months showed

that two patients had a favourable outcome with cortico-cancellous bone.

**The human amniotic membrane:** The human placenta consists of the amniotic and chorionic foetal membranes (each containing mesenchymal stem cells). Many beneficial properties of this tissue, including bacteriostatic (antimicrobial properties), anti-inflammatory, analgesic, wound healing, anti-fibrotic, reepithelialization, reduced scarring, anatomical vapor barrier and capacity to synthesize and release biologically active substances (including cytokines and signalling molecules) have been reported. In addition to its almost unlimited availability, easy procurement from the placenta, low processing costs for therapeutic application, and low immunogenicity, the amniotic membrane is widely described as a good candidate in regenerative medicine.

At Besançon, the bank of cells and tissues of the French Blood Agency has been organizing the collection and the qualification of the amniotic membranes since 2003 and retroceded them for clinical ophthalmologic indications (corneal ulcerations and severe destruction of the surface of the cornea).

We evaluated the effect of cryopreservation (temperature, cryoconservant and time of cryoconservation) on mechanical and biological functions of the amniotic membrane and we prospected its clinical use in guided bone regeneration and in substitution of induced membrane technique (to avoid a surgical stage).

### O-3310

#### BMP-2 EMBEDDED ATELOCOLLAGEN SCAFFOLD FOR TISSUE-ENGINEERED CARTILAGE CULTURED IN THE MEDIUM CONTAINING INSULIN AND TRIIODOTHYRONINE—A NEW PROTOCOL FOR THREE-DIMENSIONAL IN VITRO CULTURE OF HUMAN CHONDROCYTES

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When chondrocytes are isolated from the native cartilage and proliferate in vitro, they soon lose their original ability to express glycosaminoglycan (GAG) and type II collagen, which is termed dedifferentiation, or decrease cell viability.

We first examined in vitro cartilage regeneration of tissue-engineered pellets that consisted of human auricular chondrocytes and atelocollagen and that were incubated in vitro under stimulation with bone morphogenetic protein-2 (BMP-2), insulin, and T3. We then examined the administration of those growth factors into the scaffold or in the medium and explored the possibility that the atelocollagen, the hydrogel scaffold of the chondrocytes, may function for drug delivery of the factors. BMP-2 in the atelocollagen with the supplement of insulin and T3 in the medium could not only produce a greater GAG matrix in a shorter period but also sustain cell viability with lower

mortality. The insulin in the medium could be better administered only for 2 weeks, rather than 3 weeks, which would save time and cost, hence shortening the in vitro culture of chondrocytes. Our protocol of mixing BMP-2 into the atelocollagen with the supplement of insulin and T3 hormone might provide a new insight into the development of tissue engineering in chondrogenesis.

**O-3311**

**NEW APPROACH FOR DEVELOPMENT OF OSTEOPLASTIC MATERIALS. THE USE OF SCAFFOLDS WITH VEGF DNA-PLASMID FOR BONE REGENERATION IN A CRITICAL SIZE DEFECT MODEL.**

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**Introduction.** At present, maxillofacial surgeons and dentists are increasingly faced with the necessity to replace various bone defects among different groups of patients. Current development trends of osteoplastic materials include creation of the products with active components such as growth factors and cells. However, these approaches have several disadvantages that limit their use in clinical practice.

**Materials and Methods.** In this regard, we aim to develop a fundamentally new class of osteoplastic materials, containing nucleic acids as an innovative active component. We combined a scaffold (collagen/hydroxyapatite) with DNA-plasmid containing VEGF/GFP genes. This study investigated the effects of vascular endothelial growth factor (VEGF) DNA-plasmid non-covalently bound to different scaffolds for bone regeneration in a rat cranial and ilium critical size defects. Two groups of two different xenogenic scaffolds were generated with VEGF DNA-plasmid and implanted within 6-7 mm rat cranial and ilium critical size defects (n=12-13). At 15, 30, 45 and 60 days implants were retrieved and evaluated by computed tomography and histological scoring analysis.

**Results.** High angiogenic potentials of gene therapeutic osteoplastic material were detected in vitro. In vitro we found that plasmids of gene-therapeutic osteoplastic material leave the structure of a scaffold and transfer into MMSC, where the genes of plasmids are expressed. Endothelial cells form capillary-like structures on Matrigel. The histological analysis and CT results showed larger and faster blood vessel formation, significantly higher bone formation de novo in groups with scaffolds modified by VEGF DNA-plasmid in the dynamics.

**Conclusion.** The experiment in vivo showed the great potential of scaffolds modified by VEGF DNA-plasmid to form organotypic bone regenerate and to decrease the time of regeneration in a critical size defect model. The use of such biomaterials in maxillofacial surgery may be prospective for bone augmentation and replacement of different types of bone defects.

**O-3312**

**MAJOR BONE DEFECT RECONSTRUCTION WITH NANOTECHNOLOGICAL BIOACTIVE SCAFFOLD. EXPERIMENTAL STUDY ON RATS.**

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**The Aim:** The aim of this study was to evaluate a new surgical procedure leading to faster and more precise reconstruction of critical bone defects of the head and neck.

**Purpose:** Reconstruction of major oncologic bone defects of the head and neck is a difficult problem. Both patients and surgeons have increasing expectations of the outcomes of free flaps. New technologies, such as tissue engineering, nanotechnology and virtual planning give the opportunity to improve the results. This experiment is part of a project aiming at creating a custom made tissue engineered bone implant for restoration of major oncologic bone defects of the head and neck. Before placing the bone implant in oncologic patients it is essential to conduct, among others, in vivo studies on animals.

**Materials and Methods:** A CT scan of the planned operation area (lower extremity) was made in one rat. PCL composite scaffolds were produced using a 3d printing method based on a virtual model of a tibia. Half of the scaffolds were colonized with rat ADSC. The rats were divided into 2 groups: group 1 PCL scaffold, group 2 PCL scaffold colonized with ADSC and bone growth factors. Two stages of operation were performed under general anaesthesia. In the first stage, a part of tibia was grafted, a critical size defect was made. In the second stage, bone defects were replaced with the according scaffold. Observations were made weekly. X-ray controls were made at 4, 8 and 12 week post op. Micro CT was performed 6 weeks post op. After 3 months postoperatively all rats were sacrificed, CT scans were made and tissue material was grafted for histological analysis.

**Results:** The experiment enabled us to assess macro-, microscopic and mechanical characteristics of bioactive oncologic reconstruction methods of hard tissue in the head and neck.

**Conclusion:** Bone reconstruction with nanotechnological bioactive scaffold is a promising method in oncologic surgery of the head and neck.

**O-3313**

**INDIVIDUAL BIODEGRADABLE IMPLANTS USING SELECTIVE LASER MELTING TECHNIQUE AS A NEW WAY OF FACIAL BONE RECONSTRUCTION: IN VITRO AND IN VIVO ANALYSIS**

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In this study, a new bone substitute material composed of poly(D,L-lactide) in conjunction with  $\beta$ -Tricalcium phosphate ( $\beta$ -TCP) of varying structure for a guided facial bone regeneration was developed, using selective laser melting (SLM). The clinically approved PDLA/ $\beta$ -TCP powder material is selectively melted using a laser beam, allowing for layer production in accordance to the Dicom based three dimensional templates. Initially the proliferation rate and toxic behaviour of the materials were tested using mesenchymal stroma cells of rats (rMSC) over a



period of 21 days. Osteocalcin concentration and alkaline phosphatase (AP) activity were evaluated as an indicator for osteogenic differentiation. IHC and SEM examinations were performed in addition. DNA-micro arrays were used for analysis of the gene expression-profile of human MSCs seeded on the SLM-test bodies and  $\beta$ -TCP alone. In vivo, calvarian critical size defects of 16 mm diameter were drilled in 20 Chinchilla rabbit species and either SLM-test bodies with a pore diameter of 600  $\mu$ m or tabula external grafts were implanted. The rMSCs cultivated on the test material (PDLLA/ $\beta$ -TCP) showed significantly better proliferation without increased toxicity than on the controls. No enhanced expression of any specific tissue marker gene was seen by the micro array analysis. The three dimensional cultivation of human MSCs on the SLM-composite bodies induced no definite differentiation into specific mesenchymal tissue. Over the test period of 42 days the pore diameter of the composite bodies had significant influence on the proliferation rate. 600 - 700  $\mu$ m proved to be the ideal pore diameter for fast and reliable cell- and vascular supply. In vivo the SLM-implants led to a complete trabecular bone ingrowth without any foreign body reaction within the defect area, comparable to the control group with autogenous bone transplants. The results of this study demonstrate a good proliferation on the material (PDLLA/ $\beta$ -TCP). No cytotoxic reactions were observed and additionally, the material composition (PDLLA/ $\beta$ -TCP) seems to promote the differentiation of rMSC into osteoblasts, therefore proving to have osteoinductive properties by its own merit. Corresponding promising bone ingrowth of the test material composition was obtained by the in vivo part of the study.

**O-3314**

**RECOMBINANT HUMAN BONE MORPHOGENETIC PROTEIN-2 CONFINED BY AN IMPERFORATE TITANIUM SHELL OVER HIGH-PROFILE DENTAL IMPLANTS IN RABBIT TIBIAE: A PILOT BONE AUGMENTATION STUDY.**

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**Purpose:** To evaluate the use of a nonperforated titanium occlusive device over a bone morphogenetic protein-2 in an absorbable collagen sponge (BMP-2/ACS) in grafting the bone around high-profile (ie, supracrestal) dental implants in rabbit tibiae.

**Materials and Methods:** Eight New Zealand white rabbits were used for the experiment. Two implants were placed in the right tibia of each rabbit, with 4 mm of each implant placed supracrestally ("highprofile" placement) in four groups of two rabbits each: control, titanium shell only, titanium shell over buffered collagen, and titanium shell over BMP-2/ACS. The animals were sacrificed after 3 or 6 weeks. Calcified and nondecalcified histologic preparation was carried out to evaluate bone formation and degree of osseointegration.

**Results:** Three of the eight animals developed tibial fractures. The two BMP-2 test animal tibiae remained intact, with the 3-week specimen showing very little bone formation inside or outside of the titanium chamber and the

6-week specimen showing bone mostly outside of the chamber.

**Conclusion:** The placement of BMP-2 beneath an occlusive nonperforated titanium shell next to a high-profile implant did not result in significant bone formation.

**O-3315**

**THE ROLE OF AUTOLOGOUS CULTURED FIBROBLASTS IN THE RECONSTRUCTION OF ANOPHTHALMIC ORBIT**

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**Introduction:** Microphthalmia or anophthalmia are rare situations in which the eyeball has a smaller size than normal or is absent. To correct this condition, there are numerous procedures, like conformer prosthesis and expanders, orbital osteotomies, a variety of oculoplastic techniques, several types of grafts, and more recently the use of autologous cultured fibroblasts as a method of filling and space maker. Generally several procedures are required in each patient.

**Material and methods:** This is a retrospective series of 11 patients (5 male and 6 female) treated at the Maxillofacial Surgery Service in Hospital 12 de Octubre since 2003. 10 had unilateral involvement and only 1 patient had bilateral microphthalmia. 7 patients had anophthalmia in the aftermath of the treatment of retinoblastoma, less common entities such as medulloepithelioma or Ewing's sarcoma were found in the other patients.

**Results:** Orbital expansion with expanders or conformers was carried out in all patients. Orbitotomies for expansion were performed in 4 patients. In 3 patients underwent a temporal muscle flap for inner lining of the pouch. In 2 patients, microsurgical techniques were used. Other procedures were also used. The use of autologous culture of fibroblasts was carried out in 3 patients.

**Conclusions:** The orbital area and its surgical reconstruction is challenging in these patients and achieving an acceptable symmetry and function is a difficult goal.

The use of autologous fibroblast culture is a treatment option, microsurgical flaps, and orbital osteotomies, in order to achieve enough space in the anophthalmic orbit to contain an ocular prosthesis

## Session 34. BENIGN LESIONS OF THE FACIAL BONES

### O-3401

#### FIBRO-OSSEOUS LESIONS IN CRANIOFACIAL AREA: OUR EXPERIENCE AND REVIEW OF LITERATURE

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**Introduction:** Fibro-osseous lesions are classified as a non-odontogenic benign tumours of the craniofacial area. According to Waldrom's classification we can differentiate 3 types of lesions: fibrous dysplasia (FD), cement-osseous fibroma (COF) and desmoplastic fibroma (DF).

**Material and methods:** Epidemiological retrospective study of 19 patients with a diagnosis of fibro-osseous lesions in the craniofacial region at La Fe University Hospital, in Valencia since 1987 to 2011.

**Results:** We collected 19 cases. 15 patients were diagnosed of DF, 3 patients of COF and one case was diagnosed of FD. We had to make differential diagnosis between some different entities with similar clinical and radiological manifestations. We report the management and outcome of the patients treated in our hospital.

**Conclusions:** All fibro-osseous lesions often share clinical and radiological features. The histological features are necessary to confirm the diagnosis. The management of patients must be individualized and specific in each case. The evaluation of the clinical outcome of each patient, the knowledge of the benign nature and the expansive behaviour of these tumours must be considered.

### O-3402

#### METHODS OF KERATOCYSTIC ODONTOGENIC TUMOUR TREATMENT

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**Objectives:** The keratocystic odontogenic tumour (KCOT) comprises approximately from 5.4% to 17.4% of all cysts of the jaws [2,3]. KCOT is an interesting lesion because of high recurrence rate [1,5]. In the literatures the recurrence rate has been referred to 0 - 62.5% depending on the treatment methodology [4,7]. After cystotomy the recurrence rate could be up to 40% [6], after cystectomy - 17.79-54.5% [4], and after enucleation with peripheral osteotomy or block resection the recurrence rate is 0-2% [4,7].

**Purpose:** The purpose of this study was to report our experience in the surgical treatment of KCOT with block resection or enucleation with peripheral osteotomy and bone healing with allogenic or xenogenic demineralized bone matrix (DBM) in combination with platelet rich plasma (PRP).

### O-3403

#### ODONTOGENIC KERATOCYST - A CASE REPORT OF MALIGNANT TRANSFORMATION

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Odontogenic Keratocyst (OKC) is known for its high recurrence rate and aggressive behaviour. We report a case of a 46yr. old male with multiple recidivant OKC that was admitted in our department with inflammatory signs and a large osteolytic lesion from the mandibular angle to the condyle, for segmental mandibulectomy and reconstruction with plate and condylar prosthesis. A diagnosis of recurrence was established.

Follow-up of the patient revealed no clearance from the disease, with extension to adjacent soft tissue and progression to the cranial base despite multiple surgical interventions. Neurologic symptoms developed and resulted in a fatal final outcome about 1yr. after the first surgical intervention. Histologic findings revealed a malignant transformation of the OKC in epidermoid carcinoma, suggesting a new case of primary intraosseous carcinoma (PIOC type 1).

Although this is a rare presentation, emphasis should be given to the possibility of this aggressive behaviour and malignant transformation, underlining the importance of a prompt diagnosis and adequate treatment, as apparently benign pathologies may result in extensive maxillofacial procedures and adverse prognosis.

### O-3404

#### GORHAM-STOUT SYNDROME, AN IDIOPATHIC OSTEOLYSIS OF THE MANDIBLE. CASE PRESENTATION AND REVIEW OF THE LITERATURE.

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**Introduction:** Gorham-Stout syndrome is a very rare clinical condition showing a spontaneous bone resorption which was first described in arms by Jackson in 1872. The first case of this entity affecting the face was published by Romer in 1928, but was Gorham-Stout in 1955 who described this rare progressive osteolysis involving the skull, shoulder and pelvic girdle in a review of 24 cases. Spontaneous fractures are common and bone regeneration does not occur in all the cases. The bone resorption commences with intramedullary and subcortical radiolucent foci resembling "patchy osteoporosis", and the affected bone disappears unless spontaneous remission occurs. The aim of our paper is to describe the case of a patient with spontaneous mandible resorption, review the literature about this condition and to show our protocol of treatment in mandible osteolysis.

**Methods and materials:** we present the case of a 65 year old woman that was referred in 2010 to our department showing a pathological left mandible fracture after dental implants treatment. First treatment was open reduction and osteosynthesis with a Unilock 2.4 mms mandibular recon-

struction plate. In the immediate follow up period the bone of the left mandible started to progressively disappear from the left parasymphiseal region to the condyle and coronoid process. The plate was removed and the symphyseal region was curetted in order to improve the vascularization of the bone. We investigated all the possible local and systemic causes of mandibular osteolysis, including a biopsy of the bone, radiographic evaluation (OPG and CT Scan) and evaluation of thyroid and parathyroid hormones and calcitonin levels with no pathologic results. Microscopic evaluation showed fibrous tissue containing marked chronic inflammatory cell infiltrate with vascular proliferation. 6 months after bone resorption cessation, a mandible microvascular reconstruction with a fibula free flap was successfully accomplished. Virtual presurgical planning of the reconstruction designed by a Materialise 3D software was carried out.

**Conclusions:** idiopathic osteolysis of the mandible is a very rare condition with an unpredictable evolution that needs an accurate differential diagnosis and adequate treatment. The Gorham-Stout syndrome should be considered when severely rapid progression of lytic bony lesions of the mandible are present. Microvascular free flap reconstruction of the bone loss is the gold standard in those patients. Virtual digital technique is a valuable tool in the planning of the reconstruction.

#### O-3405

##### **SURGICAL MANAGEMENT OF AMELOBLASTOMA: OUR EXPERIENCE AND PROTOCOL**

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**Introduction:** Ameloblastoma is the second most frequent epithelial odontogenic tumours of the jaws, characterized by a high recurrence rate (11-18% of odontogenic tumours, incidence of 0,5-1 case/1,000,000 a year). This retrospective study reviews the features of the cases of ameloblastoma operated at San Paolo University Hospital in Milan, units of Maxillo Facial Surgery and Oral Surgery from 1995 to 2011. All patients were treated using the same protocol for diagnosis and surgical treatment.

**Patients and methods:** The studied parameters were sex, age at diagnosis, site distribution, histological type, treatment, and follow-up records.

**Results:** Fifty-nine patients were included (with 13 ameloblastoma recurrence of ameloblastoma treated previously in other units). The mean age was 43 years. Anatomical site distribution was mandibular location in 79% of cases, maxillary bone location in 15,2% and maxillary sinus location in 1,7%. The most common histological type was follicular ameloblastoma. Patients were treated by enucleation and curettage in 25,4% of cases and by resection in 71,2% of cases with reconstruction in 66,6% of them (bone grafts or free flaps). The follow-up was recorded for all of the patients (with a range of 6 month-16 years) with a 16,9% recurrence rate. After enucleation the recurrence rate was 20% and after resection the recurrence rate was 16,7%.

**Discussion:** The treatment depends on imaging featuring (unicystic or multicyclic lesion), anatomical site and dimension of the lesion. Conservative treatment is the first choice in primary cases with unicystic lesion of small dimension. In more complicated cases radical surgery (with immediate reconstruction if possible) is mandatory. Maxillary bone locations, due to the risk of basicranium recurrences, require more aggressive treatments.

#### O-3406

##### **ANALYSIS OF CELL PROLIFERATION AND APOPTOSIS AS A NEW ERA FOR MANAGEMENT OF FOLLICULAR AMELOBLASTOMA**

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**Objective:** Controversy regarding the surgical technique of ameloblastoma is still present. The aim of this study was to assess the degree of aggressiveness of one histological type (follicular) of ameloblastoma using immunohistochemical analysis. Ki67, PCNA, p53 and surviving expression in tumours were assessed to clarify the potential biologic behaviour of this tumour.

**Materials and methods:** This study was carried out on 20 retrospective cases of mandibular follicular ameloblastoma. Paraffin sections of tumour tissue from all cases were submitted for routine H&E stains and immunohistochemistry using Ki67, PCNA, p53 and surviving monoclonal antibodies. Surgical technique was done according to the immunohistochemical result.

**Results:** The positive expression of Ki67 was found in all tissue sections mainly in the nuclei of the central cells than in the peripheral cells. PCNA was also stained in all tissue sections but mainly in the nuclei of the peripheral cells of tumour nests than in central cells. No positivity to p53 was found in the cases studied. Surviving expression was found in 16 (80%) of the cases. The postoperative follow-up was accepted and no recurrence was observed in all cases

**Conclusions:** The results suggest that evaluation of proliferative and apoptotic status together can help in providing more information about the biologic behaviour of the follicular ameloblastoma. The study concluded that the histological and radiographical assessment is not enough for the final management of such cases and Immunohistochemical analysis is a unique approach to detect the biological behaviour of the cells upon which surgery should be addressed.

#### O-3407

##### **UNICYSTIC AMELOBLASTOMA IN AN INFANT – A TREATMENT DILEMMA**

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**Objectives:** The aim of this presentation is to describe the management of a rare case of unicystic ameloblastoma

(UAM) in a 10-month-old girl; to analyze the literature on paediatric cases of UAM; and to propose treatment modalities for this age group.

**Materials and methods:** A 10-month-old girl was evaluated for a right facial swelling of 3 weeks duration. Extraoral examination revealed a swelling of the right cheek with considerable facial asymmetry. Intraoral examination revealed a swelling in the right body of the mandible. It was decided that the patient undergo Magnetic Resonance Imaging (MRI) in order to minimize exposure of a child to ionizing radiation and to assess the extent of bony and soft tissue involvement.

**Results:** The MRI findings of an encapsulated, cystic bony lesion essentially ruled out the likelihood of malignancy, and the surgeons opted for a conservative surgical approach. With the patient under general anaesthesia, the lesion was completely enucleated and sent for histopathological examination. It was microscopically diagnosed as a unicystic ameloblastoma (mural type). No residua of the lesion were seen on a follow-up MRI scan performed 13 months later.

**Summary:** UAM is a variant of ameloblastoma, presenting as a cystic lesion that most commonly occurs during the second decade of life. The uniqueness of this case is the exceedingly young age of the patient at diagnosis (10 months). This girl is the youngest patient reported thus far in the literature. Surgical treatment of infants and children for odontogenic lesions poses difficult management dilemmas, the most important ones being the concern to minimize morbidity, to permit jaw function and to enable uninterrupted facial growth and tooth development. In the mural type UAM, the final diagnosis is possible only after complete surgical enucleation, as in the case under discussion. Since mural UAM, requires aggressive treatment as solid ameloblastoma, the dilemma was whether to subject the child to additional, more aggressive surgery shortly after the final histopathological diagnosis was available or to suffice with very close follow-up. Management decision-making was based on the patient's young age, and the second option was adopted. The patient is now 3 years old and periodic follow-up is ongoing.

#### O-3408

### **SURGICAL TREATMENT AND RECONSTRUCTION FOR CENTRAL GIANT CELL GRANULOMA OF THE JAWS: A REVIEW OF 18 CASES.**

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Central giant cell granuloma (CGCG) is an uncommon benign bony lesion that occurs in the mandible and maxilla. The clinical behaviour of CGCG ranges from a slow-growing asymptomatic swelling to an aggressive lesion that presents with pain, local bone destruction, root resorption and tooth displacement. Therapeutic options have varied greatly over the years. Non-surgical treatments with alpha interferon (alpha-IFN), calcitonin and corticosteroids have been described and their benefits may be worthy of consideration. Surgery is considered the traditional treatment and it is still the most accepted one, however in the literature not all authors agree on the type of surgery which should be performed. Although en bloc resection provides the lowest recurrence rate, only a few single case reports describe the use of this technique followed by

reconstruction with autogenous bone grafts. The authors report their experience with en bloc resection of 18 wide CGCGs which had not been previously treated medically. Immediate reconstruction was carried out for all cases and in one, a fibula free flap was used to reconstruct the mandible. No recurrence was observed. After complete healing of the graft, prosthetic rehabilitation via implants was performed. This allowed the best functional and aesthetic results.

#### O-3409

### **FRONTAL OSTEOMA – AN UNCOMMON PRESENTATION**

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Osteomas are benign bone tumours, representing the most common benign neoplasm of the nose and paranasal sinus. We present a 43yr. male that was admitted to the ER with frontal pitting oedema and pain, suggesting a bug bite. Careful examination revealed sinusitis symptoms, which advocated an imaging study. CT scan revealed filling of the ethmoidal and left frontal sinus, and a radiolucent 1,2cm lesion involving the frontal draining recess described as an osteoma conditioning frontal sinusitis, and possible erosion of the left lamina papiracea. An osteolytic left frontal lesion above the sinus with anterior cortical erosion, hypodense adjacent epicranial soft tissue collection (~6mm) with contrast peripheral enhancement, and inflammatory signs of the dura, were also observed. The patient was proposed for surgical combined Neurosurgical and Maxillofacial intervention. Before surgery he developed cardiac arrhythmia, suggesting meningeal inflammation. Surgery was undertaken, with removal of the osteoma, pus drainage from the sinus, subcutaneous and epidural areas, and meningeal decompression, reverting the cardiac symptoms. Post-op presented no complications and complete symptom remission. This case reveals an uncommon and interesting presentation of a frontal osteoma with sinusitis and intracranial signs and symptoms, with a prompt diagnosis and therapeutic, resulting in a favourable outcome.

#### O-3410

### **TOXIC PHOSPHORUS JAW OSTEONECROSIS AMONG ADDICTS TO SYNTHETIC DRUGS**

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**Objectives:** The use of synthetic drugs such as desomorphine and pervitin can lead to atypical jaw osteomyelitis among drug addicts. The purpose of this study is to present clinical findings and treatment protocol of toxic phosphorus jaw osteonecrosis.

**Material and Method:** Between December 2007 and May 2012 62 patients underwent clinical examination in maxillofacial department. All the patients presented in a study were drug addicts to synthetic drugs – 57 patients to desomorphine (91,93%) and 5 to pervitin (8,06%). 61 out of 62 patients was confirmed to have hepatitis C, 8 were

HIV-positive, 3 patient had tuberculosis. In all patient preoperative CT and standard X-rays were done. In 18 patients we performed mandible resection with immediate placement with a temporary endoprosthesis from nikelid titanium. In 11 patients we performed resection of the maxilla, in 6 cases superficial galea flap was used to eliminate oroantral communication.

*Results:* All patients presented with visible necrotic bone of mandible and maxilla after tooth extraction which remained more than 8 weeks, ample purulent discharge, extra oral fistulas, massive infiltration of soft tissue, deformation of lower and middle third of the face due to infiltration and periosteal reaction, pathologic fractures. The sequestrectomy procedures were performed as jaw resection larger than visible changes of bone seen on preoperative CT and intraoperatively. In 6 patients new areas of exposed bone were noted either on the osteotomy line or on the opposite jaw after 6 month.

*Summary:* According to clinical findings, x-ray data and assuming that during fabrication of both synthetic drugs red phosphorus was utilized, we can suppose that toxic phosphorus jaw osteonecrosis among drug addicts to synthetic drugs are similar to bisphosphonate-induced osteonecrosis and phosphorus jaw necrosis seen in the past.

## Session 35. MICROSURGICAL & REGIONAL FLAPS RECONSTRUCTION IN HEAD AND NECK

### O-3501

#### SUBCLAVICULAR ROUTE FOR CEPHALIC VEIN TRANSPOSITION IN HEAD AND NECK RECONSTRUCTION WITH FREE FLAPS

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**Objectives:** Cephalic vein transposition (CVT) is a technical option in head and neck reconstruction with free flaps when no cervical veins are available as a result of previous surgery and/or radiotherapy. In this communication we report our experience with this technique and introduce the innovation of transposing the cephalic vein (CV) through a subclavicular route to prevent the extrinsic compression of the vein between the clavicle and the overlying tissues.

**Material and method:** Seven patients were reconstructed using this technique. They were all males previously resected for squamous cell carcinoma of the oral cavity with radical neck dissection and postoperative radiotherapy. We used 3 fibular osteocutaneous, 3 scapular osteocutaneous and 1 radial fasciocutaneous forearm flap. The six osteocutaneous flaps were secondary reconstructions and the radial forearm flap was performed at the time of primary tumour resection in a patient with previous radical neck dissection and radiotherapy one year before to treat a cervical node metastasis with occult primary tumour. In the first six cases the vein was transected, transposed and then anastomosed to the corresponding flap vein. In the patient of the radial forearm flap the vein was transposed in continuity with the flap without transection and the venous microanastomosis was not necessary.

**Results:** All flaps survived completely and there was no complication related to the vascular flow of the flap or to CVT procedure. One patient complained about a disturbing keloid scar in the arm, but it wasn't a significant problem and improved after a year.

**Summary:** In our opinion, CVT should be considered in the reconstruction of head and neck with free flaps when local recipient veins are not readily available.

### O-3502

#### AN IMAGE PROCESSING APPROACH TO CHARACTERIZING PERFUSION OF ANASTOMOSES AND/OR MICROVASCULAR FLAPS WITH INDOCYANINE GREEN VIDEOANGIOGRAPHY IN PATIENTS WITH DIFFERENT INDICATIONS

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Depending on the defective size not only bone, but also soft tissue must be reconstructed. The donor region for a microvascular graft must be chosen according to the dimension of bone and/or soft tissue defects. With several times operated patients, or after radiation this vascular

connection is often complicated, if not impossible. Sclerotic changed, or radiogenic injured cervical vessels are not accessible to an anastomosis often, microvascular tissue transfer, hence, not possible. Anastomoses of the graft vessels and cervical vessels allows an immediate graft blood circulation and revitalization can be made by visualization with indocyanin green.

Indications for such procedures are tumour-conditioned defects of the lower jaw, - the upper jaw, - the cranial base, osteomyelitis, osteoradionecrosis, extreme upper or lower jaw atrophy, traumatically conditioned defects after shot injuries, toothless palate cleft patients with extreme upper jaw atrophy. With 94 patients with squamous cell carcinoma, extreme atrophy, injuries, osteoradionecrosis were indications for reconstruction. The blood circulation state of the anastomoses and the graft during and after the operation were evaluated with a perfusionsindex, after ICG-indocyanine green had been injected.

In 94 patients with different indications for reconstruction in the head and neck region indocyanine green has been injected and visualized the perfusion of the anastomoses of the microvascular transplants and the graft. ICG is a good method without surgical intervention for proving the vitality and perfusion of the graft or bone. In 79 patients the representation and perfusion of the graft intraoperatively, immediately after the anastomosis and postoperatively was possible. 6 patients had postoperative complications. 7 patients had a thrombosis in the anastomosis. In 1 patient there was partial graft loss by anatomical compression of the anastomosed vessels and in 1 patient a venous reanastomosis was carried out.

Beside the PET/CT and of the bone scintigraphy and the Doppler sonography, the ICG procedure is a new method to visualize and evaluate the perfusion of a microvascular graft during and after the operation.

### O-3503

#### A MODIFIED OPEN LOOP SUTURE: A RELIABLE ALTERNATIVE IN MICROVASCULAR ANASTOMOSIS

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**Introduction:** A microvascular technique that ensures vessel patency and minimises the ischemic time is very valuable for free tissue transfers. The simple interrupted suture (IS) technique is the gold standard for end-to-end microsurgical anastomosis. Lee introduced the open loop technique for the anastomosis of very small vessels under a clear view and to avoid catching the posterior wall of the vessel. We modified this technique using a spiral interrupted-airborne suture.

**Objectives:** To evaluate the success of the modified open loop suture (MOLS) technique in very small vessels and compare it with the simple IS technique.

**Material and Methods:** The study was performed in 30 Wistar rats with an average weight of 350 g. Using the carotid arteries, with a diameter of 1 mm, the IS technique was performed on one side and the MOLS on the other. The endpoints evaluated were the operating time, leakage through the anastomosis, and patency rates immediately

and 1 and 72 h after the anastomosis. The statistical analysis used the Student's t-test.

**Results:** The mean anastomosis time was 29.97 s for IS and 26.27 s for MOLS ( $p=0.039$ ). The anastomosis leakage was measured using the need for additional stitches; the IS technique required 13 extra stitches and the MOLS 10 ( $p=0.18$ ). The patency rates were 100% with both techniques.

**Discussion:** We modified the open loop suture technique by using a continuous suture forming a spiral in which the loops are interrupted gradually once every stitch is tied, using an airborne tying technique. The operating time was significantly shorter, without decreasing the success rate. The technique should be useful in very small vessels by avoiding through stitches and reducing the ischemia time in complex free tissue transfers with multiple anastomoses or in high-metabolism free flaps that do not tolerate long ischemia times.

**Conclusions:** The modified open loop suture is a safe, reliable technique for obtaining a patent anastomosis with proper placement, spacing, and coaptation of the stitches more quickly.

#### O-3504

##### TWISTING EFFECT ON SUPER-MICROANASTOMOSIS OF THE SUPERFICIAL INFERIOR EPIGASTRIC ARTERY IN A RAT MODEL

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The advent of microsurgical techniques and instruments, particularly in the field of perforator flap and supermicrosurgery, have expanded the scope of microsurgery. Small-calibre vessels, such as those with an internal diameter less than 0.2 mm, are susceptible to inadvertent twisting of the anastomosis. In this study, using the superficial inferior epigastric artery (SIEA)-based flap model in Sprague-Dawley (SD) rats, we evaluated the acceptable limits of twisting effects on supermicroanastomotic sites. A total of 20 supermicroanastomoses were performed using the SIEA-based flap model in 10 male SD rats, 10-weeks-of-age, weighing 300~350 g.

Rats were divided into five groups of two with four flaps as follows: 1) negative control, 2) control group with end to end SIEA arterial supermicroanastomosis, 3) experimental I (EA1) with 90° twisting, 4) experimental II (EA2) with 180° twisting, and 5) experimental III (EA3) with 270° twisting of the supermicroanastomosis. Each SIEA was anastomosed using six 11-0 Ethilon® (Ethicon Inc. Co., New Jersey, USA) stitches except negative control group where the SIEA only was clamped with Supermicro vascular clamps® (S&T, Neuhausen, Switzerland) for 20 minutes.

On postoperative day 10, the skin flap surface texture had no color change and skin necrosis was not found in any group within a 1.0 mm sized grid measurement in less than 1% of the whole skin flap surface ( $p > 0.05$ ). In a semiquantitative assessment of histopathologic findings, there were no statistically significant differences between the groups in six criteria, including cellular swelling,

nuclear swelling, nuclear pyknosis, nuclear pleomorphism, change in dermal collagen, and the number of microvessels.

The anastomosed arterial patency showed no remarkable changes according to doppler waveforms measured with a Swardop 45 Doppler System (Hadeco Inc., Kawasaki, Japan). The pulsatility index (PI) was increased at postoperative day 10 in the EA2 and EA3 groups, and the resistance index (RI) showed no statistically significant difference between preoperative and postoperative values at 10 days. Flap viability and anastomosed vessel patency were not significantly affected by the degree of arterial twisting in this study, other than in the EA3 group where minor effects on arterial patency of the microanastomoses were encountered.

It appears that minor twisting on small caliber arteries, used in supermicroanastomoses, can be tolerated. However, twisting should be avoided as much as possible, and more than 180° twisting must be prevented in clinical practice.

#### O-3505

##### BIOMECHANICAL EVALUATION OF DONOR SITE MORBIDITY AFTER RADIAL FOREARM FREE FLAP

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**Objectives:** Although the radial forearm free flaps (RFF) is a commonly used microvascular flap for orofacial reconstruction prospective studies regarding donor site morbidity are rare.

**Material and methods:** In a prospective study of donor site morbidity 30 free radial forearm flaps for orofacial reconstruction were performed. Biomechanical evaluation included Mayo-Wrist-Score, Dash-Score, grip-strength (B&L Engineering Hand Dynamometer), tip pinch, key pinch and palmar pinch (B&L pinch gauge). Moreover the range-of-movement of the wrist was tested by a protractor in an active and a passive way. All patients were examined preoperatively and three month postoperatively. Primary defects were uniformly closed with autochthonous full-thickness skin grafts from the donor site forearm circumventing a secondary defect site. Quality of life was evaluated using a standardised questionnaire (SF36).

**Results:** Postoperative functional results revealed a reduction in hand strength (grip strength: -18%, tip pinch: -27%, key pinch: -21% and palmar pinch: -16%) or wrist movement: extension, flexion, radial / ulnar abduction and pronation were reduced from 8 to 15%. Supination was changed insignificantly. Mayo-Wrist-Score was reduced by 26% compared to the preoperative situation of the same forearm. Dysaesthesia was usually mild and improved spontaneously as time passed. The patients rated the aesthetic results as good and not limiting their quality of life.

**Conclusions:** The results of this prospective study demonstrate a significant reduction in hand strength and wrist movement after harvest of a radial forearm free flap. The aesthetic results after closure of the donor site defects with the novel technique of an autochthonous full-thickness skin graft are good. Thus a secondary donor site and the

disadvantages of a split-thickness skin graft could be avoided.

#### O-3506

### DONOR SITE MORBIDITY IN ORAL AND MAXILLOFACIAL RECONSTRUCTION PROCEDURES: A REVIEW OF OUR EXPERIENCE

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**Introduction:** Pedicled and free tissue transfers have been established as accepted maxillofacial reconstructive procedures for surgical defects in the head and neck region. Donor site complications are usually limited and acceptable considering the patient's previous malignant pathology, but should not be forgotten, sometimes requiring revision surgeries or specific treatment.

**Material and methods:** This study reviewed 132 consecutive flaps (pedicled or free-tissue transfers) over a 3 year period in order to assess the incidence and causes of donor site complications in patients undergoing reconstructive flap procedures in the oral and maxillofacial region. In most cases, reconstruction was undertaken after resection of a malignant tumour. The flap donor sites were the radial forearm (n= 24), fibula (51), iliac crest (21), rectus abdominis (n=3), latissimus dorsi (n=1) and pectoralis (n= 30). Complications at the donor sites occurred in 63 cases (47.72%) We review the most frequent of each kind of free tissue transfer.

**Results:** The most common complication was inguinal hernia in iliac crest donor site (42.8 %), all of them required revision surgery. The high incidence of postoperative hernia was overcome with a change in the closure technique of the donor site avoiding direct closure and using a non resorbable mesh. Other complications were partial skin graft loss in radial forearm and fibula flaps (25% and 17.64 % respectively) also requiring a second skin graft surgery in some cases, hypo or paraesthesia of the superficial radial nerve territory, restriction of the function of the donor arm, infection (including one case of mucormycosis) and wound dehiscence

**Conclusion:** Donor site morbidity was limited and considered acceptable, although relatively frequent and often requiring specific treatment, including second surgeries, as well as changes in our surgical techniques, and should always be considered before an oral and maxillofacial reconstructive procedure.

#### O-3507

### RECONSTRUCTION OF CRANIAL AND CRANIAL BASE DEFECTS USING PEDICLED FLAPS VERSUS FREE FLAPS AFTER TUMOUR RESECTION

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**Objective.** The harvesting of local flaps is the gold standard to reconstruct craniofacial or cranial base defects after ablative cancer surgery. A second effective reconstructive method, when defects are larger or local tissue conditions prevent to use local flaps is represented by free flaps, such as latissimus dorsi, forearm, anterolateral thigh ones. Traditional pedicled flaps (as latissimus dorsi, pectoralis major, deltopectoral, superior trapezius, lower island trapezius myocutaneous flaps) are commonly the last reconstructive choice because their distal tissues (generally located into the third angiosome) may be lost because of poor vascularization. That may lead to fistulae, infections and life threatening complications. However, in some selected cases, pedicled flaps become an important surgical option. That is the case of patients previously treated with radiotherapy or with poor general health conditions (diabetes mellitus, hypertension, severe vasculopathy).

**Methods.** Between 2007 and 2012, 7 head and neck pedicle flap reconstruction procedures were carried out among our Maxillo-facial and Neurosurgical teams. The patients (4 females, 3 males) were affected by cranial or cranial base tumours. The histology was infiltrating basal cell carcinoma of the temporal region and scalp in 2 cases, squamous cell carcinoma of the occipital and parietal regions in 2 case, bone and soft tissue defects after ablative neurosurgery in 3 cases. The defect size ranged from 15 to 25 cm of major diameter. Three patients were reconstructed with pedicled latissimus dorsi musculocutaneous flap, two with pectoralis major flap, two with lower island myocutaneous trapezius flap.

All patients included in the study have previously undergone radiotherapy or were affected by systemic diseases which could impair the success of a local or microvascular flap.

**Results.** No patients had significant post-operative complications. No total nor partial flaps failure occurred. The morbidity related to this technique was acceptable, with poor functional sequelae and great acceptance by all patients.

Four patients have shown reduced motor function of the upper limbs, so they underwent physiotherapy with great functional improvements.

**Conclusions.** The use of pedicled flaps may offer a safe option in selected cases, offering some advantages such as a shorter duration of the procedure, a shorter hospitalization and reduction of post-operative complication.

#### O-3508

### FUNCTIONAL OROFACIAL RECONSTRUCTION : NIS'S EXPERIENCE



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**Aim:** To present the results of 12 years application of various techniques and methods in reconstruction of defects of the orofacial region.

**Materials and method:** a group of 131 patients of both sexes and age ranges from 5 to 75 years have undergone reconstruction of postoperative and congenital defects such as: direct nonsurgical skin adhesion of skin wounds with Dermabond® skin adhesives ( 55 patients) and Glubran 2(9 patients); closure of parotid extraoral salivary fistula with Dermabond skin adhesive (8 patients); reconstruction of intraoral mucosal defects by means of buccinator myomucosal arterial flaps (24 patients). Reconstruction of soft and bone tissue with microvascular techniques of the following regions: perinasal region by means of prelaminated submental microvascular flap (1patient); lip reconstruction with microvascular forearm flap(3 patients); chin and lip reconstruction with microvascular prelaminated arm flap(1 patient), tongue reconstruction with free microvascular latissimus dorsi flap after subtotal hemiglossectomy(1 patient); jaw reconstruction with onlay, inlay, interpositioning free bone grafts (24 patients), maxillary reconstruction with free scapular microvascular graft and mandibular reconstruction with free fibular microvascular grafts (3 patient) and use of Multiguide mandibular distraction device for distraction osteogenesis of 3 patients with mandibular micrognathia and assymetry.

**Results:** Late thrombosis on the 5th day occurred in patient with microvascular reconstruction with arm flap. Local infection occurred in 4 patients with mandibular bone reconstruction which was controlled by local irrigation and proper antibiotic administration. Partial necrosis occurred in a patient with lateral nose reconstruction but without aesthetic and functional significance. In group with Dermabond and Glubran 2 surgical glues, we achieved absolute success in primary closure of skin wounds without necrosis, inflammation or hypertrophic scars .

**Conclusion:** It is possible to achieve successful reconstruction of lost tissue with the same or similar tissue with minimal morbidity of donor region .

#### **O-3509**

### **DOES THE PECTORALIS MAJOR MYOCUTANEOUS FLAP HAVE MORE COMPLICATIONS IN AN ORAL AND MAXILLOFACIAL SURGEONS' HANDS?**

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The pectoralis major myocutaneous flap has been a workhorse role in the reconstruction of lower part of face since it was introduced by Aryan in 1975.

Several techniques are described in the literature for reconstruction of orofacial defects. It varies from simple primary closure to a major surgery by using a free flap (microvascular surgery). Meanwhile, local flaps and distant flaps have been commonly used by surgeons for coverage of the cervicofacial defects especially in patients with orofacial cancers. In large defects however the sce-

nario would be different. There is no doubt that in large defects the gold standard is to use microvascular surgery but it needs surgical expertise and special equipment that are not available in general hospitals particularly in developing countries.

So the ability of maxillofacial surgeons to use distant flaps for primary reconstruction of large orofacial defects might be very important and helpful to the patients. The question is, are there more complications reported by maxillofacial surgeons compare to the other surgeons when using this flap?

To answer this question, we reviewed the literature and also present our experiences on pectoralis major myocutaneous flap in reconstruction of lower face defects in our department with focused on its complications during recent years. Of 31 patients that we have surveyed, immediate complications consisted of dehiscence in 3 cases (9.6%) and flap necrosis in 2 cases (6.4%). Late complications consisted of dehiscence in 3 cases, partial necrosis of skin without muscle necrosis in 1 case and donor site infection in one case .

#### **O-3510**

### **THE ROLE OF THE PECTORALIS MAJOR MYOCUTANEOUS FLAP IN RECONSTRUCTION OF COMPLEX HEAD AND NECK DEFECTS: A REVIEW OF 17 PATIENTS**

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**Purpose:** The pectoralis major myocutaneous flap (PMMF) is one of several types of pedicle flaps which can be used in reconstruction of complex head and neck defects. Generally, these flaps are used as second choice or alternative surgical procedure, relying in most cases on the microvascular free flap as the ideal reconstruction surgery technique. However, the PMMF may be the best reconstructive option for certain patients.

**Material and methods:** We analyzed all patients treated with reconstructive surgical techniques from 2008 to 2011 in the Department of Oral and Maxillofacial Surgery, Hospital Infanta Cristina, Badajoz. During this period we made 141 reconstructions of complex head and neck defects, of which, 111 were treated with microvascular free flaps and 30 with pedicle flaps. In this last group there were 17 patients with PMMF. We reviewed the reasons to use this flap instead of free flaps, and the complications involved in its use as well as the characteristics of the patients.

**Results:** During this period we analyzed 17 male patients with an average age of 60'7 years. 15 patients presented squamous cell carcinoma of the head and neck. One of these patients was treated to close a pharyngostoma and other patient had arteriovenous malformation. The rate of global complications was 35'2%. We also grouped all the patients in four distinct groups according to the different indications for which we used the PMMF as the first reconstructive and having into account the different characteristics of the patients.

**Conclusion:** The PMMF is often relegated to the back-

ground. According to recent publications, it is widely preferred the use of free flaps because of its aesthetics and functional results, as well as its low complications rates. However, there are many cases in which the characteristics of the patients are not favourable for the free flaps options and the PMMF is chosen as the first reconstructive option. The PMMF is quite easy to shape, thus, it can be employed as a simple procedure to treat complex cases presenting a low rate of complications.

## Session 36. DISTRACTION OSTEOGENESIS

### O-3601

#### SIGNIFICANCE OF DISTRACTION OSTEOGENESIS IN CRANIOMAXILLOFACIAL SURGERY – 10 YEARS OF EXPERIENCE OF ONE CENTRE

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**Introduction:** Since about two decades distraction osteogenesis (DO) has been applied to the field of craniomaxillofacial surgery after G.A. Ilizarov systematically had described the “tension stress effect” as a method for gradual expansion of bone and surrounding soft tissues. Although relevant factors for successful distraction osteogenesis are well known there are ongoing controversies about indications and limitations of the method. It seems that buried, internal distraction devices have achieved widely more acceptance compared to external appliances.

**Material & Methods:** Since 2003 craniomaxillofacial distraction osteogenesis has been applied in the department of craniomaxillofacial surgery, Campus Virchow Klinikum, Berlin, Germany using buried distraction devices by the same team of surgeons. For the planning of unidirectional procedures individual models and casts were routinely used. In more complex situations distraction planning has been supported by virtual simulations using commercially available software. Significance of craniomaxillofacial DO within the whole surgical spectrum of the department is pointed out and illustrated by a selection of typical patients.

**Results:** From 2003 to 2012 around 25.000 patients received craniomaxillofacial procedures under inpatient conditions. During that period distraction osteogenesis has been applied in 60 (6-12) patients affected by different types of deficiency or growth restriction of the craniomaxillofacial skeleton (0,23 %). Although minor distraction related complications occurred (4/60) the majority of procedures ended up with the predicted result and long term stability. Stable vertical mandibular distraction for alveolar ridge augmentation was performed with partially good long term results. Distraction of the ascending ramus has been combined with Anaplastology in order to provide unobtrusive situations in patients affected by CFM before puberty. Craniomaxillofacial distraction was performed in different syndromal patient cases. Since 2007 transpalatal distraction has become more and more accepted for orthognathic treatment documented by an annual increment of applications.

**Conclusion:** According to the departments' statistics craniomaxillofacial distraction osteogenesis plays a minor role with respect to the “number of cases”. However for certain patients the principle of gradual expansion by DO seems to be the therapy of choice to overcome the inherent craniomaxillofacial growth restriction which can barely be achieved by other methods.

### O-3602

#### CRANIOSYNOSTOSIS TREATMENT USING POSTERIOR CRANIAL VAULT DISTRACTION OSTEOGENESIS IN 16 CASES

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**Introduction:** Craniosynostosis, especially in syndromal cases will result in inadequate cranial vault volume. This study reports on experience with distraction osteogenesis of the posterior cranial vault in children requiring increased intracranial volume.

**Materials and methods:** Sixteen patients were treated with cranial distractors. Six children had previously been operated for scaphocephaly and one child for Saether Chotzen syndrome. Four patients had bilateral coronal suture synostosis with Muenke syndrome and five patients had Apert syndrome. At surgery cranial bones were mobilized, the head was widened during surgery, and the segments fixed to each other with distractors. Further expansion at a rate of 1 mm/ day was performed over 2 to 4 weeks. The cranium was distracted posteriorly from 20 to 30 mm.

**Results:** Patients all tolerated surgery and distraction well and parents were able to perform and complete the planned distraction at home. There were no technical problems with the distraction devices. Two cases had minor cutaneous problems, where the distractor penetrated the skin. These cases responded to gentle local wound care measures. At the time of distractor removal, ossification had occurred sufficiently in one of these two cases. In the other case the device was removed and replaced with a resorbable plate, without any harmful effect on the result. In all cases sufficient expansion was achieved without causing more cosmetic deformity. Ossification occurred in all cases.

**Conclusions:** This preliminary series shows that cranial bone distraction is a useful method for cranial expansion with low morbidity in children with craniosynostosis.

### O-3603

#### ZYGOMATIC DISTRACTION OSTEOGENESIS FOR CORRECTION OF MID-FACIAL SUPPORT AFTER HEMIMAXILLECTOMY: EXPERIENCE AND TECHNICAL CONSIDERATIONS.

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**Introduction:** The maxilla is the functional and aesthetic keystone of the mid-face. However, large maxillary defects after oncologic ablation are still a challenge for reconstructive surgery. Distraction osteogenesis of the zygoma has been advocated as a new reconstructive alternative to microvascularized free flaps with less morbidity and long-stable results.

**Patients and Method:** A series of four patients with maxillary defects after oncologic surgery is presented. Internal

bone transport of the zygoma was the reconstructive technique used for restoration of bony support in low maxilla.

**Results:** After a latency period of 15 days, distraction was begun at a rate of 0,5 millimetres per day. A double-step distraction was carried out in three cases, by changing the direction of the zygomatic device. After a consolidation period between 4 to 6 months for each distraction, the devices were removed and bone edges were joined together with an autogenous bone graft (anterior iliac crest and calvarian). A good quality of bone in the distracted gap was observed that allowed dental implant placement and prosthetic rehabilitation.

**Conclusion:** In patients with large maxillary defects in which the remaining bone is insufficient and other reconstructive methods have failed, zygomatic distraction is an excellent option to restore low projection of the maxilla. Bone transport has demonstrated to be a stable reconstructive method that allows restoration of function and aesthetics in oncologic patients.

#### O-3604

### MODIFIED SIMULTANEOUS BIMAXILLARY DISTRACTION OSTEOGENESIS FOR CORRECTION OF FACIAL ASYMMETRY IN CHILDREN AND ADULTS, WITH LONG-TERM FOLLOW UP.

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**Aim:** To study the efficacy of modified simultaneous maxillary–mandibular distraction to correct facial asymmetry in patients with compensated dental occlusion and a canted occlusal plane.

**Patients and methods - Inclusions Criteria:** Patients with facial asymmetry; having compensated dental occlusion and a canted occlusal plane, both children and adults.

During the period January 2000 –December 2010, 60 patients with facial asymmetry (28 males and 32 females). Their age ranged from 8 years to 28 years; with mean age(11 years) were treated using a modified technique of simultaneous maxillary–mandibular distraction. Their facial deformities were caused by hemicraniofacial microsomia (n = 20) or unilateral ankylosis of the temporomandibular joint (TMJ) (n = 30). Fifteen patients were after release of ankylosis, and fifteen patients before release of ankylosis. Six patients had facial asymmetry secondary to unilateral post-traumatic condylar hypoplasia with good mouth opening. Four patients had facial asymmetry secondary to early resection of ramus-condyle unit early in life.

The surgical technique, advantages and limitations of this technique will be mentioned.

**Results:** The mean (range) gain in mandibular height was 16 (13–22) mm, and increase in elongation 14 (11–18) mm achieved over 11–22 days. Predicted movement on cephalometric analysis correlated closely with the actual distraction (mean accuracy 0.4 mm). Improvement in patients with post-ankylosis jaw deformities was better than those with hemifacial microsomia.

Follow up of our patient ranged from one to eleven years.

**Conclusion:** Modified simultaneous bimaxillary distraction osteogenesis is a robust technique that provides the

surgeon with the ability to correct facial asymmetry in patients with hemiofacial microsomia and those with facial deformity after or before release of ankylosis of the TMJ, and other developmental or acquired conditions which may result in facial asymmetry. A cephalometric prediction tracing made before distraction is a reliable guide to the actual distraction needed to correct the facial deformities in these patients.

#### O-3605

### USE OF MULTI VECTOR DISTRACTORS FOR CONCURRENT INDEPENDENT LENGTHENING OF THE MANDIBLE RAMUS AND BODY WITH CHANGE TO THE MANDIBULAR ANGLE, SECONDARY TO HYPOPLASIA .

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Mandibular hypoplasia is part of congenital hemifacial microsomia, Pierre Robin, Franceschetti syndromes and acquired conditions such as TMJ ankylosis. Main goals of rehabilitation of this group of patients are mandibular ramus and body lengthening and angle normalization.

Distraction with uni vector distractors gains the result by stages, but it prolongs the rehabilitation time and increases the number of surgical procedures.

**Purpose:** The rehabilitation of patients with congenital/acquired mandibular hypoplasia.

**Materials and methods:** 17 patients at age from 13 to 18 with congenital/acquired malformations including mandibular hypoplasia underwent a course of treatment with multi vector distractors made exclusively by «Conmet» (Russia). The distractor was constructed with daily extension of 1 mm for body and 1 mm for ramus.

**Results:** Use of multi vector distractors allows increasing the length of mandible ramus and body at the early stage and also allows change to the angle for the occlusal improvement and aesthetics at the final stage. The use of multi vector distractors reduces the number of surgical procedures and in some cases excludes the requirement for orthognathic surgery.

#### O-3606

### "EXTRAORAL STABILIZER" FOR MANDIBULAR DISTRACTION OSTEOGENESIS WITH TWO TRANSPORT DISCS

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Volumetric soft and bone tissue resection and cervical dissections are performed in the treatment of advanced malignant tumours infiltrating the mandible. The lack of reliable data for radicalism and worsened conditions for autogenic bone transplantation sometimes require the use of "endo-prosthesis" from reconstructive plates. They are a temporary solution and the goal is to be replaced with autogenic bone. The distraction osteogenesis is one of the opportunities. In significant defects two transport discs can be used, which requires reliable stabilization during distraction and consolidation period. The extraoral devices

for fixation are one of the options for surgical immobilization of the mandibular fragments.

**Purpose and Objectives:** In the treatment of mandibular defects by distraction osteogenesis with two transport discs, our goal is to create "extraoral stabilizer" which maintains mandibular fragments, joint stability and having possibility to be combined with two factory distraction osteogenesis devices.

**Material and methods:** We surgically treated and observed three patients with cancers of the mouth floor, infiltrating the bone and regional cervical metastases. We restored resectional defects (from 80 mm to 110 mm) of the body of the lower jaw by reconstructive plates. We removed them due to the intrusion of soft tissues up to 12 months. The mandibular defects were restored by distraction osteogenesis with two transport discs - one on each side of the defect. We prepared "extraoral stabilizer" to maintain the equilibrium of the joints, to guide the distraction osteogenesis and to keep the final result in the consolidation period.

**Results and discussion:** In all patients the significant mandibular defects were restored and a good functional and aesthetic rehabilitation achieved. We evaluate the results clinically and radiologically for a period of 6 years. Set up by us "extraoral stabilizer" was successfully combined with two distraction osteogenesis devices. It ensures a possibility for osteoplasty with two transport discs, maintain the stability of the joints and preserve a satisfactory function of the orofacial system during the treatment.

#### O-3607

##### **SYMPHYSEAL DISTRACTION : A SIMPLIFIED PROCEDURE**

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**Introduction:** Mandibular incisor crowding reflects often a transverse bone deficiency. This orthodontic problem is classically treated by teeth extraction, teeth slicing or dental compensation. An alternative is the symphyseal distraction to widen the mandible. The aim of this clinical study was to assess the symphyseal distraction and compare our results with previous studies data and suggest a simplified surgical protocol.

**Materials and Methods:** Twenty-three patients were treated by symphyseal distraction: five with a bone-born device and eighteen with a tooth born device. We retrospectively evaluated pre- and post-distraction inter-canine and inter-molar measurements, morbidity and long-term occlusal stability.

**Results:** Transverse expansion rate was greater in anterior dental arch. Three patients presented a severe mucosa irritation and this represented the main problem. No temporomandibular joint disorder occurred and all patients were in Angle class I occlusion with a minimal follow-up period of 12 months after consolidation. Tooth borne device simplified the surgical procedure.

**Conclusion:** Symphyseal distraction is a safe alternative to the orthodontic treatment of mandibular width deficiencies. Tooth born device procedure is simple, efficient and reliable. Orthodontist can manage the procedure by himself and controls the whole expansion process according to

specific requirements.

#### O-3608

##### **THE CLINICAL - EXPERIMENTAL STUDY OF CONTINUOUS DISTRACTION OSTEOGENESIS.**

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In today's oral and maxillofacial surgery technique compression-distraction osteogenesis is widely used. The mechanism of bone formation in the implementation process of distraction is sufficiently studied in detail. All types of distraction devices available today are motorized and cannot maintain a constant tension in the atraumatic regenerate, alternating with periods of peak tension and relaxation. This led us to the study, the goal of which is the creation and pilot testing of an automatic device for continuous distraction, followed by the study of bone regenerates, and its introduction to the practice of oral and maxillofacial surgery.

Our study was conducted in four stages:

1. Development of an automatic device for continuous distraction.
2. Creating a clinical model of an automatic device for continuous distraction.
3. Experimental testing of the clinical model of the machine in cooperation with company «Konmet» (Russia).
4. Morphological study of obtained bone regenerates.

We created and built an automatic distractor with an engine based on the electrochemical traction and tested it at the Department of Children's Surgical Dentistry and Maxillofacial Surgery MSMSU. With the help of the software the device was able to maintain normal (1 mm in sut.za 4 admission), and continuous mode high rhythmic distraction.

The experimental part of the animal studies was conducted in the operating veterinary centre. Distractor was installed under general anaesthesia on the body of the mandible of experimental animals (dogs). Electronic control unit with a program of continuous expansion (2 mm. a day) was connected in 6 days after distraction. At the end of 3 days the distance between the bone fragments was 6 mm. The shadows of ossification of the new regenerate were determined by the results of radiographic control carried on the 10th and 30th day after the beginning of distraction. The histomorphological studies of distraction regenerates produced by continuous distraction in different modes and rates, in animal experiments clearly demonstrated the possibility of building bone regenerates while they are constantly stretched.

#### O-3609

##### **EXPERIENCE OF DIFFERENT TYPES DISTRACTORS**

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**Introduction:** Different types of pathology of facial bones need to be treated with distractors. Congenital illnesses as

hemifacial microsomia, Pierre Robin, Franceschetti syndromes and acquired conditions such as TMJ ankylosis should also be treated with uni- or multi vector distractors for mandible ramus and body alignment .

Congenital or acquired maxillary hypoplasia should be treated with a palatal distractor for palatal expansion.

*Aim:* The rehabilitation of patients with congenital/acquired mandible and maxillary pathology

*Materials and methods:* 102 patients with congenital/acquired malformations underwent a course of treatment with a distractor made exclusively by «Conmet» Russia. In 71 cases unilateral distractors were applied for mandibular ramus or body hypoplasia . 17 patients were treated with multi vector distractors, which allowed an increase in the mandibular ramus and body length. At the distraction final stage it allowed a change to the mandibular angle with the purpose of occlusal and aesthetic improvement . Activation of uni- and multi vector distractor was 4 times per day and with daily extension for 1 mm each vector. 14 patients were treated with a palatal distractor for palatal expansion. A Palatal distractor is made as a modular construction: 2 plates are securely fixed in the hard palate on the left and right side with a removable central part. The replacement central part allowed smaller to following larger size when necessary.

*Results:* The use of uni- , multi vector and palatal distractors achieved the planned result in all cases and an excellent functional and aesthetic outcome .

*Conclusions:* Rational choice of distractors improves the quality and reduces rehabilitation time.

#### O-3610

### DISTRACTION OSTEOGENESIS OF THE ANTERIOR MANDIBULAR ALVEOLAR PROCESS: TOOTH-BORNE VERSUS BONE-BORNE DISTRACTION DEVICES

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*Introduction:* Anterior alveolar osteodistraction is a commonly known method for enlargement of the dentoalveolar process. Using this technique allows decompensation of retroalveolism or to correct an incongruent curve of Spee. Furthermore bicuspid extractions can be avoided in cases of severe dental crowding of the lower dental arch. For the distraction procedure either tooth-borne or bone borne devices are used. *Aim* of the study was to three-dimensionally evaluate the dentoalveolar changes within the front-block segment after distraction. It was to find out whether one distraction method is superior to the other.

*Material and Method:* Patients with retroalveolism, or severe dental crowding were included in this retrospective study. All patients underwent segmental distraction osteogenesis of the anterior mandibular alveolar process.

In the first group tooth-bone appliances served as distraction devices, while in the second group a bone borne device was used. Several measuring points and angles were defined in order to analyse the amount of skeletal and dental movement within the alveolar segment before and after alveolar distraction osteogenesis. Measurements were carried out on Cone beam CT scans. Additionally a

clinical evaluation of the periodontal status prior and after the distraction procedure was performed.

*Results:* 43 patients were analyzed. In 21 patients tooth borne distraction devices were used, while in 22 patients a bone borne distraction plate was used. Using tooth-borne appliances the amount of dental tipping within the alveolar segmental movement made up to 24% while 76% of the movement was skeletally. In patients with bone borne distractors the alveolar movement was solely skeletal. In almost all patients gingival recessions in the teeth bordering the distraction gap were seen.

*Conclusion:* Distraction osteogenesis is a sufficient method in enlargement of the dentoalveolar process. Using tooth-borne distraction devices the amount of dental tipping is unfavourably high, which excludes patients with a very thin mandibular symphysis, or constricted periodontal health from this technique. In contrast bone borne distraction devices ensure solely skeletal movement of the anterior alveolar segment. This observation indicates a reasonable advantage of the bone borne distraction plate compared to the tooth borne distractors. One has to be aware that gingival recessions may be a side effect of segmental distraction osteogenesis of the anterior alveolar process. This finding occurred in patients with bone-borne distraction devices as well as in patients using tooth-borne distraction appliances.

## Session 37. TEMPOROMANDIBULAR JOINT PATHOLOGY AND SURGERY I

### O-3701

#### DIAGNOSTIC-THERAPEUTIC PROTOCOL IN TEMPOROMANDIBULAR JOINT DISORDERS

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The authors present their protocol and results using different surgical techniques in the treatment of temporomandibular joint disorders

The protocol involves the use of increasingly invasive surgical techniques.

Firstly minimally invasive temporomandibular joint surgery is used, such as arthrocentesis and visual arthrocentesis techniques, which require only local anesthesia and conscious sedation.

Secondly, after the possible failure of the previous techniques, operative arthroscopy is performed under general anesthesia.

In conclusion, arthrocentesis has proved particularly effective in solving the acute closed lock. Arthroscopy showed high efficacy in the treatment of chronic closed lock. Surgery, in a progressive way, firstly with arthrocentesis and secondly arthroscopy, should be considered as the primary treatment in intracapsular temporomandibular joint disorders, due to its low invasiveness and high rate success.

### O-3702

#### WHY TEMPOROMANDIBULAR JOINT SURGERY? A 5 YEARS EXPERIENCE

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**Objectives:** Assess the surgical results of temporomandibular joint (TMJ) surgery, namely arthroscopic and open joint surgery in the treatment of temporomandibular joint pathology.

**Patients and Methods:** The patients presented in the maxillofacial consultation with orofacial pain, TMJ noise or limited mouth opening. All patients were studied with orthopantomograms and magnetic resonance imaging of the temporo-mandibular joint, in severe cases of mouth opening limitation computed tomography was preferred. Surgery of the TMJ was performed after the failure of conservative treatment.

71 patients underwent TMJ surgery in the period between 2007 and 2012 of which 63 were female and 8 male whose age at surgery ranged from 15 to 66 years (mean 33.45 years), giving a total of 103 joints operated on, 47 arthroplasties and 56 arthroscopies. 3 patients were re-operated and 1 patient operated on the right was later on operated on the left side.

The interincisal opening was measured during consultation and the patients rated their pain in a visual analogue scale (VAS) and answered a questionnaire where pain, jaw dysfunction and activities of daily living (ADL) were noted prior to surgery and in different occasions after surgery.

The data was analyzed using statistical software SPSS, the Independent Sample Mann-Whitney U Test and the Wilcoxon Signed Ranks were performed, in order to establish whether there were significant improvements in the results obtained after surgery.

**Results:** There were statistically significant differences between pre and post surgical status in all measured parameters. Pre-operative mouth opening ranged from 5 to 53 mm (29,5 average, SD9.57), whereas post-operative mouth opening ranged from 19 to 67 mm (40.4 average, SD7,21). Pain in VAS improved from 6.0 (0 to 10 scale) to 2.3 (p<.001).

**Conclusion:** The surgery of the temporo-mandibular joint is a safe procedure that allows a dramatic improvement in the quality of life of the patients who suffer from TMJ pain and dysfunction.

### O-3703

#### RESORBABLE PINS FOR DISC FIXATION IN TMJ ARTHROSCOPY. SURGICAL TECHNIQUE AND PRELIMINARY RESULTS

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**Introduction:** Several techniques have been described to fix TMJ disc after reposition during arthroscopy of the temporomandibular joint (TMJ). All of them include the use of different sutures. Most of them fail to maintain the disc in a normal position, as suture is knotted to a soft tissue area.

**Aims:** To describe a new, non published technique, described by Joseph McCain, to fix the central part of the disc to the condylar head through an arthroscopic way, as well as to report the preliminary results with this technique in TMJ dysfunction.

**Material & method:** The technique starts after a standard myotomy of the pterygoid muscle for a proper reposition of the disc. Then a third approach to the joint is performed using a cannula with a distal window through a postero-inferior point. A probe is used to maintain disc in a postero-lateral position. Then a perforation of the disc and condylar head is done with a rotational drill. Later, a resorbable pin is inserted and tapped to fix the disc to the condyle. This pin (Smart-Nail®, ConMed Linvatec Biomaterials Ltd., Tampere, Finland) (CeSa Central Sanitaria S.L.) is 16 mm long and 1,5 mm wide with small teeth on its side that avoid mobility. We analyzed the clinical charts of 30 patients that underwent surgery using this technique; 50 pins were placed.

**Results:** Follow-up included periodical reviews, analysing maximum interincisal opening (MIO), lateral and protrusive movements and pain with a VAS. Also a control MR was made in all cases. Patients were included in Wilkes

stages II and III with a TMJ dysfunction syndrome. All patients improved in all variables analysed. Few complications were observed.

*Discussion:* This technique seems to be the unique that really maintains the disc fixed in normal position. However, it is a difficult technique to perform and a long learning curve is needed. Also, with this fixation, the rotational movement of the condyle under the disc, is lost.

*Conclusions:* The resorbable pin fixation may be an appropriate technique to securely fix the disc in a proper position after repositioning during an operative arthroscopy of the TMJ.

#### O-3704

##### DOUBLE ANCHORS FOR DISC DISPLACEMENT

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The anterior disc displacement, reducible or not, is a lesion that afflicts large numbers of people. We believe that the treatment for these kinds of lesions must be surgical. Based in the described technique by Prof: Dr. Larry M. Wolford in 1992, using an anchor in the latero/posterior region of the mandibular condyle, it is possible to reposition the articular disc. After starting this technique in Brazil 1992, we had a recurrence of disc displacement in 176 operated TMJ's. After re-evaluating the patients and looking at the MRI images, we performed surgical revision for the patients. During the operative we observed that the disc was displaced into the medial region. We introduced one anchor in the lateral pole, pulling the articular disc to the lateral region and suturing it, keeping complete covering of the mandibular condyle ( Bucket Handle). After the patients had been evaluated for a period of approximately five years, we had a recurrence of 4,2%. Our conclusion, is that the fixation of the articular disc with double anchors allows greater stability of the disc and completely covers the articular surface of the mandibular condyle.

*Keywords:* Temporomandibular joint; mandibular condyle

#### O-3705

##### SURGICAL REDUCTION FOR TMJ DISLOCATION VIA SIMPLIFIED DIRECT APPROACH TECHNIQUE –A SURVEY OF 40 PATIENTS

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*Aim:* To establish the reliable procedure for dislocation of the temporomandibular joint (TMJ), especially for medically compromised patients.

*Materials and Method:* Sixty-six TMJs in 40 patients (average age with 83 years) were subjected. The patients could be divided into habitual dislocation (29 pts) and prolonged dislocation (11 pts) and the majority had dementia and serious systemic disease. The original procedure was performed under local anesthesia in 37 patients and under general anaesthesia in the other 3. This was based on a vertical skin incision approximately 2cm just above the articular eminence and careful blunt dividing of

the subcutaneous tissues, entering into the superior compartment through the lateral capsule. The eminence was shaved using an electric drill according to the conventional manner. Additional procedures with high condylectomy and/or discectomy was available in selected recurrent or resistant cases to eminectomy alone.

*Results:* This procedure was successfully undertaken in all cases. The operation time averaged approximately 50 minutes. Nine patients had recurrent symptom in which 5 patients were re-operated on to obtain a successful result. Another problem in prolonged dislocation group was disclosed, the complete reduction obtained in only 8 pts due to involuntary movement resistant to intermaxillary fixation. Incomplete 7th nerve palsy was identified in 2 cases.

*Conclusion:* The simplified approach to the TMJ is reliable procedure for dislocation patients without care for facial skin scar.

#### O-3706

##### A MULTICENTER STUDY EVALUATING EMINECTOMY AS A TREATMENT FOR CLOSED LOCK

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Eminectomy is an uncommonly performed operation. There are no absolute indications for this procedure but it was originally described as a treatment for recurrent dislocation of the mandible and involves the surgical removal of the articular eminence from the cranium. A pilot study published in 1994 pioneered the eminectomy for the treatment of closed lock caused by internal derangement or intra-articular adhesions. Locking occurs when the articular disc does not reduce into its original position on mouth opening thus preventing the mandibular condyle from achieving its full antero-inferior movement. This retrospective study combines data from this original paper and also data from two other centers.

All patients who underwent eminectomy as a treatment for closed lock had been refractory to conservative management and evidence of internal derangement had been demonstrated on MRI. Success of the operation was measured by reduction of pain, improvement of function (mouth opening) and reduction of clicking. In addition complications were recorded: damage to the facial nerve, great auricular nerve and auriculotemporal nerve.

100 eminectomies were performed across the three centers over a period of 18 years. 69% of patients who underwent eminectomy were pain free at discharge. The mean improvement of mouth opening was 13.3mm (comparing the inter-incisal distance measured at initial consultation and discharge). 42 patients described troublesome clicking as a symptom and of these 20 had complete resolution at discharge (43%). 6% of patients suffered the complication of permanent weakness in the distribution of the temporal or zygomatic branches of the facial nerve. 4% had permanent loss of sensation in the distribution of the great auricular nerve damage whereas 18% had clinically detectable damage to the auriculotemporal nerve.

The results demonstrate a clinically significant improve



ment in function and reduction in pain which indicate the eminectomy as a successful treatment for closed lock.

Please note that by September 2012 further data from another center may be available for inclusion into this study.

#### O-3707

##### PRELIMINARY STUDY OF CONDYLECTOMY VIA INTRAORAL APPROACH.

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**Objective:** Condylectomy was used to treat condylar osteoma or hyperplasia. We introduce two methods of condylectomy via intraoral approach and their clinical results.

**Patients and Methods :** 35 patients were treated by condylectomy via intraoral approach, age ranged from 22 to 57. 21 patients were condyle osteoma, 14 patients were hemimandibular hyperplasia and condylar hyperplasia. Intraoral vertical ramus osteotomy (IVRO) was used to treat 32 patients and intraoral condylectomy via coronoid process resection was used in 3 patients. **Results:** All patients achieved good occlusion, oral function and facial symmetry after the operation. The temporomandibular joint (TMJ) dysfunction syndrome alleviated or disappeared. The follow-up period was 6 months to 3 years and no relapse of condylar osteoma or hyperplasia was found. The patients who had IVRO and TMJ reconstruction had some degree of transplanted bone resorption, and one patient had relapse of facial asymmetry. The patients who had intraoral condylectomy via coronoid process resection only had mild condyle remodeling and no obvious bone resorption.

**Conclusion :** Two methods of intraoral condylectomy can successfully correct the facial deformity and TMJ dysfunction caused by condylar osteoma or hyperplasia, but the surgeons need to have excellent surgical skills and careful selection of the indications.

**Key words:** condyle osteoma, intraoral approach, temporomandibular joint

#### O-3708

##### LONG-TERM CLINICAL OUTCOME OF TEMPOROMANDIBULAR JOINT TOTAL AND HEMI-ARTHROPLASTIES: A THIRTEEN-YEAR RETROSPECTIVE AUDIT

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**Purpose:** The current evidence on the efficacy of total and hemi- prosthetic replacement of the temporomandibular joint (TMJ) in the short and medium term is adequate as the National Institute of Clinical Excellence (NICE) guidelines suggest. However, the evidence on long-term efficacy and on safety is less so.

**Aim:** To evaluate the clinical and functional outcomes of TMJ total and hemi-arthroplasties in the long-term.

**Materials and Methods:** Over a thirteen year period, 26 patients involving 34 joints were operated on (18 hemiar-

throplasties and 8 total arthroplasties) using the Christensen prosthesis. Parameters used to assess clinical and functional outcome was 3 fold: i) pre- and post-operative maximum incisal opening, ii) Pre- and post-operative pain and iii) pre- and post-operative diet (normal, soft or liquids). Clinical diagnosis, surgical complications and length of follow-up were noted.

**Results:** The study consisted of 18 hemi-arthroplasties (78% female, 22% male, mean age 44 years) and 8 total arthroplasties (75% female, 25% male, mean age 32.5 years). Main reason for total TMJ arthroplasty was degenerative arthritis (57%) and internal derangement (61%) for hemi-arthroplasty. Mean follow-up period for total arthroplasty and hemiarthroplasty was 42 months. Seventy-one percent of hemi-arthroplasty patients and 50% of total arthroplasty patients had improvement in pain; 58% of hemi-arthroplasty patients and 63% of total arthroplasty patients had an improvement of maximal incisal opening with a mean increase of 6.2mm and 7.7mm respectively; 54% of hemi-arthroplasty patients and 25% of total arthroplasty patients had improvement of their diet. Complications included facial weakness and device failure. Joint prosthesis had to be removed in 13% (n=1) of patients who had a total arthroplasty and 33% (n=6) of patients who had hemi-arthroplasties of which 4 were replaced.

**Conclusions:** Majority of patients in either cohort experienced an improvement in more than one parameter. The long-term efficacy of hemi- and total TMJ arthroplasties are satisfactory, with the majority of complications occurring in the short to medium term and amenable to treatment.

#### O-3709

##### FUNCTIONAL OUTCOME AFTER ALLOPLASTIC TOTAL-TMJ-RECONSTRUCTION (TJR)

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**Purpose:** Purpose of this prospective study was to analyze functional and subjective outcomes of patients after alloplastic TJR. Evaluation was done concerning joint mobility, maximum voluntary bite force, objective pain threshold and the subjective oral health related quality of life.

**Patients/Methods:** Seventeen patients with different diagnoses resulting in condylar hypomobility (8 patients; 15 joints) and condylar instability (9 patients; 12 joints) had undergone alloplastic TMJ reconstruction. Data were recorded preoperatively (T0), 2 (T1), 6 (T2) and  $\geq 12$  (T3) months postoperatively. Mobility (mandibular kinematics) was measured with an ultrasound based jaw-tracking device, bite force was recorded with an individual manufactured bite fork and pain was evaluated using a pressure algometer. generic oral health related quality of life was assessed using a visual analog scale (VAS) and the German oral health impact profile (OHIP-G 49) to estimate subjective impressions.

**Results:** All measured movements showed an increase in mobility in cases of hypomobility. Independent from the diagnosis, maximum voluntary bite force of the operated

TMJ steadily increased from average 88.85N  $\pm$ 84.25N at T0 to 166.51N  $\pm$ 97.75 at T3. The mean VAS ratings decreased for all items from T0 to T3; mean improvement percentage was  $\geq$ 58.2%. Prevalence for negative responses assessed with the OHIP-G more than halved from T0 to T3.

*Conclusion:* Data of this study suggest alloplastic TJR as a reliable surgical technique with positive functional outcome. For long-term-results a reevaluation of the patients will be performed.

#### O-3710

### AUTOLOGOUS FREE FAT GRAFTS PLACEMENT AFTER FAILED ALLOPLASTIC TMJ RECONSTRUCTION

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A variety of alloplastic materials have been used to reconstruct the human temporomandibular joint. Alloplastic implants such as Silicone rubber and Proplast- Teflon interpositional implants (PTIPI) and autogenous grafts, such as temporalis fascia, ear cartilage, dermis graft, fat graft and abdominal dermis-fat graft were used to replace the articular disc following TMJ discectomy procedures. During the past several years management of failed alloplastic TMJ reconstruction has progressed from a subject for discussion. Various protocols for the management of failed alloplastic TMJ disc implants were described in literature. These involved removal of the implants, joint debridement, recontouring of the articulating surfaces, and placement temporalis muscle/ fascia flap, sternoclavicular graft, dermal graft, conchal cartilage, costochondral graft or total joint prosthesis for joint reconstruction..

Abdominal fat harvest and augmentation to the maxillofacial region is a relatively inexpensive, safe, and readily available procedure. Autologous free fat grafts prevent scar formation by acting as an effective haemostatic agent and space filler that prevents the accumulation of blood and serum, which would otherwise turn into scar or bone. In the literature, most autologous grafts have been used to replace failed alloplastic implants. However, there is no report autologous free fat graft placement after failed TMJ alloplastic reconstruction. This study presents a protocol for the management of failed alloplastic TMJ reconstruction that consisted of removal of the implant, joint debridement, recontouring of the articular surfaces, and placement of an autologous free fat graft.

#### O-3711

### ARTHROPLASTY WITH THE CORONOID PROCESS IN THE TREATMENT OF TEMPOROMANDIBULAR JOINT ANKYLOSIS

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*Keywords:* temporomandibular joint ankylosis, arthroplasty, sagittal osteotomy

The contemporary operating protocol for the treatment of

temporo-mandibular joint ankylosis (TMA) includes: aggressive resection to 1/3 of branches and ipsilateral coronoidectomy; in cases of no intraoperative mouth opening more than 30 mm contralateral coronoidectomy is performed as well; with reconstruction of the joint and early mobilization. The arthroplasty is performed with artificial joints or autogenous bone grafts. It was discovered that the autogenic grafts gradually formed organotopic bone regenerating fields. Their shape is close to the anatomical one of the articular processes and they can perform their functions. However, they require a donor area, which is related to a defect, trauma and pain.

*Purpose and Objectives:* Our goal was to use the coronoid processes, which other surgical techniques eliminate, for an arthroplasty.

*Material and methods:* We used the method in two patients with TMA (28 years old man with ankylosis at the right side and 17 years old girl with bilateral TMA). We removed the ankylosing condylar processes by an extraoral approach and formed a new articular fossa. Intraorally sagittal osteotomy by the method of Trauner-Obwegeser was performed. We distalized the lateral segment while the coronoid process settle in the newly formed joint fossa, medialized the lower jaw to optimal occlusal relationships and osteosynthesized.

*Results and Discussion.* Seven years of observations confirm that the method forms new joints of autogenic mandibular bone material. It adjusts the height of the ramus of the lower jaw and the disturbed occlusion. It improves the contact area, fixation and conditions for healing process. The method is applicable in cases free of ankylosing bone joint processes, unexpressed micrognathia or after the completion of the growth of the jaws. The method could be another treatment option in cases of TMA.

#### O-3712

### TOTAL PROSTHESIS OF THE TEMPOROMANDIBULAR JOINT

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*Introduction:* Total reconstruction of the temporomandibular joint (TMJ) is the method used for the treatment of the extensive pathology of the TMJ. *Aim of the study:* to describe our own experience in treatment of mandibular ankylosis by means of a total joint prosthesis.

*Material and methods:* The study included three patients with ankylosis of the temporomandibular joint. The surgical details of inserting joint implants is described and additionally illustrated with clinical cases.

*Results:* Morphological, functional and esthetic outcomes of the surgical treatment in these three patients was assessed as good.

*Conclusion:* On the basis of our observations and experience it can be concluded that the surgical technique of replacing TMJ proved a useful alternative to other surgical methods of managing TMJ pathologies.

**O-3713****SLIDING RAMUS OSTEOTOMY FOR RECONSTRUCTION OF THE CONDYLE (LETTERMAN TECHNIQUE)***Ana Otero-Rico<sup>1,\*</sup>, Javier Collado-López<sup>1</sup>, Inés Vázquez-Mahía<sup>1</sup>, María Pombo-Castro<sup>1</sup>, Jose Luis López-Cedrún<sup>1</sup>**<sup>1</sup>Department of Oral and Maxillofacial Surgery. University Hospital A Coruña, Spain*

**Introduction:** Controversy concerning the best way to reconstruct the mandibular condyle continues to exist. Many methods using autogenous as well as alloplastic materials have been reported. The first may lead to resorption in the long term with subsequent decrease in height of the ramus, resulting in facial asymmetry and deviated mouth opening. The latter tend to cause foreign body reactions, with the risk of extrusion and displacement. The Letterman split osteotomy offers the option of a pedicled graft avoiding both bone resorption and foreign body reaction. Our objective was to assess the feasibility and clinical outcome of the sliding vertical osteotomy for condylar reconstruction.

**Patients and Methods:** Three adult patients, one with the diagnosis of osteochondrosarcoma and two with posttraumatic sequelae, underwent resection of the condyle or removal of the fractured condylar segment respectively. Simultaneous reconstruction of the condylar process with vertical sliding of the posterior border of the mandibular ramus was performed in all cases. While the preauricular approach combined with a cervical incision was used in two cases, in the third patient surgical access through the preauricular region was combined with a transmasseteric dissection instead. The facial nerve and its branches were carefully preserved. In all patients, either a temporalis muscle myofascial flap or the native articular disc was inserted as interpositional tissue. The stump of the posterior border of the mandible was remodeled to create a neocondyle with a functional shape for proper positioning in the glenoid fossa. Rigid fixation was performed with titanium miniplates.

**Results:** After two to twenty-five months follow-up, all patients showed apparent improvement of joint function and occlusion. However, various degrees of paresis of facial nerve branches were observed, which resolved completely in two cases, and may still resolve in the third case. Good remodeling, without resorption of the neocondyle was achieved.

**Conclusions:** From our experience a sliding vertical osteotomy is a viable option and a promising alternative in the management of condylar defects, with satisfactory functional and cosmetic results. Further evaluation is needed to confirm the favourable long-term outcome of this technique.

## Session 38. HEAD AND NECK RECONSTRUCTIVE SURGERY

### O-3801

#### ANTIBIOTIC PROPHYLAXIS IN MAJOR HEAD AND NECK RECONSTRUCTION

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**Objective:** To identify the variations in antibiotic prophylaxis practices for major head and neck oncologic reconstruction amongst practitioners in Europe, North America, and Australasia.

**Methods:** Invitation to participate in an online survey available in English and French was distributed to members of the European Academy of Craniomaxillofacial Surgery, the Canadian Society of Otolaryngology-Head and Neck Surgery, the American Head and Neck Society fellowship programs, the Head and Neck Oncology practitioners in the United Kingdom and Italy, and the Australia and New Zealand Head and Neck Cancer Society. This instrument sought to identify standards of practice for MRSA screening, the roles in the multidisciplinary team in determining antibiotic protocols, patient factors that would cause deviation from protocol, rates of post-operative infections, and general philosophies in antibiotic routines.

**Results:** Surgical practitioners in North America, Europe, Australasia, and the Middle East completed 145 responses. Responders included otolaryngology-head and neck surgeons (40%), maxillofacial surgeons (57.2%) and general plastic reconstructive surgeons (2.8%). 74% of respondents performed at least 20 major head and neck reconstructions per year. While 98.6% of respondents employed standard post-operative antibiotics, only 81% have a standard protocol with complete adherence to this protocol in 53.9%.

**Conclusions:** While there appears to be significant regional variations regarding standard antibiotic prophylaxis for major head and neck reconstruction these variations do not translate to significant differences in rates of post-operative infections.

### O-3802

#### THE SUBMENTAL FLAP IN MAXILLO-FACIAL RECONSTRUCTION: INDICATIONS AND LIMITATIONS. OUR EXPERIENCE

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**Introduction:** Defects resulting from surgical excision of maxillo-facial cancer sometimes require reconstruction using microvascular free tissue transfer. The submental flap is a regional island flap which helps eliminate microsurgical risks. This work aims to present our experience with this flap, since it was first introduced into practice in 2008, to point out the anatomical variations encountered and to explain its indications and limitations.

**Patients and method:** A successive series of 11 patients in which oral reconstruction was performed by using the submental flap was reviewed retrospectively, and the results were analyzed.

**Results:** Submental flap was performed on 11 patients (8 men and 3 women) between 2008 and 2012. Mean patient age was 55.5 years (ranged from 31 to 69 years). The flap was used to reconstruct defects resulting from oral malignancies excision of tongue, floor of the mouth, posterior and superior alveolar ridge and palate. There were no cases of marginal mandibular nerve palsy. Two flaps suffered partial necrosis (of 30% and 50%). MRND was performed in all patients and there were no neck recurrences. Still, 1 patient developed an intraoral recurrence of the tumour, 1 patient was diagnosed with a secondary metachronic laryngeal tumour and 1 patient developed a liver metastasis. In one case we dealt with the intraoral exposure of the mandibular reconstruction plate covered with the submental flap. The other cases developed no local or general complications.

**Conclusions:** The submental flap is a viable treatment option in selected cases with a correct flap harvesting technique.

### O-3803

#### THE SUBMENTAL ISLAND FLAP: A PROPER AND SAFE OPTION FOR ORAL RECONSTRUCTION IN HEAD AND NECK CANCER

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Since its first description (Martin 1993) the submental island flap (SIF) has been used for reconstruction of non-malignant diseases or low-grade cutaneous malignancies defects. Recently, other Authors, have described this flap for reconstruction of defects following oral carcinoma resection, but in our opinion, clear and safe indications have not been proposed until now. These indications are mandatory in the case of oral cavity squamous cell cancer, because the submental flap, harvested in the region of the first neck lymphatic drainage level, can compromise the oncologic sound of neck dissection or can transfer malignant nodal tissue to the area of reconstruction with relapse of disease. We report the use of SIF, clarifying its safe indications and its proper technical execution, in a selected group of patients for successfully reconstruction of cheek-mucosa defects following SCC ablation. The lower rate of neck metastases of these lateral tumours explains the minor involvement of submental (level Ia) nodes. From January 2006 to March 2011, in our department, 10 patients with SCC of the cheek-mucosa underwent submental island flap reconstruction. Neither clinical nor radiological evidence of neck metastases results in the preoperative assessment, nevertheless all patients were submitted to a prophylactic selective neck dissection. The patients ranged in age from 70 to 91 years with severe co-morbidity. All the patients are alive with no evidence of loco-regional and distant disease after a median follow up of 36 months. There were no cases of flap failure. The minor complications encountered were marginal flap necrosis in one case that was healed uneventfully and an haematoma in the neck in another case without consequences for the flap. Functional and aesthetic outcomes were assessed by surgeon and by patient and were excellent in all cases. Recent

advances in local and regional flap outcomes have shown distinct advantages over the use of free tissue transfer in certain circumstances. When the cheek-mucosa is involved by SCC, the SIF represents an excellent reconstructive alternative to free flaps without prejudicing the oncological radicality, in old patients with co-morbidity strictly NO.

#### O-3804

### REVIEW OF 25 TEMPORALIS MUSCLE FLAPS USED AS PRIMARY RECONSTRUCTION FOLLOWING MAXILLECTOMY

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**Objectives:** This paper presents our experience utilising the temporalis muscle flap for reconstruction and rehabilitation of intra-oral maxillary defects following maxillectomy.

**Method:** This is a retrospective review of 25 consecutive patients having maxillectomy for both benign and malignant disease followed by immediate reconstruction with a temporalis muscle flap from December 2007-2011.

**Results:** The overall survival rate of the temporalis muscle flap was excellent. Complications encountered include: dehiscence of the distal margin of the flap, trismus and oro-nasal fistulae. Despite this being a soft tissue flap, in the majority of cases denture rehabilitation has been achieved. Post-operative functional outcomes such as speech, chewing and swallowing were satisfactory and interestingly no untoward aesthetic concerns were reported with regards to hollowing at the donor site.

**Conclusion:** The temporalis muscle flap is a simple and robust flap with a predictable outcome. There was a low complication rate. Satisfactory functional and aesthetic outcome can be expected and this flap still deserves full consideration as an immediate reconstructive option for maxillary defects.

#### O-3805

### THE USE OF PMMA FOR RESTORATION OF THE TEMPORALIS FLAP DONOR SITE: OUR CLINICAL EXPERIENCE

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The use of temporalis myofascial flap (TMF) as a pedicled flap in craniofacial reconstructive surgery is well established. This technique may provide a cosmetic deformity of the temporal fossa with an asymmetric contour of the head. Reconstruction of this donor site deformity is desirable. We report the use of polymethyl-methacrylate (PMMA) (Palacos®). From January 2009 to December 2011, 11 patients (6 men and 5 women) aged 81 to 56 years (mean 67) were treated. Ten patients had squamous cell carcinoma and 1 mucoepidermoid carcinoma of minor salivary glands in the upper jaw. The oncological defects were reconstructed with TMF and the temporal fossa was simultaneously filled with PMMA. A retrospective review of the postoperative complications (hematoma, seroma) and the aesthetic results was conducted. All patients

were contacted 6 months later by phone and provided with information pertaining to the aims of this study. The patients were then instructed on how to fill out the relevant questionnaires. Aesthetic results were judged satisfactory from all patients. The hemicoronal skin flap healed uneventfully in all patients and did not cause a visible scar even to bald male patients. In our group of patients no surgical seroma or hematoma in temporal fossa were observed. PMMA reconstruction was characterized by excellent biocompatibility with no inflammatory activation. The symmetry of temporal fossa was judged satisfactory. Intraoperative cast-molded camouflage of the temporalis flap donor site with PMMA is a feasible, accurate, fast, and cost-efficient technique that results in excellent cosmetic.

#### O-3806

### THE PLATYSMA MYOCUTANEOUS FLAP (PMF) FOR HEAD AND NECK RECONSTRUCTION: A RETROSPECTIVE AND MULTICENTRIC ANALYSIS OF 91 T1-T2 PATIENTS.

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The platysma myocutaneous flap (PMF) was first applied to intraoral reconstructions in 1978. PMF is not only an alternative to microvascular flaps but it also represents an excellent reconstructive choice especially in cases where free tissue transfer cannot be carried out. Failure and complications rate have been described as varying from 18 to 45% and this is why this flap should not be used in specific cases such as in the presence of cervical metastases and in cases of mandibulectomy and simultaneous reconstruction with alloplastic materials. The purpose of this study is to examine the experience and results obtained in three different and independent institutes in Turin, Italy, where PMF has been adopted in 91 patients for head and neck cancer reconstructions. The authors report their departments' separate but simultaneous experiences with PMF for small and middle-size soft tissue defects in a 10-year period.

#### O-3807

### THE SUPRACLAVICULAR FLAP IN THE RECONSTRUCTION OF HEAD AND NECK DEFECTS

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The reconstruction of head and neck defects involving soft tissues is often complex because of the functional and aesthetic importance of the structures involved. The restoration of the mucosal and face lining, in fact, requires the use of reliable, pliable and color matched flaps

The methods currently available range from skin grafts and loco-regional flaps, mostly myo-cutaneous flaps, to the revascularized flaps. The improvement of microsurgical techniques in recent decades has led to an increasingly wide use of the latter, with predominant use of the forearm or anterolateral thigh flaps. In the proposed study we

analyze and propose the use of the fascio-cutaneous supraclavicular flap as a suitable reconstructive option. Based on the supraclavicular artery, branch of the transverse cervical artery, this flap allows the use of a skin paddle sizing up to 18x25 cm. The shoulder skin is pliable, often thin and, unlike other donor sites, is characterized by an appropriate colour matching. The long vascular pedicle (up to 20 cm) and the pivot at the supraclavicular area allow the flap transposition to reconstruct defects at a distance such as the temporo-orbital region. The direct closure of donor site significantly reduces the post-operative morbidity and the recovery time of the patients.

The presentation will explain the anatomy, surgical technique, indications and complications associated with use of the supraclavicular flap. It will also discuss its use as an alternative to the more common revascularized flaps in the reconstruction of defects affecting the oral cavity (cheek, tongue, oropharynx, palate, floor of the mouth) or the skin of the neck or face.

### O-3808

#### VERSATILITY OF TONGUE ISLAND FLAP IN RECONSTRUCTION OF THE DEFECTS AFTER ORAL CANCER RESECTION.

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Tongue flaps have been extensively used in reconstruction of various defects in the oral region such as : palatal, buccal, tonsillopharyngeal ,floor of the mouth and vermilion(Bakamjian & Calomel, McGregor). According to the vascular pattern, these are anteriorly or posteriorly based random flaps. Tongue island flap is an pattern flap axial, based on lingual artery and vein. It is first described by Virag 1996, as a reliable method for the reconstruction of floor of the mouth defects after ablation of T2 tumours.

Since that time, we have done 47 reconstructions for T2 and even T3 tumour defects on a various region of oral cavity. There were 3 floor of the mouth and alveolar ridge defects(anterior and lateral), 6 retromolar region defects, 4 buccal mucosa defects, 3 palatoglossal defects and even 2 labial defects.

In 3 cases (6,3%) we had complications with superficial necrosis of the flaps due to a venous stasis. There were no speech and swallowing problems in neither cases.

Careful dissection of lingual artery and vein deeper into the base of the tongue gives us a longer pedicle and more freedom for bringing the flap to the distant regions of the oral cavity. Also, careful planning of the flap can give us up to 5x7cm of epithelized tissue for even T3 defects to be covered, which is very beneficial particularly to the elderly patients who are not considered to be suitable for regional flaps or microsurgical reconstructions.

### O-3809

#### CHEEK MUCOSA: A VERSATILE DONOR SITE OF MYOMUCOSAL FLAPS. TECHNICAL AND FUNCTIONAL CONSIDERATIONS

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The reconstruction of mucosal defects of the oral cavity or the oropharynx, secondary to cancer ablation or traumatic injury, is typically performed with skin grafts and local, regional, or distant flaps. Apart from the notorious disadvantages of split-thickness skin grafts, myocutaneous locoregional flaps, which provide a large amount of viable tissue, may impair the functional result because they are too bulky in most cases of medium-sized intraoral defects. Indeed, moderate-sized intraoral defects (not extending into the cervical or facial skin) represent a reconstructive challenge for the surgeon because they are too large for primary closure and yet too small to be properly filled using currently available flaps. Although free, axial, or perforator flaps are excellent for large defects, they may not provide mucosal sensitivity, mobility, volume, or texture similar to that of native tissue. A goal in plastic surgery is that “the ideal reconstruction should be accomplished with the same or similar type of tissue as the original.” Cheek myomucosal flaps pedicled on branches of the dense vascular network between the facial artery and the internal maxillary artery conform to this rule because they carry thin, mobile, well-vascularized, and sensitive tissue, like that excised or lost. As they share the same operating field as the defect, these flaps can be readily and quickly harvested; they do not require 2 surgical teams, entail shorter operating times, and cause lower donor-site morbidity, without leaving a conspicuous scar. These advantages justify the renewed interest in these flaps. Several surgical techniques have been reported, but literature lacks a summary of the various types of flaps that is possible to harvest from cheek mucosa. We fully exploited the cheek mucosa as donor site of multiple flaps and proved the versatility in a large series of 69 buccinator myomucosal flaps. We present 6 types of different buccinator myomucosal pedicled flaps, drawing attention to technical modification and different applications of these flaps.

### O-3810

#### SUBLINGUAL GLAND FLAP FOR RECONSTRUCTION OF ANTERIOR AND ANTERO-LATERAL FLOOR OF MOUTH DEFECTS

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**Background:** Functional closure of floor of mouth defects remain a challenge. Healing by secondary intention, regional or even free flaps are used in the reconstruction of these defects. A new method of reconstruction of the anterior and antero-lateral floor of mouth and mandibular defects after ablative surgery is described.

**Methods:** Six consecutive patients with suitable T1 and T2 floor of mouth and mandibular alveolar carcinomas were investigated regarding the use of the sublingual gland as a flap for the coverage of resection defects.

**Results:** In all patients it was possible to mobilize the remaining part of the sublingual gland or contra lateral sublingual gland on its vascular supply to such an extent that full coverage of the defect, often including the mandible was possible. Vascular perfusion could be maintained

in all cases and further healing was uneventful, apart from a mucocoele development in one patient. Slight elevation of the floor of mouth was observed in all patients without clinical consequence. All patients maintained good speech, one patient had slight restriction of tongue mobility.

*Conclusions:* The newly described sublingual flap should be considered as a reliable reconstructive option for most T1 and smaller T2 lesions in anterior and antero-lateral floor of mouth defects, utilizing local tissues with minimal morbidity.

#### O-3811

### FREE AUTOGENOUS BONE GRAFTS IN PATIENTS WITH BONE DEFECTS WITHIN THE FACIAL SKELETON.

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#### *Introduction*

Reconstructive surgery within the facial skeleton is a problem involving many concepts and methods that are designed to restore the proper function and esthetics of dentition. The multitude of clinical procedures, materials and methods of their use often makes the physician obliged to take a decision based on empirical knowledge.

Autogenous material is widely recognised as the most biocompatible and predictable reconstructive technique. In most cases its use in facial skeleton reconstructions leads to therapeutic success. Still, the loss of newly forming bone and the risk of local complications are the most common problems.

*Aim of the study:* The aim of the study is to present bone reconstructions within facial skull by means of free autogenous iliac crest bone grafts.

*Materials and Methods:* Presented patients required alveolar bone reconstruction of height, width or needed to restore jaw continuity after segmental resection surgery. Eight autogenous iliac crest bone grafts were performed. In two cases bone marrow mixed with bone chips was applied into recipient site. Patients were controlled both clinically and radiologically. CT scans were performed before surgery, after surgery and during the healing period. These X-rays were also used for implant treatment planning. In cases of bone marrow application, its laboratory analysis was conducted as well.

*Results and conclusions:* Analysis of CT scans allows assessing the potential loss of newly forming bone. The cases presented are now over 3 months in observation, and some of patients have implants already installed.

Scientific work financed from the budget for science in 2010-2013 as a research project.

#### O-3812

### MANDIBULAR RECONSTRUCTION WITH POROUS NICKEL TITANIUM ENDOPROTHESIS

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*Objectives:* Mandibular resection leads to a significant impairment of the lower facial function and aesthetics. Osseous free-flaps are the gold standard for reconstructing bone defects, but affect donor site function. Extended bony defects are a common problem after trauma or tumour surgery in the speciality of cranio-maxillo-facial surgery, because autologous bone grafts are not available in a sufficient quantity. *Material and Method:* Thirteen patients with different kinds of mandibular defects were observed. Endoprosthesis were made of super-elastic porous nickel titanium with pores' sizes from 100 to 300  $\mu$ m. Nickel titanium has a high degree of bioinertia, biomechanical compatibility. *Results:* In 11 cases endoprosthesis healed without complications restoring mandibular continuity and its function, 2- had to be removed after surgery because of inflammation and exposure. *Summary:* Use of endoprosthesis from porous Nickel Titanium makes mandibular reconstruction simple and can be an option for treatment.

## Session 39. RECONSTRUCTIVE SURGERY OF CRANIOFACIAL MALFORMATIONS I

### O-3901

#### CORONOID HYPERPLASIA IN THE PAEDIATRIC AGE GROUP

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**Introduction:** Coronoid process enlargement may be unilateral or bilateral. Bilateral hyperplasia of the coronoid process of the mandible is defined as an abnormal elongation of the coronoid process, formed of histologically normal bone.

The main clinical finding is a progressive, painless difficulty in opening the mouth, due to contact with the temporal surface of the zygomatic bone or medial surface of the zygomatic arch.

The aetiology of the complaint is unknown, although several theories have been postulated, including hyperactivity of the temporal muscle, causing reactive elongation of the coronoid process, dysfunction of the temporomandibular joint caused by chronic disc displacement, which would be related with cases of unilateral hyperplasia and is mentioned as one of the causes of Jacob's disease, endocrine stimuli, traumatism and even genetic and family factors.

**Material and Methods:** The main aim of treatment is to restore the mouth opening, in a stable manner. The only successful treatment to restore the mouth opening caused by coronoid process hyperplasia is surgical correction of coronoid-malar interference by coronoidectomy or coronoidotomy.

Coronoidectomy may be combined with myotomy, fasciotomy, and zygomatic osteotomy in specific situations.

Usually, the intraoral approach provides sufficient access for the resection of the coronoid process and a cuff of temporalis tendon. An extraoral approach can be used for a more complete resection of the temporalis muscle.

**Results:** Obtaining a satisfactory outcome will depend largely on proper post-operative rehabilitation. The results obtained immediately following surgery ought to be maintained and, if possible, improved upon by early use of bite openers and intensive stretching exercises. We recommend that physiotherapy begin between three days and one week after surgery, the exercises to be performed for 10 minutes three times daily and repeated over 3-6 months. These aim to prevent formation of fibrous tissue that limits mouth opening.

In conclusion, coronoidotomy when combined with prolonged postoperative physiotherapy, gives satisfactory and stable long-term results in the correction of coronoid-malar interference.

**Conclusion:** Coronoid hyperplasia is a rare condition in the paediatric age group. It may be an unrecognized cause

of restricted mouth opening in children.

### O-3902

#### HOW TO IMPROVE AESTHETIC RESULTS IN PLAGIOCEPHALY

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**Introduction.** The aim of surgery in craniosynostosis is to prevent or treat functional problems, if present, and to obtain a better craniofacial shape in terms of symmetry and proportion, without interfering with normal growth. Cranioplasty, that is reshaping and repositioning of cranial bone segments, is the first choice in the treatment of craniosynostosis in growing patients. That is because autologous bone grafts provide the lowest morbidity and don't interfere with growth.

**Objectives.** In this presentation we show the surgical steps and the technique to obtain an adequate morphology in plagiocephaly.

**Material and methods.** A sample of 27 patients affected by cranio synostosis were treated in our department from January 2001 to December 2011. They were all Caucasian with an age ranging from 5 to 26 months ( average 8 months). All of these patients were treated at first with a cranioplasty.

The pre and post op evaluation includes clinical examination, ophthalmological examination CT and photographic evaluation.

**Results** Long - term follow up ( 60 month ) demonstrates that in simple craniosynostosis the fronto – orbital shape is correct and symmetric, no lack of ossification or large deformity on the cranial vault are found, ocular globe position and vision are adequate except in 25% of the plagiocephalies in which we found a convergent strabismus requiring surgery on the extrinsic globe muscles.

**Conclusion:** Cranioplasty is the first choice in the treatment of craniofacial synostosis in growing patients. The surgical technique we have shown allows a more accurate remodelling of the bone either when a simple two dimensional bending is needed or when a complex torsion is required like in plagiocephalies. This technique also allows an easy and effective stabilization of the bone after repositioning, preventing bone resorption. Accurate planning providing overcorrection of the defect in both remodelling and repositioning can probably partially compensate for recurrence of the phenotype.

### O-3903

#### TREATMENT OF AN ADULT PATIENT WITH CROUZON SYNDROME WITH A TWO STEP SURGICAL PLAN - A CASE REPORT

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**Introduction:** In craniofacial syndromic patients surgery must correct the extremely retro-displaced mid-face, with attention to final aesthetic result, particularly when treating young females. Therefore, sometimes a multi-steps



procedure is advisable.

**Case report:** A 19 year old female with Crouzon's disease came to our observation, showing hypoplastic maxilla, zygomas and orbits; nose-radix was sagittally correct. Surgical plan consisted of two different steps. First, correction of middle-face hypoplasia, without fixing occlusion.

A second surgery was later planned to correct occlusion and chin. There were two reasons for this choice.

First, when performing Le Fort I just after Le Fort III osteotomy, patient's face and lips are already swollen; therefore it is difficult to precisely verify fine parameters as dental exposure, naso-labial angle, chin projection. This could generate a poor final result.

Second, in this patient nose radix was not retruded, unlike majority of Crouzon cases, thus a mid-face osteotomy had to exclude the nose; contemporary execution of Le Fort I osteotomy could present troubles with plate osteosynthesis, because both the mid-face osteotomy and the Le Fort I start from pyriform apertures.

The osteotomy chosen was a Le Fort III without nose for counter-clockwise advancement of orbits, cheekbones and upper maxilla, to correct sagittal discrepancy, but worsening open bite. Periorbital tissue was incised in several sites for decompression of orbital fat; lateral canthopexies corrected palpebral inclination.

Ten months later came second surgery, consisting in 3 pieces Le Fort I to advance and clockwise rotate upper jaw, Sagittal Split to advance and counterclockwise rotate lower jaw and chin-shield osteotomy to advance chin and create lip seal and nice lip-chin fold.

Patient reached good skeletal-aesthetic proportions, satisfactory dental exposure, and good eyeball prominence.

**Discussion:** Le Fort I osteotomy together with Le Fort III is described in literature.

However, occlusal and aesthetic features are easier to accomplish with separate operations. If nose-radix is in good position, mid-face osteotomy should not include this structure, otherwise an over-projected nose with grotesque appearance could result; bone plating is more demanding, if not impossible, if a Le Fort I is performed simultaneously. For these reasons, two different surgical steps were performed.

#### O-3904

##### A MORPHOLOGIC EVALUATION AND SUTURAL FUSION RESCUE STRATEGY IN CROUZON MICE

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Crouzon syndrome is characterized by bicoronal synostosis and midface deficiency. The genetic underpinning results in a gain of FGFR2 function. A Crouzon mutant mouse has been developed allowing for further elucidation of the underlying etiopathogenesis (Eswarakumar et al., 2004). The aim of this study is to compare the morphology

of wild type and mutant mice. .

**Methods:** A total of 30 P1 pups (Crouzon=14, Wild type=18) were evaluated. CT morphologic analysis was performed using 3D micro CT in vivo CT-120 (microCT, GE Healthcare Inc), and analyzed using Osirix software. Craniometric points were evaluated. Factor delivery (GDF5, Noggin, and FGFR2 inhibitor) was performed using microsphere embedding along the coronal, sagittal, and occipital sutures. Mutant, treatment group, and control mice were morphologically compared. Statistical analysis was performed involving the t-test.

**Results:** The control mutant mice showed significantly narrower coronal sutures (p=0,04). The metopic as well occipital suture width did not show significant differences. The sphenoid skull base length and angulation were significantly shorter and bent differently compared to controls (p=

**Conclusions:** The Crouzon mouse exhibits aberrant cranial and skull base morphology compared to the control. Instillation of modulating growth factors does not ameliorate this abnormal morphology in the early age mouse group. Further efforts will be geared toward ossification differences, histologic analysis, and sutural gene expression.

#### O-3905

##### PROGNOSTIC PREDICTORS SIMPLIFIED: SERIAL HEAD CIRCUMFERENCE AND NEUROLOGIC AND NEURODEVELOPMENTAL SCREENING AFTER SURGICAL CORRECTION FOR SINGLE- AND MULTIPLE-SUTURE CRANIOSYNOSTOSIS

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**Background/Purpose:** secondary revision correction of Craniosynostosis may be considered a cosmetic procedure, however, we hypothesized that secondary revision correction of Craniosynostosis with adequate calvarial expansion may diminish neurologic and neurodevelopmental symptoms that may be caused by this malformation. We intended to show that serial head circumference measurements can be used as a noninvasive method to demonstrate adequate calvarial expansion, and declining head circumference measurements correlate with neurologic and neurodevelopmental symptoms that may require secondary revision.

**Methods:** A retrospective assessment of all children treated with single-stage fronto-orbital advancement (FOA) or total calvarial expansion (TCE) for single-suture (SS) or multiple-suture (MS) synostosis over seven years was undertaken. Mean time from surgery to each visit was collected. At each postoperative visit, HC was recorded and neurodevelopment screening is performed. Neurologic and neurodevelopmental screening included headache, vision, speech, motor, and behavioural changes since the previous visit. Using standard growth curves, change in HC z-score was recorded. For analysis, patients were stratified into two groups: those who underwent surgical revision and those who did not.

**Results:** Of 183 patients undergoing primary surgery, complete records and adequate follow-up were available for 112 patients. Mean surgical age was 14.2 months). There were 97 (87%) patients with SS and 15 (13%) with MS synostosis. Fifty-seven (51%) patients underwent

FOA and 55 (49%) TCE. The proportion of revisions in SS and MS synostosis patients was 16% and 47%, respectively. Syndromic and non-syndromic revision proportions were 37% and 17%, respectively. Patients undergoing surgical revision demonstrated a significantly larger decline in HC (mean = -0.8, median = -1.0, z-score) from one postoperative visit to the next than those who did not have revision (mean = -0.3, median = 0, z-score). This difference was more marked in those with SS synostosis (mean -0.9 versus -0.3,  $P < 0.001$ ); however there was not a significant difference when considering those with MS synostosis alone (mean -0.4 versus -0.2,  $P = 0.14$ ). Neurodevelopmental findings were significantly higher in the surgical revision group (median = 2) compared with the non-revision group (median = 0,  $P < 0.001$ ).

**Conclusions:** At our institution, a decline in head circumference has a significant association with surgical revision. Surgical revision has a significant association with positive neurodevelopmental screening; therefore, there may be a connection between neurodevelopmental findings and change in head circumference.

#### O-3906

### ULTRASOUND ASSISTED FIXATION OF BIODEGRADABLE MATERIALS IN CRANIOSYNOSTOSIS

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**Introduction:** Management of craniosynostosis is based on early surgical correction including synostotic sutures liberation and orbit-cranial remodelling. Bone fragments fixation aims to obtain a stable result avoiding complications. The introduction of resorbable fixation methods has become the state of art in this type of surgery.

**Material and methods:** We present a retrospective study of 25 patients undergoing surgery of craniosynostosis at our institution between 2006 and 2012, using in all cases the absorbable osteosynthesis system based on the welding principle by ultrasounds. The most frequent diagnosis was trigonocephaly. The cases have been analyzed by gender, age, type of craniosynostosis, associated pathology at the time of birth and intra- or postoperative complications. The average follow up period was one year (from 3 months to 6 years).

**Results:** All patients had good performance in terms of aesthetics and functionality. There were no cases of severe intraoperative or postoperative complications. The most frequent complication was a slight infection of the surgical wound in 3 cases (13%), presented together with dehiscence in 2 patients (8.6%). All cases resolved with conservative measures of antibiotic and local treatment, combining debridement and subsequent direct closure or local flap.

**Discusión:** Use of titanium osteosynthesis in craniofacial surgery showed problems like difficult adaptation and potential interference with bone growth, making sometimes necessary a second and difficult procedure to remove those plates. Thus resorbable materials are indicated in this type of surgery. A new method using resorbable

plates and pins based on the welding principle by ultrasounds can improve the fixation technique in this type of surgery. With this method we obtain good mechanical results, preventing torsional forces and decreasing the risk of material fracture. In our experience this method allowed for a simple, quick and stable fixation of the osteotomized bone fragments without major complications.

**Conclusions:** The emergence of an osteosynthesis system based on the welding system assisted by ultrasounds has been an important evolution improving the surgical treatment of craniosynostosis in terms of mechanics, material handling, reducing surgical time and facilitating surgical work.

#### O-3907

### THE USE OF IMMEDIATE AUTOLOGOUS FAT TRANSFER WITH IMMEDIATE CRANIOPLASTY RECONSTRUCTION-OUR EXPERIENCES SO FAR

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**Introduction/Aims :** The Coleman fat transfer is an atraumatic method of autologous fat harvesting that aims to maximize structural integrity at the recipient site. Routine use of Coleman fat transfer in patients with temporal hollowing post cranioplasty for soft tissue augmentation has not been widely described. Individuals can exhibit temporal hollowing secondary to muscle atrophy (temporalis). Temporalis atrophy can often occur after neurosurgical intervention, and subsequently can arise many years after fixation of a cranioplasty plate. Current alternatives include temporal implants within the subfascial plane, dermal grafts and bone cement.

**Aims:** We aim to share our experience with utilization of the abdominal Coleman fat transfer technique in conjunction with immediate cranioplasty reconstruction in a selection of our patients including relevant imaging and clinical photographs.

**Results:** Each individual had neurosurgical intervention in conjunction with immediate cranioplasty with a titanium plate. At the same time they were offered abdominal fat harvesting with the implantation .

**Conclusions/Clinical Relevance:** We have identified that fat transfer is a safe and reliable ideal 'filler' in soft tissue augmentation we have adapted this technique to from our experiences post-cranioplasty in temporal hollowing to provide immediate cranioplasty reconstruction with immediate fat transfer. However, the long-term outcome of this technique in temporal filling remains to be elucidated with recognized variations in clinical outcomes of lipofilling.

#### O-3908

### THE TESSIER NUMBER 14 FACIAL CLEFT: A 20 YEARS FOLLOW-UP

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Here we report a case of a Tessier number 14 cleft, the rarest form of craniofacial cleft, and our step-wise approach to its surgical correction. The patient's appearance was analyzed over a 20-year follow-up period. At the

fourth and final operation, the interorbital distance was reduced, the maxilla was advanced, rib and costal cartilage were grafted for augmentation of the nasal bone, and a double eyelid fold operation was performed. Although the surgical results were not entirely satisfactory from an aesthetic point of view, this stepwise surgical approach has allowed gradual improvement in the patient's facial appearance.

#### O-3909

### THE OCULO-AURICULO-FRONTO-NASAL SYNDROME (OAFNS) - DESCRIPTION AND MANAGEMENT OF A RARE CRANIOFACIAL PATHOLOGY

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**Introduction:** Craniofacial clefts are amongst the most significant congenital malformations with respect to functional, aesthetic and psychosocial consequences. Aetiology is still under discussion, recent molecular genetic findings suggest defects in the ciliary function of neural crest cells during facial development. Severity of craniofacial clefting is known to be extremely variable. Different classifications have been proposed however nomenclature is not uniform. If vertical, median craniofacial clefting of fronto-naso-maxillary structures is accompanied by auriculo-mandibular malformations the term oculo-auriculo-frontonasal syndrome OAFNS (OMIM 601452) has been proposed. About 30 cases are documented worldwide.

**Materials and Methods:** We describe the interdisciplinary management of a female patient from birth to 6 years of age who was born in 2004 after unremarkable pregnancy as the second child of non-sanguineous parents. At birth severe thoracic scoliosis due to vertebral fusion, choanal atresia, right sided cleft lip, hypertelorism, bifid nasal complex as well as bilateral auricular dysplasia were obvious. Further craniofacial dysgrowth unmasked the skeletal malformations. CT-scans at 5 years of age revealed a median craniofacial cleft (Tessier type 0-14) accompanied by a right-sided paramedian cleft (Tessier type 1-13) both associated with severe bilateral auriculo-mandibular dysplasia (Tessier type 7) suggesting the diagnosis of OAFNS.

**Results:** After initial choanal stenting, closure of cleft lip and palate was performed during the first year of life. After interventional cardiologic diagnostics insertion of an orthopaedic device (VEPTR-System) to prevent thoracic insufficiency was performed at 2 years of age. Craniofacial correction at 6 years of age consisted in hypertelorism correction by facial bipartition and frontal cranioplasty. Additional mastoideal implant insertion for bone anchored hearing devices has been performed. Nasal and auriculo-mandibular reconstruction is still pending. Despite the severe dysmorphology there is age-related psychomotorical development of the patient as well as full familial integration.

**Conclusion:** Adequate correction of craniofacial clefts is a surgical challenge. Interventions have to be adapted individually to patients needs with respect to general condition, age and growth and will probably stay subject to interdisciplinary centres.

#### O-3910

### THE CRANIOFACIAL PHENOTYPE IN PKD MUTATIONS: FROM TRANSGENIC MICE TO HUMANS

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**Objective:** Mice with a conditional knock-out of the Pkd2 gene in neural-crest derived tissues have a severe postnatal craniofacial phenotype. Interestingly, Pkd2 is involved in autosomal dominant polycystic kidney disease (ADPKD), the most common cause of congenital terminal renal failure in humans. ADPKD is not known to be associated with orofacial abnormalities. The aim of this study was to screen patients with ADPKD in order to find potential craniofacial disorders.

**Method:** We first characterized the phenotype of Pkd2 mouse mutants using micro-CT, synchrotron microtomography, histology and radioactive in situ hybridation. We then screened 20 patients with ADPKD (REC 10/H0701/98) using 3D photography and compared the affected group with 203 controls using dense surface modeling (DSM). For asymmetry analysis, a mirrored form of each face was generated and swapped over the landmarks. We measured linear distances based on the landmarks in order to support the results of DSM.

**Result:** Pkd2 mutations in mice caused dental loss, root fractures, temporomandibular joint ankylosis, suture fusions, shortened snout and class III malocclusion. Surprisingly, patients with ADPKD had significant facial abnormalities: increased midfacial length, hypertelorism, deep-set orbits and nasal asymmetry. Based on linear measurements, we found that these abnormalities were increasing with age.

**Conclusion:** Here we characterize previously unknown craniofacial abnormalities in a common congenital disorder. These new findings could be important in the diagnostic of ADPKD. We focused our investigations on the face based on the results of the study of a mutant mouse model. The same approach indicates that patients with ADPKD should be screened for dental and TMJ disorders.

## Session 40. TEMPOROMANDIBULAR JOINT PATHOLOGY AND SURGERY II

**O-4001**

### MANAGEMENT OF JAW DEFORMITIES SECONDARY TO THE TMJ ANKYLOSIS (UNI-& BILATERAL). SURGICAL ORTHODONTIC REHABILITATION. THE EGYPTIAN EXPERIENCE

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**Introduction:** Jaw Deformities Secondary to temporomandibular ankylosis depend on many factors like; age of patient at onset of ankylosis, side affected, (unilateral or bilateral), previous surgery (released or not), duration of the ankylosis, also, if the ankylosis is fresh or recurrent, the latter may be single or multiple recurrence.

**Aim:** Is to evaluate different protocols used for treatment of jaw deformities and compare them with others in the literature. As well as the long term follow up of our results.

**Patients and Methods:** Management of jaw deformity secondary to ankylosis of the TMJ, depends on:

1. Side affected; Unilateral or Bilateral ankylosis
2. The ankylosis; fresh or recurrent,
3. Age of the patient at the start of trauma (at onset of ankylosis).
4. The age of the patient at the time of treatment (growing or adult),
5. The surgeons capabilities and facilities available.
6. Duration of ankylosis, short time, intermediate or long-standing.

According to the above mentioned factors, our patients are divided into the following categories:

- I- Growing patients with early and fresh ankylosis, i.e.; no jaw deformity.
- II- Adult patients with early and fresh ankylosis, i.e.; no jaw deformity.
- III- Growing patients with jaw deformity, usually with long-standing or recurrent ankylosis, (facial asymmetry or birdface).
- IV- Adult patients with jaw deformity; the ankylosis may be:

- A- Fresh (not operated upon before),
  - B- Recurrent (single or multiple recurrence),
  - C- Unilateral Ankylosis with facial asymmetry,
- The treatment protocols for all these groups will be presented.

Accordingly there are the following lines of treatment:

- I- Facial Asymmetry, treated by:
  1. Pre- & Post-surgical Orthodontics
  2. Genioplasty, if mild,
  3. Bimaxillary osteotomies, with genioplasty,
  4. Unilateral Mandibular Distraction with or without genioplasty,
  5. Simultaneous Bimaxillary Distraction Osteogenesis, if the occlusion is compensated, with genioplasty.
- II- Jaw deformities secondary to bilateral ankylosis :

A- Recent approach; Distraction osteogenesis with pre-distraction orthodontics (if possible) and post-distraction orthodontics. Distraction may be done before or after release of ankylosis.

B- Old Approach:

- 1- Pre and Post-surgical Orthodontics
- 2- Bimaxillary Osteotomies, with advancement and, genioplasty,

In the period from Jan. 2000 to Dec. 2010 ; 120 patients with different jaw deformities were treated in the Cranio-maxillofacial, and Plastic Surgery Department, Faculty of Dentistry, Alexandria University, Egypt. The surgical techniques, the results, complications and follow-up of different protocols will be presented.

**O-4002**

### CONDYLAR HYPERPLASIA – REDEFINING TREATMENT PROTOCOL

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**Objectives:** A retrospective analysis of cases with facial asymmetry secondary to condylar hyperplasia were studied. Clinical presentation, interventions performed and the outcome was evaluated.

**Material and Method:** Forty two cases of facial asymmetry secondary to condylar hyperplasia were identified retrospectively over a fifteen year period (1997 to 2012) with the help of the clinical coding system. 28 patients have had interventional surgery and 14 patients are awaiting surgery.

Clinical and radiologic analysis was performed on the 28 patients who have been treated. Demographic details were obtained. The presenting complaint, investigations performed (plain radiographs/scintigraphy) and treatment provided (condylectomy/ condylectomy + orthognathic surgery) was recorded. Obwegeser and Makek: classification was used for the purpose of this study. An attempt to correlate the histopathological findings with bone scintigraphy was made where possible. Outcome following intervention was then studied.

**Results:** 28 patients were identified with facial asymmetry secondary to condylar hyperplasia over a fifteen year period. This cohort included 18 female and 10 male patients. The age range at presentation was 11 to 23 years (mean 16 years). 18 cases were classified as hemimandibular hyperplasia, 4 as hemimandibular elongation and 6 as combination form. The laterality of distribution was 13 right side vs 15 left sided. Fifteen patients underwent bone scintigraphy and these findings were correlated with histopathological findings. All the patients in our cohort underwent condylectomy as the primary treatment modality. Only six patients went on to have corrective orthognathic surgery and two patient's required a repeat condylectomy to deal with continued growth.

**Summary:** We advocate condylectomy as a satisfactory primary treatment measure for condylar hyperplasia, thereby preventing the need for corrective orthognathic surgery in majority of the patients. Early intervention prevents progression of the condition and obviates the need for complicated orthognathic corrective surgery at a

later date. However a preexisting underlying skeletal deformity has to be treated alongside a condylectomy.

Disclosure of Interest: None Declared

#### O-4003

### CHRONIC TMJ DISLOCATION AND ITS SEQUELAE

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**Introduction:** Dislocation of the temporomandibular joints is a common complaint which we treat as oral and maxillofacial surgeons. Left untreated, this cause pain, discomfort and loss of function. Given the nature of the complaint, it must invariably be treated promptly but like any other joint, long term dislocation compromises the joint's vascularity and can predispose to chronic bony changes within the joint capsule itself.

**Background:** We review the case of a 34 year old man who was initially under the care of the respiratory physicians for pulmonary TB. Whilst an inpatient, he had suffered a number of fits related to his medication and was documented to have an abnormal jaw position for several weeks. As part of his medical assessment, he underwent a MRI scan of the head, where a dislocation of both mandibular condyles was noted but left untreated for approximately 8 weeks.

**Management:** He was subsequently referred to the maxillofacial team at a local teaching hospital where an attempt to relocate the condyles failed. A CT scan was performed to identify if any bony fusion or ankylosis was present. Thereafter, he was transferred to the care of a TMJ surgeon and reduction was successfully achieved via an open joint arthroplasty approach.

**Conclusions:** Long term chronic dislocation of the TMJ is rarely reported, as in this case. The consequences of a chronic dislocation of the TMJ are poorly described in the literature. We review the potential sequelae, including radiological changes, as demonstrated in this case, where long term definitive management may involve bilateral TMJ replacement.

#### O-4004

### OPERATIVE MANAGEMENT OF TEMPOROMANDIBULAR JOINT ANKYLOSIS

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**Background:** Ankylosis of the temporomandibular joint is defined as the inability to open the mouth because of fusion of the mandibular condyle to the base of the skull. It may cause problems in mastication, digestion, speech, and appearance with dento-facial deformities in children.

**Materials and methods:** From January 2004 to December 2009, 30 patients with temporomandibular joint ankylosis underwent a TMJ reconstruction as the initial surgery followed by the correction of secondary deformities as the second surgery.

**Results:** With a follow-up of 6 months to 4 years, patients had a maximum interincisal opening of 33 to 42 mm and their oral function and skeletal deformities are significantly improved. We report one case of relapse.

**Discussion:** the incidence of temporomandibular joint ankylosis is still high in developing countries. Trauma has been reported as the most common factors. Surgery is the treatment of choice.

#### O-4005

### RELAPSE AFTER 20 YEARS OF CONGENITAL TMJ ANKYLOSIS & TRISMUS. REPORT OF 2 UNUSUAL CASES

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**Key words:** Temporo mandibular joint, ankylosis, trismus, temporalis muscle flap.

Ankylosis of the temporomandibular joint may be defined as the fusion of the articular surfaces with bony or fibrous tissue. It is associated with trauma, infection or systemic disease such as psoriasis, rheumatoid arthritis or ankylosing spondylitis. TMJ ankylosis is a disabling condition leading to serious problems in eating, speaking, digestion, and hygiene resulting in physical and psychological disability.

The treatment poses a significant challenge due to technical difficulties and a high incidence of recurrences. Several surgical techniques have been described. None of them have produced uniformly successful results. The most frequently reported techniques include: arthroplasty with (interpositional arthroplasty) or without (gap arthroplasty) interposition of alloplastic material or temporalis muscle flap, joint reconstruction with autogenous material such as osteochondral graft or coronoid process or alloplastic as total joint replacement.

Two patients, one with Goldenhar Syndrome with unilateral ankylosis and one with Pierre Robin Sequence with bilateral ankylosis were treated with a total of three TMJ's.

Preoperative assessment included pre operative imaging (panoramic X-Ray, CT scan, MRI) and physical examination including maximal incisal opening ( 5 mm), lateral and protrusion movements.

The two patients were previously treated in another center for temporomandibular joint ankylosis with ankylotic block resection and reconstruction with a vitallium prosthesis (ramus and condyle). Ankylosis recurrences showed-up about 18 years after surgery. Treatment included: resection of the ankylotic block, removal of one prosthesis and interposition of a strip of temporalis muscle flap. Aggressive physiotherapy started immediately post-operatively. Both patients showed a significant improvement in articular function and symptoms and no secondary surgery was necessary. A mean mouth opening of 3.5 cm. was achieved.

**O-4006****OUTCOMES OF OCCLUSAL SPLINT THERAPY ON NON REDUCING DISK DISPLACEMENT IN TMJ DISORDERS: EFFECTS ON THE SYMPTOMS AND ON THE DISK POSITION**

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The aim of this study is to investigate the effects of occlusal splint therapy on patients with a diagnosis of nonreducing displaced disk (NRDD) of their temporomandibular joint (TMJ).

951 TMJ Magnetic Resonance Imaging (MRI) investigations were performed from January 2006 to June 2011 and reviewed retrospectively. Among these, 250 with NRDD were included.

Patients with lack of follow-up, TMJ treatment before MRI was performed, or known history of maxillofacial surgery were excluded. The remaining 54 patients treated with occlusal splint therapy and documented NRDD were included.

Among these, 43 were treated by occlusal splint plus physical therapy (Group 1) and 11 by occlusal splint alone (Group 2).

22 post-treatment MRIs were found for these fifty-four patients.

The results show that the occlusal splint successfully reduced the signs and symptoms of TMD in both groups: pain was eliminated in 88.9% (p < 0.05). With regards to TMJ disc, the 22 post-treatment MRIs unfortunately did not show any change in position of the disc (p > 0.05). Only one of them presented with a partial reducibility of a NRDD.

Despite these findings, this preliminary study shows a reduction of TMJ pain and symptoms in our selected patients.

**O-4007****THE ROLE OF SPECT BONE SCAN IN UNILATERAL CONDYLAR HYPERPLASIA: IS IT MEASURING THE CONDYLE SIZE?**

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**Background:** The use of Tc-99m SPECT bone scan has been recommended as the assessment tool for patients with unilateral condylar hyperplasia. A condyle is generally regarded as active if the scintigraphic activity difference is 10% greater than the contralateral side. However, there was little information regarding the association between the bone scan uptake and the histopathological features of the hyperactive condyle.

**Aim:** The aim of this study is to check the association between the SPECT bone scan uptake and the dimension of the mandibular condyle in patients with mandibular asymmetry caused by condylar hyperplasia.

**Material and Method:** 27 patients with mandibular asymmetry caused by condylar hyperplasia were recruited. The

clinical records, dental casts, SPECT and cone-beam CT data were used for the analysis. The clinical records and serial dental casts were used to check the activity of asymmetry. The cone-beam CT data were imported for building the virtual mandibular model for the 3-dimensional analysis of the hyperactive and contralateral condyles. 3-D cephalometric analysis was performed to measure the linear dimension of condyle and ramus. Pearson correlation analysis was used to check the association of the percentile difference between the SPECT scan and (i) condylar dimensions including x, y and z-axis, (ii) dimensions of mandibular ramus and body.

**Result:** Among the 27 patients, only 2 patients showed active asymmetry from clinical and model analysis plus cone beam CT superimposition. The mean percentile difference between the right and left condyles in the remaining 25 patients showing inactive asymmetry was 12.05%. 12 patients (48%) having percentile differences > 10%. Correlation analysis revealed linear association in the percentile difference of condyles between the SPECT scan uptake and (i) the linear dimensions of the condyle (R ranged from 0.68-0.83), (ii) surface area of the condyle (R=0.80), (iii) vertical ramus height (R=0.81) and (iv) mandibular body length (R=0.85).

**Conclusions:** There was strong association between the condyle dimension and the SPECT uptake. Patients with inactive mandibular asymmetry caused by condylar hyperplasia could have the percentile difference greater than 10%.

**O-4008****“PREVALENCE OF TEMPOROMANDIBULAR JOINT INTERNAL DISORDERS IN SUBJECT VOLUNTEERS. A CLINICAL-RADIOLOGICAL CORRELATION STUDY”**

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**Introduction:** The term internal derangement of the temporomandibular joint (TMJ) is commonly used to indicate an abnormal relationship of the articular disc with respect to the mandibular condyle and temporal eminence. Its incidence in asymptomatic healthy subjects was reported by Kirco in 1987 close to 31%. Subsequent studies do not differ if the anterior disc displacement (ADD) is a predisposing factor for dysfunction or just a normal anatomic variant.

**Objectives:** - To determine the prevalence of internal derangement of the TMJ in asymptomatic volunteer subjects.

**Secondary:-** To study the structural morphology of the TMJ related to the appearance of internal derangements and the ability of Craniomandibular Index (CMI) to predict the presence of ADD and associated joint pathology.

**Material and methods:** Analytical, observational, cross-sectional study of TMJ Internal Disorders in asymptomatic volunteer subjects. Different variables related to the TMJ were studied. Exclusion and inclusion criteria were established. All subjects underwent history, specific physical examination of the TMJ, clinical evaluation according to

CMI and radiological assessment by means of magnetic resonance imaging evaluated by two blind observers. Morphologicals and structural characteristics of the TMJ were analyzed by computer program.

*Results:* Forty-three subjects, 24 females and 19 males with a mean age of 28.6 years (range 25-40) were analyzed. Six of these refused Magnetic Resonance Imaging and were excluded from the study. The average of maximum mouth opening was 50,6 mm. 35.1% of subjects had an ADD valued by at least one of the two observers. The average of CMI was  $0.058 \pm 0.035$  for the joints with disc displacement and of  $0.023 \pm 0.019$  for the joints with normally positioned disc.

*Conclusions:* The results of our study show that there is a high prevalence of ADD in our environment, CMI constitutes a useful tool in the clinical screening of patients with temporomandibular disorders and diagnosis of joint pathology should not be established exclusively by radiographic findings.

#### O-4009

#### MRI IMAGING OF THE TMJ - THE KING'S EXPERIENCE

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*Introduction:* Management of TMJDS can be complex. At King's College Hospital a TMJ MDT clinic has been established where many of these patients are reviewed. MRI scans of the TMJ are requested after an initial course of non-surgical management has failed. We reviewed the MRI's of all patients imaged in 2011 to establish the proportion of patients undergoing MRI, the impact of MRI on therapeutic management and security of diagnosis, and the correlation of MRI appearances with subsequent outcome.

*Methods:* In 2011 162 patients with a TMJ diagnosis were seen. 61 underwent MRI imaging of the TMJ. We present the completed results on 21 of these patients. Information was collected using a set proforma and captured data such as patient demographics, reasons for presentation, maximal incisal opening and pain scores. The summary of the MRI report was analysed and a review of the subsequent management undertaken.

*Results:* 38% (n=61) of patients seen on this specialist TMJ clinic underwent an MRI scan of the TMJ.

57% (n=12) of patients with the results of the MRI subsequently underwent surgical intervention. Initial management for 92% of these was arthroscopy/arthrocentesis. The other case required a bilateral eminectomy for recurrent dislocation.

5% (n=1) required referral to another specialty for coincidental pathology (nasopharyngeal carcinoma).

24% (n=5) remained non-operative (in that scan was deemed normal) 15% (n=3) were with the results of the MRI planned for delayed surgical intervention, as significant degenerative change was noted, and consideration given for the future role of a total TMJ replacement.

*Conclusions:* Imaging the TMJ is an effective tool which has in this cohort of patients successfully guided surgical

intervention at an earlier stage. We have a designated neuroradiologist who reports these scans and have found that this is an invaluable tool in the successful interpretation of this imaging. We would advocate that all patients for planned surgical intervention should be imaged prior to accessing the joint space so that an accurate assessment of the TMJ in particular, the disc can be made.

## Session 41. RECONSTRUCTIVE SURGERY OF CRANIOFACIAL MALFORMATIONS II

### O-4101

#### VISUAL FUNCTION AND OUTCOME IN THE CORRECTION OF HYPERTELORISM

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**Introduction/Methods:** Hypertelorism (HPT) correction requires translocation of the intact orbit and its functioning contents. Classification of HPT by its orbital morphology identifies four patient groups from various diagnostic categories for which either frontofacial bipartition or box osteotomy is differentially effective. Either technique changes the visual axis and therefore poses risk to binocular vision. A study of binocularity in fifteen children undergoing HPT correction from different diagnostic categories/morphological groups is presented.

**Results:** Four patients had preoperative esotropia (convergent squint), which was maintained postoperatively, of which one had a postoperative entrapment episode requiring re-operation. Five patients maintained a small angle exotropia (divergent squint) postoperatively. Two patients reduced a preoperative large angle exotropia by HPT surgery, thereby facilitating globe alignment by cosmetic squint surgery. Four of fifteen patients entered surgery with visual fusion and depth perception (stereopsis). One awaits imminent HPT correction, and of the remaining 3 patients, 1 maintains postoperative binocular single vision and the other two had postoperative entrapment episodes, requiring intervention. In the two entrapped patients with preoperative visual fusion, the patient with axial entrapment and a horizontal diplopia corrects with prism lenses. The patient with vertical diplopia cannot correct with prisms and requires functional squint surgery.

**Conclusions:** HPT correction in skeletally mature orbits cannot 'rescue' binocularity in non – binocular patients. Visual fusion and stereopsis may be present in a third of candidates for HPT surgery, and present a high risk group for visual disruption. Orbital translocation poses a risk for entrapment (3/15 patients), and therefore diplopia in patients with preoperative binocularity. Axial entrapment with horizontal diplopia has a wider tolerance, and may be rehabilitated in patients with preoperative visual fusion by prism lenses. Vertical entrapment has a poor tolerance and requires early operative release to reduce the risk of secondary functional squint surgery. Operative release of entrapment in non – binocular patients is indicated to optimise outcome of secondary cosmetic squint surgery.

**Discussion:** Hypertelorism correction provides excellent outcome for the correction of facial difference with low overall complication rate. Operative care is particularly required in binocular patients, and technical modifications are discussed.

### O-4102

#### TRIGONOCEPHALY: RESULTS AFTER SURGICAL CORRECTION OF NONSYNDROMIC ISOLATED METOPIC SUTURE SYNOSTOSIS IN 68 CASES

Gregor Castrillón-Oberndorfer<sup>1,\*</sup>, Michael Engel<sup>1</sup>, Joachim Mühling<sup>1</sup>, Kolja Freier<sup>1</sup>, Jürgen Hoffmann<sup>1</sup>, Robin Seeberger<sup>1</sup>, Oliver Thiele<sup>1</sup>

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Children with nonsyndromic isolated metopic suture synostosis suffer from a significant deformity of the supraorbital ridges, the temporal regions and hypotelorism. We retrospectively analyzed 68 consecutive cases of isolated nonsyndromic metopic synostosis treated over a 14-year-period. The data were evaluated using patients' clinical records, skull radiographs in two planes, CT-scans, MRI scans and pre-/post-operative photographs. Surgery with standardized fronto-orbital advancement was performed at a median age of 10.9 months. Follow-up ranged from 1 month to 190.3 months, with an average of 55.7 months. The average blood loss was less than 255 ml and the average post-operative length of stay was 5 days. No major complication was observed except for uncomplicated dural tears in six cases. According to the classification of Whitaker, results were considered good to excellent (Category I and II) in all except one case (Category IV). As the current techniques have been standardized for routine use, surgical risks are reasonably low with no mortality or permanent morbidity. We think that the treatment of single metopic synostosis is safe with very low reoperation rates and short length of hospital stay. Overall, our results showed acceptable minor complication rates and generally satisfactory aesthetic outcomes.

### O-4103

#### SURGICAL OUTCOME AFTER USING A MODIFIED TECHNIQUE OF THE PI-PROCEDURE FOR POSTERIOR SAGITTAL SUTURE CLOSURE

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Fusion of the sagittal suture is the most prevalent form of craniosynostosis. Due to the variety of deformities of scaphocephaly depending on the location of the fused sagittal suture, the surgical procedure has to be adjusted to the individual case. In this study, 38 patients with a predominantly posterior sagittal suture closure were treated with a modified technique of the pi-procedure and the surgical outcome has been evaluated with respect to complications, morphological and aesthetic outcome. The improvement of the cephalic index in our series in the follow-up examination (mean 60.1 months) after surgery was significant ( $p < 0.0001$ ).

According to the classification of Whitaker, 31 patients had a Class 1 outcome, with excellent surgical results. Aesthetic outcomes were excellent in 29, good in 5, and poor in 4 of cases, as judged by both the families and the craniofacial team. No severe complications have been observed. Posterior sagittal suture with marked occipital bulging can be successfully treated with this modified posterior procedure with a low complication rate, significant improvement of the cephalic index and a good aesthetic outcome. In all cases of sagittal synostosis, the



operative procedure should be tailored to the nature and severity of the deformity.

#### O-4104

### WHAT MAKES A NORMAL FOREHEAD? SCORING OUTCOME FROM FRONTO-ORBITAL REMODELLING AGAINST AGE-MATCHED CONTROLS IN UNISUTURAL SYNOSTOSIS.

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**Aims:** To quantify forehead appearance in metopic (MS) or unicoronal synostosis (UCS) against unaffected controls, and to assess operative outcome following two different corrective surgical techniques.

**Methods:** Comparable pre- and post-operative facial images of children with MS (12) or UCS (12) were analysed with 13 controls. Six UCS patients underwent remodelling by a bandeau technique (FOR-B), and six by a supraorbital technique (SR).

26 'blinded' assessors rated the randomly mixed images from 1-5 (abnormal – normal) on an auto-timed presentation, shown 'clean' and then divided into 6 aesthetic units.

Nasofrontal angle (NFA), 'forehead vector' angle (FVA) and 'forehead width ratio' (FWR), were derived from the images and compared to the panel scores in an attempt to identify a dominant aesthetic feature relating to the appreciation of a successful outcome.

**Results:** Control foreheads scored a mean of 104.7 (63-126). UCS-preoperative scored 68.5 (45-93) rising to 78.2 (54-103) postoperatively. The MS-preoperative scored 61.1 (39-87) rising to 75.7 (36-104) postoperatively.

FOR-B achieved a mean gain of 17.7 points for UCS versus 1.7 points by SR in cases of comparable preoperative severity range. Similar mean gain in MS was achieved by both techniques (FOR-B 15.3, SR 14.3).

NFA, FWR and FVA were normalised by surgery. No particular aesthetic unit correlated with appearance score or surgical result.

**Conclusion:** Fronto-orbital remodelling normalises appearance in UCS/MS, reducing a significant difference in the operative groups to insignificance. UCS outcomes are favoured by the FOR-B technique.

#### O-4105

### VALUE OF PREOPERATIVE IMAGING IN THE DIAGNOSTICS OF ISOLATED METOPIC SUTURE SYNOSTOSIS: A RISK-BENEFIT ANALYSIS

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Radiographic evaluation, including plain radiographies and computed tomographic (CT) scans, are considered as a necessary tool for diagnosis of craniosynostosis. As concerns about harmful effects of ionising radiation in children have been raised recently, some authors have suggested the use of magnetic resonance imaging (MRI) as a helpful alternative in preoperative imaging of patients

with isolated metopic synostosis. Besides confirming the diagnosis of trigonocephaly, MRI is the superior technique for the evaluation of underlying brain anomalies. However, if the benefit of preoperative imaging justifies possible side effects it is still discussed controversially. Hence, this study investigated the value of preoperative imaging for the diagnosis of isolated synostosis of the metopic suture compared to a sole clinical examination.

In a series of 63 cases with isolated metopic craniosynostosis operated on at the Department of Oral and Maxillofacial Surgery, 48 (76.2%) patients received additional radiography or MRI investigation, while in 15 (23.8%) patients the diagnosis was based on clinical examinations only. In all patients, diagnosis was confirmed intra-operatively by a fused metopic suture. CT scans with three-dimensional reconstruction (12.5%) or plain radiographs (39.6%) did not provide any additional benefit for the diagnosis or the surgical treatment. In 23 patients (47.9%), MRI showed the typical soft-tissue alterations like triangular brain deformation in the frontal area. Besides these findings, no brain or other underlying anomalies were diagnosed which had required any additional treatment. The incidence of underlying brain abnormalities in isolated metopic synostosis seemed not to be different from that of the general population.

## Session 42. LIP CANCER - RECONSTRUCTION

### O-4201

#### A SPECIAL RECONSTRUCTION METHOD FOR LIP DEFECTS AFTER TUMOUR RESECTION.

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The lower lip cancer is one of the most frequent tumour sites among caucasian people. The most frequently used treatment is surgery. After tumour resection the "one step" reconstruction is indispensable. Based on the very important aesthetic and functional role of lip the excellent reconstruction is a challenging task for the surgeon in the extensive defect. After recurrence this task presents a greater challenge for reoperation.

We show a special externally used platysma-based submandibular transpositional flap cases for lip reconstructions with good aesthetic and functional results.

The reconstructed tissues are in consistency, colour and width as same as the original lip tissues.

The method can be used when the oral mucous membrane is sufficient internally.

### O-4202

#### RECONSTRUCTION AFTER RESECTION OF LIP CANCER

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**Background:** The lip carcinoma is one of the most common cancers of the head and neck region. The accepted method of therapy for lip cancer is surgical excision and reconstruction. The repair should achieve appropriate aesthetic quality and conserve labial function.

**Methods:** We report the most advantageous reconstructive procedures of the lower and the upper lips using local flaps, distant flaps and free flaps and we relate our experience.

**Results:** All the patients were satisfied of the aesthetic and functional results of the labial reconstruction.

**Conclusion:** A wide range of reconstructive procedures have been developed but only the most useful have been described in this presentation.

### O-4203

#### LONG-TERM RESULTS AFTER LOWER LIP RECONSTRUCTION WITH A MODIFIED STAIRCASE TECHNIQUE

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**Introduction:** There are numerous techniques for reconstruction of the lower lip. According to localisation and

size of the defect direct closure, transposition flaps, rotation flaps or lip-switch flaps are used. We successfully use a modified staircase technique (according to Johanson) for lower lip reconstruction in defects up to 60% of lip width.

**Material and Methods:** In 20 patients with squamous cell carcinomas of the lower lip reconstruction was performed with the modified staircase technique. The tumour size ranged from 0.8 - 2.8 cm (average 1.2 cm). The resected specimens comprised 30 - 60% of lower lip width. 9 central defects were closed with symmetrical bilateral flaps, 11 paramedian or lateral defects were closed with 9 asymmetrical bilateral flaps and 2 unilateral flaps. Suprahyoid neck dissections were performed in 9 patients. The follow-up ranged from 5 - 8 years (average 5.5 years). A clinical evaluation was performed in all patients.

**Results:** No recurrences or lymph node metastases were observed. All patients regained normal lower lip sensibility after 6-12 months. Symmetrical lip mobility was found in all cases. No microstomia was observed and no secondary commissurotomies had to be performed. All patients showed an adequate vestibular sulcus and could insert dentures.

**Discussion and Conclusions:** The modified staircase technique is technically easy and oncologically sound. The technique can be used for defects up to 60% of lower lip width. It provides excellent functional and aesthetic long-term results because the sensory and motor supply of the lips is preserved and the perioral muscles are correctly aligned. The modified staircase technique is our reconstructive method of choice for medium-sized lower lip defects.

## Poster presentation

### 1. BENIGN LESIONS OF THE FACIAL BONES

#### P-0101

#### SUCCESSFUL MANAGEMENT OF A LARGE GIANT CELL GRANULOMA IN THE LOWER JAW BY INTRALESIONAL CORTICOSTEROID INJECTIONS, SUBCUTANEOUS CALCITONIN INJECTIONS AND ORAL BISPHOSPHONATE ADMINISTRATION

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The central giant cell granuloma (CGCG) is an uncommon benign bony lesion that accounts for less than 7% of all benign lesions of the jaws. Their true nature remains unknown and it has not been clarified if they are reactive, inflammatory, infective or neoplastic origin. Its biologic behavior can be changed ranging from an asymptomatic or with minor symptoms slowly growing bone swelling to an aggressive rapidly growing painful bone destructive lesion. Therefore CGCGs have been classified into non-aggressive and aggressive. This condition usually affects children and young adults, predominantly females. Surgery is a choice treatment for aggressive lesions whereas conservative therapy which includes intralesional steroid injection, subcutaneous calcitonin, interferon injection, and oral bisphosphonate administration is the choice for the management of slow-growing lesions.

*Case:* A 20-year-old female patient referred to our clinic with CGCG (extending from right lower 1. molar to the left second premolar), aggressive type lesion, located in symphysis and body of the mandible. In history she was recommended a surgical excision of the lesion and radiation therapy in a clinic which she had admitted previously. We have planned conservative nonsurgical management of the lesion in a sequence; initially intralesional injection of corticosteroid, then systemic calcitonin injections followed by oral bisphosphonates. The lesion was treated successfully with preservation of the continuity of the mandible and the teeth. At the 5-year clinical and radiological follow up there were no signs of recurrence and the affected teeth were immobile.

*Conclusion:* We considered that aggressive CGCG can be also cured or reduced the size of the lesion by nonsurgical approaches in some cases that minimize the need for extensive surgical resection that can result in functional and esthetic deficits.

#### P-0102

#### NOONAN SYNDROME: DIAGNOSIS IN AN ADULT DUE TO GIANT CELL GRANULOMAS OF THE MANDIBLE

Ada Ferrer Fuertes<sup>1,\*</sup>, Juan Antonio Hueto Madrid<sup>1</sup>, Ferran Boneu Bonet<sup>1</sup>, Jordi Garcia Linares<sup>1</sup>, Javier González Lagunas<sup>1</sup>  
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*Introduction:* Noonan syndrome (NS) is an autosomal dominant developmental disorder characterized by congenital heart defects, facial anomalies, short stature, webbed neck, skeletal anomalies (such as chest deformity). Other common features are bleeding diathesis, ectodermal anomalies, lymphatic dysplasias, cryptorchidism, and cognitive deficits. The main craniofacial features include hypertelorism, downward eyeslant, low-set posteriorly rotated ears, and ptosis. The diagnosis of NS depends primarily on the clinical features, although the prevalence of the characteristic features among affected individuals depends on the patient's age.

*Case report:* Even though it is mainly diagnosed in childhood, we report a case of a 24 year-old woman diagnosed in adulthood only after consulting at our Unit seeking treatment for multiple giant cell lesions in the mandible. The patient presented radiolucent lesions in the mandible, at symphysis and both mandibular angles. The patient presented a peculiar facies with short stature and a short neck. Her personal medical history revealed a pulmonary stenosis that had been repaired through a catheterism on her first months of life. The rest of her medical history was unremarkable. She showed normal intelligence. Suspecting a Noonan syndrome, a genetic study was performed, confirming the diagnosis. Blood tests showed no alterations. Treatment consisted in the surgical excision of the lesions under general anesthesia and the filling of the osseous defects with DBX Putty® (DBX; Synthes Maxillofacial) Histological findings supported the diagnosis of giant cell granulomas.

*Discussion:* Multiple giant cell lesions have repeatedly been observed in patients with clinical features of NS. Giant cell lesions are benign tumor-like lesions most frequently affecting the jaws but also occurring in other bones or soft tissues. They consist of multinucleated giant cells in a background of fibrous connective tissue with abundant spindle-shaped mononucleated cells. NS is characterized by marked phenotypic variability. The syndrome's genetic alterations are heterogeneous. NS is caused by genetic lesions promoting upregulation of RAS signaling, and located in genes PTPN11, SOS1, RAF1, KRAS, NRAS, BRAF, SHOC2, MEK1 or CBL. As additional NS disease genes remain to be discovered, a failure to identify a mutation does not exclude the diagnosis.

**P-0103****TWO STAGE ENUCLEATION AND DEFLATION OF A LARGE UNICYSTIC AMELOBLASTOMA WITH MURAL INVASION IN MANDIBLE**

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**Objective:** A strategy of treating unicystic ameloblastoma (UA) should be decided by its pathological subtype including luminal or mural type. Luminal type of UA can be treated only enucleation alone, but UA with mural invasion should be treated aggressively like conventional ameloblastomas. However, it is difficult to diagnose the subtype of UA by an initial biopsy. There is a possibility that at the lesion is an ordinary cyst or KCOT, leading a possible overtreatment. Therefore, this study performed "two stage conservative surgery". Patients and methods: Two patients with a large UA with mural invasion in mandibular ramus, 20-year-old male and 63-year-old female, were treated by the two stage conservative surgery. This two stage conservative surgery performed the enucleation of the cyst wall and deflation at first surgery, and the pathological finding confirmed mural invasion into the cystic wall, leading to the second surgery 3 to 4 months after the first surgery. The second surgery performed enucleation of scar tissue, bone curettage, and deflation.

**Results:** The both patients showed facial symmetry, no facial and mental palsy, and no trismus at 2 years and 6 months after the first surgery in the 20-years-old patient and at 1 year and 2 months in the 63-year-old patient. CT and panoramic X-ray showed that no evidence of tumor recurrence, visible new bone formed and ramus expanding shrank. **Conclusion:** This strategy for UA with mural invasion could avoid the resection of a mandible and could become facial symmetry with no major complications. The second surgery was able to contribute to the reduction of the recurrence rate by removing tumor nest in scar tissue or new bone, enhance new bone formation, and shrink the mandibular expanding by fenestration. However, this strategy for UA remains in the need of justification through a larger study and long-term follow-ups.

**P-0104****MANDIBULAR AMELOBLASTIC FIBROMA IN A TEENAGER**

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**Introduction:** Ameloblastic fibroma, first described by Kruse in 1891, is a rare benign odontogenic tumor that represents 2% of the odontogenic tumors. It is a tumor of mixed origin, both epithelial and mesenchymal. It usually appears in the posterior mandible of young patients (80-90% of the cases), with an incidence peak in teenagers between 14 and 15 years old, without distinction between sex. Radiological examinations show a well defined radiolucent lesion with different levels of opacity.

**Material and methods:** A case of a patient with ameloblastic fibroma in a teenager and its posterior treatment is reported. Scientific literature regarding this pathology is revised.

**Case report:** A 14 year-old male with left paramandibular swelling was referred to our unit for diagnosis. Radiological examinations showed a radiolucent image associated to non-erupted second and third left mandibular molars, suggesting follicular cyst. Treatment consisted surgical removal of the lesion, curettage and surgical extraction of both non-erupted molars. The lesion was a solid, elastic tumor with a yellowish-white colour. The osseous defect was filled with DBX®. Histology determined it was an ameloblastic fibroma. The patient actually remains asymptomatic. Radiographical exams show a correct osseous regeneration without clinical nor radiologic evidence of recurrence.

**Discussion:** Differential diagnosis must be established with odontogenic cists, Pindborg tumors, odontogenic keratocysts, odontogenic mixoma, odontomas, ameloblastic fibroodontoma, odontogenic adenomatoid tumor, histiocytosis and central giant cell granuloma. Treatment consists in careful removal of the tumor and posterior curettage of the tumoral cavity. Recurrence is described in 18,3% of cases, generally due to incomplete resection. Its transformation to a malignant tumor is not rare: up to 40% of ameloblastic fibrosarcomas are originated in previous ameloblastic fibromas or ameloblastic fibroodontomas.

**Conclusion:** Odontogenic fibroma is a rare odontogenic tumor. Its treatment implies the complete and careful removal, to prevent recurrence and potential malignization.

**P-0105****SICKLE CELL CRISIS IN THE MAXILLOFACIAL REGION: A CASE AND REVIEW**

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Sickle cell disease is one of the most common genetic disorders in the UK and worldwide. It is well-recognised as a potentially life-threatening condition with widespread implications throughout the body. The effects of vaso-occlusive events during sickle cell crises in the limbs, chest, abdomen, central nervous system and genitalia are well documented. However, far fewer cases involving the maxillofacial region, where it can have a significant impact on the eye, maxilla and mandible, can be found in the literature.

We describe the rare and challenging case of a pregnant patient who presented to our department with an acute painful facial swelling, profound trismus, anaesthesia of the lower lip and no evidence of dental disease or infection. Investigations revealed a diagnosis of a sickle-cell-induced vaso-occlusive event of the mandible. We discuss the details and challenges of her clinical management and her outcome at six months post event. To understand the implications and management of sickle cell disease in the maxillofacial region, we have also carried out a review of the international literature.

**P-0106****THE USE OF ALLOGENEIC ORTHOTOPIC TRANSPLANT OF THE LOWER JAW TO REPLACE ITS DEFECT AFTER TUMOR REMOVAL.**

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**Introduction:** After removal of tumors of mandible sometimes there are large defects in bone tissue, which are not always possible to replace with bone autografts or implants. In cases where the entire lower jaw is removed or the half of it with a branch, joint and coronoid process, it is feasible to use allogeneic orthotopic grafts of whole mandible, or part of it.

**Objective:** To study the clinical features of allogeneic graft of the mandible, its radiological characteristics after transplantation to the recipient site in the replacement of half of the defect jaw.

**Materials and methods.**

In the clinic of maxillo-facial surgery we conducted a clinical case study of a patient with ameloblastoma of the right side of the mandible spread to the body, branch, and condylar process. Cytology, biopsy, x-ray diagnosis, anthropometric measurements were taken. Surgery was performed under general anesthesia – removal of the tumor of the mandible with resection of the right body, the branches and disarticulation. Orthotopic allogeneic graft was prepared and transplanted into the tissue defect area - half of the lower jaw, taken from the corpse in the tissue bank. Allogeneic graft fixated with titanium miniplates and screws.

**Results.** The patient was observed at hospital for two weeks after the surgery. Jaws were immobilized. Three weeks after surgery swelling subsided and the patient was able to open and chew. Swallowing normalized within a month. At this time the x-ray showed well-defined allogeneic bone graft fixated with miniplate. A month later the patient could open his mouth and chewed normally, the newly created temporo-mandibular joint was functioning. After 4 months the function of masticatory muscles recovered completely.

**Conclusion.:** Analysis of the clinical picture in the postoperative period, the control X-ray examination and the functional load on the mandible of the patient suggest the possibility and expediency of the successful use of this method for bone grafting.

**P-0107****RELATIVE FREQUENCY AND DISTRIBUTION OF DIFFERENT TYPES OF ODONTOGENIC TUMORS IN SOUTH-EASTERN EUROPE**

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**Objective:** This study was designed to determine the relative frequency and distribution of different types of odontogenic tumors in South-Eastern Europe, focusing on the Black-Sea Region of Turkey.

**Study Design:** 1165 oromaxillofacial biopsy records were

evaluated for histologic diagnosis of odontogenic tumors over a seven-year period from patients referred to the Department of Oral and Maxillofacial Surgery and Department of Pathology, Karadeniz Technical University, Faculty of Dentistry and Medicine, Trabzon, Turkey.

**Results:** A total of 86 odontogenic tumors were reported. Malignant transformation only occurred in 6 cases (6.8%), while the others were benign (93.2%). Odontoma was the most common odontogenic tumor (41.8%) followed by keratocystic odontogenic tumor (17.4%), Ameloblastoma (12.7%) and odontogenic myxoma (%9.3).

**Conclusion:** The relative frequencies of odontogenic tumors exhibited variability between geographic regions. In the Black-Sea Region ,Turkey, odontoma and keratocystic odontogenic tumors are the most common benign odontogenic tumors with distinct anatomic predilections.

**Keywords:** Odontogenic Tumor, Ameloblastoma, Keratocystic odontogenic tumor, Prevalence

**P-0108****AMELOBLASTIC FIBROMA. UNEXPECTED DIAGNOSIS IN A 6-YEAR-OLD PATIENT**

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**Aim:** To report a case of non-expected histological findings in an apparently normal follicular cyst during routine impacted tooth removal.

**Case report:** A 6-year-old female patient consulted for an interincisal diastema and an unerupted right lateral incisor. The right central incisor had erupted palatally displaced. She had family record of lateral incisor agenesis — mother— and no other remarks in the patient's or the patient's family history. Her mother referred the patient's deciduous right incisor never erupted.

**Results:** Occlusal premaxilla x-ray findings consisted of right lateral incisor agenesis and an embedded deciduous right central incisor causing diastema and diseruption with no other remarkable findings. No lithic lesions were achieved. Surgical removal of the deciduous impacted tooth was scheduled. Surgical findings showed a follicular cyst greater than expected from findings in x-ray images, and enamel defect in the occlusal aspect of the tooth that led to think of tooth diseruption caused by traumatic origin. Excision and curettage was performed along with tooth removal. The cystic lesion was sent for histological examination and was reported as ameloblastic fibroma (AF).

**Discussion:** AF is an uncommon benign mixed odontogenic tumour in which mesenchymal tissue as well as odontogenic epithelium can be found. It represents 2% of all odontogenic tumours. AF usually appears as a radiolucent, well-defined lesion that in most cases associates with an impacted tooth. Opaque areas within the lesion must lead the diagnosis towards ameloblastic fibro-odontoma. It develops most commonly in the posterior segments of the mandible. The average age is 12 although the upper age limit is 40. It shows no gender predilection. Differential

diagnosis must include other lithic lesions such as ameloblastoma, odontogenic myxoma, dentigerous cyst, odontogenic keratocyst, central granular cell tumour and histiocytosis. It is thought recurrence is due to incomplete resection. Malignant transformation into ameloblastic fibrosarcoma has been reported, thus complete excision and thorough curettage of the surgical site must be accomplished.

*Summary:* Despite the apparently benign appearance and/or radiographic features in all oral lesions, they should be sent for meticulous histological study in order to plan the adequate treatment and follow-up according to an accurate diagnosis.

#### P-0109

### MULTIPLE BROWN TUMOR IN THE MAXILLARY REGION AS ONSET OF ADVANCED PRIMARY HYPERPARATHYROIDISM.

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#### Introduction

Brown tumor onset in primary hyperparathyroidism is rarely seen in our environment and it usually arises in cases of advanced disease with osteolytic bony lesions that involve the jaws, clavicle, ribs and pelvic bone. Brown tumor shows no pathognomonic histologic features and a laboratory parathyroid hormone level evaluation is mandatory for differential diagnosis with other clinical entities such as central giant cell granuloma.

*Objectives:* To report the case of a 56-year old male patient with multiple/double brown tumor of the jaws. We show diagnostic sequence, differential diagnosis as well as the therapeutic options that were planned in this case.

*Methods:* A 56-year old male patient presented multiple osteolytic bone tumor lesions in an edentulous mandible as well as in the maxillary upper left region. After histopathologic, radiological and analytical study we found the appearance of couple brown tumor lesions and an undiagnosed advanced primary hyperparathyroidism.

*Results:* Histologic study revealed giant cell granuloma. With an increased serum calcium, a low phosphorous level and an elevated parathyroid hormone level, the patient was studied by the Endocrine Department where the study was completed. Final diagnosis was parathyroid adenoma as the cause of an advanced asymptomatic primary hyperparathyroidism. To correct the hormonal imbalance, the Surgery Department of our hospital performed a partial parathyroidectomy including the adenoma. During the first year of postoperative follow-up, the patient recovered uneventfully. Both mandibular and upper maxillary lesions disappeared, with complete tumor regression; the patient remains recurrence-free at a 3 year follow-up.

*Conclusions:* Brown Tumors are a very uncommon presentation of hyperparathyroidism. Diagnosis requires a systemic investigation for lesion differentiation. Initial treatment involves the correction of hyperparathyroidism, what usually leads to tumor regression.

#### P-0110

### HOSTIOTICITIS OF LANGERHANS CELLS IN THE BONES OF THE CRANIAL ABOBEDA

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*Aim:* The histiocytosis Langerhans cell (also known as a disease of Abt-Letterer-Siwe, Histiocytosis X disease and Hand-Schüller-Christian) is a rare disease that involves abnormal proliferation of Langerhans cells, being extraordinary, the presentation about the cranial bones abobeda.

*Materials and methods:* The authors present a case of X Histiocytosis monoostotica in the frontal bone and its surgical approach.

A 41 years old patient with headache and right frontal swelling, diagnosed by imaging methods and pathology of Histiocytosis X, monostotic by the extension study, patient undergoing surgery doing craniotomy with wide margin, and its subsequent reconstruction.

*Conclusions:* The histiocytosis X is a rare disease of the abobeda cranial bone, which should make an extension study, excision with wide margins, and being in this area, you need a specific reconstruction.

#### P-0111

### RESTORATION OF THE ALVEOLAR PROCESS AND DENTITION AFTER REMOVAL OF SOLID ODONTOMA OF THE MANDIBLE.

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*Introduction:* Restoration of dentition, elimination of defects and deformities of the alveolar processes and jaws after the removal of tumors is a complex problem that requires an individual approach to the medical definition of planning, timing of treatments, techniques and materials.

*Aims:* The aim was to find the best approaches to address the defects and deformities of jaws after removal of odontogenic tumors.

*Materials and Methods:* We treated a patient with a solid form of odontoma of the mandible. The first stage of treatment - removal of the tumor under general anesthesia, followed by histopathological examination. During the operation seven teeth adjacent to the tumor were extracted. The resulting defect in the body of the mandible and the alveolar process was simultaneously partially closed using bone autograft taken from the resected right coronoid process of the mandible. The second step was carried out by implantation of Alpha Bio dental implants with alveolar ridge augmentation. In the third step the dentition was restored with metal ceramic prostheses.

*Results:* After removal of the tumor, the patient had impaired functions of chewing, biting and speech. Two months later, the panoramic radiograph showed that the cavity in the jaw bone and the chin 6 x 3.5 cm, was filled with young bone regenerate. Six months later the graft fixation screws were removed. At the same time the new bone regenerate forming the alveolar bone and completely

filling the defect in the jaw was noted. Dental implants were installed in the projection of each of the extracted teeth. The contour of the alveolar process was formed with natural bovine bone "Alpha Bio's GRAFT". Installed healing abutments, then individual aesthetic abutments, metal ceramic prosthesis.

**Conclusion:**

The patients dentition is restored, chewing, biting and speech function are recovered. As a result of conducted treatment, restored are the front bone segment of the mandible, the alveolar process, the patient recovered a functional and aesthetic integrity of the dentition. Complete social and medical rehabilitation of the patient is achieved.

**P-0112**

**PROGNOSTIC FACTORS FOR KERATOCYSTIC ODONTOGENIC TUMOR : ANALYSIS OF CLINICO-PATHOLOGIC AND IMMUNOHISTOCHEMICAL FINDINGS FOR PREDICTION OF RECURRENCE.**

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**Background:** Considerable controversy still exists regarding the proper management of Keratocystic Odontogenic Tumors (KOTs). Recurrence rates range from 0-56% with enucleation alone and reported 0% with en-bloc resection. In many studies adjuvant treatment together with enucleation has decreased the percentage to 1-8%. Although prognostic factors to determine the potential for recurrence still remains unclear, their use may become important to manage this neoplasm's aggressive behavior and aid in selecting the optimal treatment with the most successful outcome and reduced morbidity.

**Objective:** Determine prognostic factors for the recurrence of KOTs following simple enucleation by examining clinico-pathologic and immunohistochemical findings.

**Material and methods:** We performed a retrospective study and analyzed the KOTs treated in our department during 2000-2003. Data was collected to include localization, association with Gorlin Syndrome, if it was unilocular or multilocular, presence of cortical perforation, presence of dysplasia, cystic area, inflammatory infiltration, satellite cysts, fragmented or complete enucleation and immunohistochemical study for Ki-67.

**Results:** A total of 16 cysts were analyzed, resulting in 43,5% (n=7) of recurrence following enucleation without any adjuvant treatment. The mean follow-up period was 87.6 months, and the mean time for recurrence was 58,4 months. We detected a strong relationship between cortical perforation with risk of recurrence (71,4% of the cases recurred had this characteristic), as well as association with Gorlin Syndrome ( 75% of these patients had recurrence). Other risk factors seem to be the presence of satellite cysts (28,6% in recurrence and 11,1% in no recurrence), inflammatory infiltration (85,7% in recurrence and 77,8% with no recurrence) multilocular structure (28,6% of cysts recurred versus 22,2% of no recurrence) and a larger cystic area ( 4,9cm<sup>2</sup> vs 3,5cm<sup>2</sup>). Factors such as fragmented enucleation and Ki-67 (positivity, localization and intensity) didn't seem so to be related to recurrence in our study.

**Conclusions:** Enucleation as unique treatment can have acceptable results with a low morbidity compared to other more aggressive techniques. However, in cases which present risk factors for recurrence such as big cysts with cortical perforation, Gorlin Syndrome, satellite cysts, intense inflammatory infiltration or multilocular structure, adjuvant treatment such as Carnoy's solution could be targeted to try and decrease the recurrence rate.

**P-0113**

**AN EXTENSIVE MEDULLAR OSTEOLASTOMA OF THE MANDIBLE, RESECTED AND RECONSTRUCTED BY A DCIA FREE FLAP THROUGH AN INTRAORAL APPROACH. REPORT OF A CASE.**

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Osteoblastomas are rare bone tumors (less than 1%), affecting mostly long and flat bones in the human body and very rarely localized in the jaws. In such cases they are found slightly more often in the mandible, than the maxilla, with a posterior bone regions predilection and predominantly in females and males under the age of 30. It could develop centrally in the bone (medullar type) or peripherally (periosteal osteoblastoma) and has similar histopathological features to the osteoid osteoma, but without the typical nocturnal pain (influenced by PG inhibitors).

Despite its benign characteristic, it requires standard resection and reconstruction in the extensive cases, which along with the young age of the patients and the good general prognosis makes the aesthetic component of the treatment planning extremely important.

We present the case of a 29 y/o female patient, suffering from an extensive bilateral osteoblastoma of the mandible affecting the region from the premolars on the right side to the molars on the left side – resected and reconstructed by a DCIA free flap, through an intraoral approach.

This case was included in the clinical program for microsurgery development in Bulgaria, following the Memorandum for Cooperation between the EACMFS and the University Specialized Hospital for Maxillofacial Surgery – Sofia, signed on 01.July.2011.

**P-0114**

**MELANOTIC NEUROECTODERMAL TUMOR OF INFANCY – TWO CLINICAL CASES**

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**Introduction:** Melanotic neuroectodermal tumor of infancy (MNTI) is an uncommon melanin-containing mesenchymal tumor of neural crest origin. MNTI is a benign neoplasm with rapid expansile growth and a high recurrence rate, especially during the first 3 months after surgery. The typical clinical presentation is a firm, painless, rapidly

growing mass arising from the maxillary alveolus; the tumor elevates the upper lip and can interfere with nursing. Computed tomography scans are very helpful in planning surgical excision. Although these studies are useful to delineate the tumor extent, they seldom are diagnostic, such that incisional biopsy is almost always required. However, clinical assessment continues to remain the basis for diagnosis of such lesions. Difficulty in management stems from the uncertain biological behavior of this tumor. Although it is almost always benign, recurrences (15% to 20%) occur, with a small percentage of tumors being malignant. We present two clinical cases of MNTI and we intend to discuss the treatment options such as chemotherapy, radiotherapy and surgery more or less conservative or a combination of these.

**Clinical case:** We present two clinical cases: a 18 months old boy with an extense mass extending from the maxilla and maxillary sinus to the orbit inducing large facial asymmetry that had been submitted to chemotherapeutic treatment before surgery with no reduction of the tumor and a 5 months old boy with a small mass arising from the maxillary region, with blue pigmentation changes. A biopsy was performed in both cases. Complete resection of the tumor was achieved in both cases with no residual tumor or recurrence. In the first case the operative piece had 8x5x4.5 cm and in the second 1.8x1.5x1.1 cm.

**Discussion:** If technically possible, complete resection with a 5-mm margin is recommended, but when radical surgery would cause mutilation such as the first case we opted for local excision with curettage of the underlying bone, which is described as being usually sufficient.

**Conclusion:** Early conservative surgical excision provides an excellent result with good prognosis.

#### P-0115

### FIBRODYSPLASIA OSSIFICANS PROGRESSIVA: A RARE CONDITION

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**Introduction:** Fibrodysplasia ossificans progressive (FOP) is an extremely rare, disabling genetic condition. Only 700 cases have been reported worldwide. FOP induces mineralisation in muscles, tendons, ligaments and connective tissue following minor trauma.

**Case presentation:** We present an unusual case of a 42 year old Caucasian lady who is one of the 25 people diagnosed with FOP in the UK. She was diagnosed with this rare condition in 1983. In 1997 she attended her local maxillofacial unit with pain and some trismus. She underwent surgical removal of her lower left wisdom tooth and manipulation under anaesthesia of her temporomandibular joints. This resulted in formation of bone within bilateral lateral pterygoid muscles causing bilateral bony ankylosis between the mandibular condyles and lateral pterygoid plates and complete trismus.

**Conclusion:** Manipulation in patients with this condition is contraindicated due to risk of progressive ossification. Due to the scarcity of literature available we would like to highlight the importance of the disabling complications of FOP which could easily occur following minor interven-

tions.

#### P-0116

### TRAUMATIC ULCERATIVE GRANULOMA WITH STROMAL EOSINOPHILIA (TUGSE): REPORT OF 2 CASES

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**Objectives:** Traumatic ulcerative granuloma with stromal eosinophilia (TUGSE) is a chronic, benign, self-limiting lesion of oral mucosa, manifesting as an ulcer with elevated rolled-up margin. It may mimic squamous cell carcinoma as well as other malignant lesion. The most common location is the tongue, although other locations in oral mucosa are possible. Pathogenesis of the lesion is unclear but trauma is considered to have a central role. Most cases of TUGSE in the literature have been treated by conservative incisional or excisional biopsy with subsequent spontaneous healing.

**Materials and Methods:** In the present cases, we reported, a 70-year-old woman and a 52 year-old-man presented at Oral and maxillofacial clinic, Faculty of Dentistry, Chiang Mai University complaining of mild pain associated with tongue ulcer of more than 2 weeks duration. The lesions appeared as ulcers with pale pink-yellow rolled-up margins. TUGSE in the first patient resulted from sharp tooth cusp, while the other patient had no associated local trauma.

**Results:** Incisional biopsy were performed in both cases. One week after biopsy, the lesions revealed signs of remission: 1 month later, the ulcers disappeared. Both patients were scheduled 6 months for follow up, no recurrence had been found.

**Summary:** In this report, we showed 2 cases of TUGSE of the tongue and discuss the benign nature, self limit lesion and need to differentiate from other malignant lesions in order to prevent misdiagnosis and overtreatment.

#### P-0117

### OSTEOBLASTOMA OF THE MAXILLA: A CASE REPORT

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**Objectives:** Osteoblastoma is a rare benign tumor of osteoblastic origin, occurring less than 1% of all bone tumors. Osteoblastoma is commonly found in vertebrae and long bones of the extremities. It occurs only 15% in the facial bones and skull. Men are affected more often than women. The tumor is slowly progressive, causing bone expansion

**Material and methods:** In the present case, we reported, a 17-year-old, thai man who had osteoblastoma in the maxilla. The patient presented with dull pain affecting the right maxilla with a swelling in the buccal sulcus. The tumor



was clinically characterized by locally destructive behavior and histologically consisted of plump osteoblast-like cells and multinucleated osteoclast-like giant cells. With cone-beam CT, the tumor revealed a radiopacity involving alveolar bone of the right posterior maxilla and expanding into the right antral floor.

**Results:** The osteoblastoma was treated by resection. After the specimen was removed, the buccal fat pad was filled in the defect and it was covered by the mucoperiosteal flap. After 2-year follow up, no recurrence was detected.

**Summary:** A case of osteoblastoma in the maxilla, that is rare, is described. The lesion was diagnostically confirmed by histological examination. Clinical and radiographic findings were shown. The outcome of the treatment was satisfied.

#### P-0118

### AMELOBLASTOMA OF THE JAWS: A RETROSPECTIVE STUDY OF 22 CASES.

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**Introduction:** Ameloblastoma is a type of odontogenic tumour that is defined as a benign locally invasive epithelial odontogenic neoplasm of putative enamel organ origin.

**Materials and methods:** We make retrospective study from all cases about ameloblastoma, that were attended and treated in La Paz University Hospital, from April 2002 to April 2012. We analyzed the patient's age, gender, the location, the clinical signs and symptoms, the radiographic appearance, the treatment and the recurrence.

**Results:** 22 patients were found (12 men and 10 women), with a mean age at the diagnosis of 46 years. 15 tumours were found in the mandible, while the other 7 were found in the maxilla. The most frequent clinical findings are pain, mobility of teeth and cortical enlargement. Most of the tumours are multicystic. The treatment consists on excision of the tumour in most of them. In 3 patients, we performed segmental resection with microsurgical reconstruction. In 4 patients we found a recurrence, and in 1 patient, we found 2 recurrences.

**Conclusion:** Ameloblastoma is an uncommon but clinically significant odontogenic epithelial neoplasm. In our serie, the prevalence is similar between men and women. The mandibular location is more frequent than de maxillary location, and most of the tumours have multicystic appearance. The treatment of choice is the excision of the tumour. The big size tumours often require microsurgical reconstruction.

#### P-0119

### MANDIBLE OSTEOMAS IN FAMILIAL ADENOMATOUS POLYPOSIS: A CASE REPORT

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**Objectives:** Familial adenomatous polyposis (FAP) is an autosomal dominant inherited disease which has an incidence at birth of about 1/8,300 and is caused by germline mutations in the Adenomatous Polyposis Coli gene (APC-gene). Nearly 400 different mutations have been described and it is consensual that the site of mutation within the APC-gene correlates with the clinical phenotype. It is characterized by the development of multiple adenomas in the colon and rectum during the second decade of life that will inevitably become malignant if left untreated. This disease can present with oral and maxillofacial extraintestinal manifestations such as osteomas, multiple dental abnormalities and soft-tissue lesions. These manifestations may show up many years before intestinal polyposis. Gardner's syndrome is a clinical variant characterized by the triad of colonic polyposis, osteomas and mesenchymal tumors of the skin and soft tissues. In particular, jaw osteomas are often multiple and some authors even suggest that young patients with more than three osteomas may undergo medical examination for FAP. We report a case of a peripheral solitary mandibular osteoma in a 40-year-old man with FAP.

**Material and method:** We describe the clinical case of 40-year-old man with a past history of total colectomy with ileal-rectum anastomosis at 19 years old due to colorectal cancer in the context of FAP. A Malherbe's tumor was already excised from his scalp. He was referred to our consultation after an episode of pain and swelling of the right retromandibular region. Panoramic dental radiograph and facial front and side views showed a well-circumscribed radiopaque mass at the right angle of the jaw. Surgical resection by intra-oral incision was performed.

**Results:** The histopathological study of the excised lesion confirmed the diagnosis of a compact osteoma. Optimal functional and aesthetic results were achieved without any significant post-op complication.

**Summary:** Although the literature describes most osteomas related to FAP as multiple, this case proves the phenotypical variability of the disease. Despite the fact that osteomas are relatively common benign lesions, solitary jaw osteomas in children with FAP's family history may alert for the presence of this disorder.

#### P-0120

### GIANT CELL TUMOUR OF THE MANDIBLE AS THE FIRST MANIFESTATION OF PRIMARY HYPERPARATHYROIDISM – CASE REPORTS.

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The study included 2 cases of primary hyperparathyroidism (HPT) associated with brown tumours of the lower

jaw. In both cases bone lesions appeared to be the first manifestation of primary HPT.

Patient 1 was a 57-year-old woman with giant cell tumour of the anterior mandible. Blood tests demonstrated elevated calcium (2.62 mmol/l) and parathyroid hormone (PTH) serum concentration (159 pg/ml) and hypercalciuria (16.5 mEq/24 h) was proven. Scintigraphic examination revealed the presence of parathyroid adenoma. The patient was treated with surgical removal of mandibular tumour and excision of the adenoma.

Patient 2 was a 32-year-old female with giant cell tumour involved the right side of the mandible. The diagnosis of brown tumour associated with primary HPT was confirmed by elevation of calcium (3,0 mmol/l) and parathyroid hormone (PTH) serum concentration (136 pg/l) and hypercalciuria (17 mEq/24h). Scintigraphic examination revealed the presence of parathyroid adenoma. She underwent excision of parathyroid adenoma and after 1 year the residual mandibular tumour was excised.

In both presented patients the HPT is under control and there is no recurrence of brown tumours.

#### P-0121

### INTRAOSSEOUS HEMANGIOMA OF THE ZYGOMA – REPORT OF A RARE CASE AND LITERATURE REVIEW

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**Objectives:** Intraosseous hemangiomas (IOH) are rare, slow-growing, benign vascular anomalies, accounting for less than 1% of all osseous tumors. Involvement of the facial skeleton is uncommon with the mandible and maxilla most frequently involved. IOH of the zygoma are extremely rare with only 35 cases reported in the literature, mostly in single case reports.

We present a clinical case of IOH of the left zygoma, treated with partial resection with good aesthetic outcome and no signs of relapse. We review the literature and discuss the pathophysiology, treatment and controversies in the approach of this rare pathology.

**Material and Method:** Clinical prospective study of a 73 years-old caucasian female patient, referred to our Department with complain of slow growing asymptomatic hard swelling in the left zygoma, with 4 months of evolution, causing aesthetic deformity and medial distopia of the left ocular globe. She had history of facial trauma 5 years before.

CT images of the face revealed a 2x2x3 cm, hypointense honeycomb-like intraosseous mass in the left zygoma, with mass effect in the left orbital floor and lateral wall.

The patient underwent surgical partial resection of the lesion through a subciliar approach. Superficial osteotomy and osteotomy of the orbital floor and external zygomatic lesion was performed, with hemostasis and regularization with bone wax.

**Results:** The excised specimen histopathological study confirmed the diagnosis of IOH.

The patient was satisfied with the aesthetic result and remained in continuous clinical and radiologic surveil-

lance with no signs or symptoms of recurrence.

**Summary:** IOH of the zygoma are exceptional rare tumors, with only 35 cases reported in the literature.

We report the case of a patient of IOH of the left zygoma, treated with partial resection with good aesthetic outcome and no signs of relapse.

Although complete tumor resection represents the definitive treatment for IOH of the facial bones, conservative partial resection with superficial osteotomy presents as a good alternative in selected cases with primary cosmetic concern. Partial resection may restore the facial contour with minimal side effects and low recurrence rate, avoiding possible complications of more challenging reconstructive defects.

#### P-0122

### IMMUNOGLOBULIN G4-RELATED SYSTEMIC DISEASE INVOLVING JAW BONE: A CASE REPORT

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Immunoglobulin G4-related systemic disease (IgG4-RSD) is a recently defined lymphoproliferative disorder with fibrotic or sclerosing changes in affected organs. There were no diagnosis criteria of the disease until now, but two characteristics were generally accepted: 1. elevated serum IgG4 (>135mg/dL) and 2. histopathological features including lymphocyte and IgG4-positive plasma infiltration (IgG4-positive plasma cells/IgG-positive plasma cells > 40%). IgG-related disease occurs in various systemic organs, such as the hepatobiliary tract, salivary glands, orbits and lymph nodes. However, it was first found and most commonly caused pancreatitis, also known as autoimmune pancreatitis (AIP). Glucocorticoid therapy comprises the mainstay of treatment and surgical excision may be not needed. In this article, we present a case of rapid growing mass lesion over mandible in a 46-year-old man, which proved to be IgG4-related sclerosing disease after surgical intervention.

#### P-0123

### CLINICO-STATISTICAL STUDY OF ODONTOGENIC TUMORS ACCORDING TO THE 2005 WHO CLASSIFICATION IN JAPANESE PEOPLE

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**Introduction:** Odontogenic tumors are relatively rare but important lesions in the jaws for oral and maxillofacial surgeons. Odontogenic tumors are almost always benign, it is extremely rare for an odontogenic tumor to be malignant. There are various types of benign odontogenic tumors, ranging from tumors that show expansive growth to tumors that show invasive growth. Treatment requires special considerations, because the tumors often occur in schoolchildren. We examined relative incidence of odontogenic tumors in a Japanese people using a global standard of the 2005 WHO classification.

**Materials and Methods :** We use the 2005 WHO classification of odontogenic tumors to report a results of clinico-statistical surveys for 15 years from 1996 to 2010 in our department, First Department of Oral and Maxillofacial Surgery, Osaka Dental University, and for 10 years from 1995 to 2004 carried out by the Japan Society for Oral Tumors(JSOT). We discuss the epidemiology of odontogenic tumors in comparison with survey results obtained in foreign countries.

**Results:** 1. We experienced 186 benign odontogenic tumors and malignant tumor was not found in our institution. The most frequent tumor was keratocystic odontogenic tumor(39.2%), followed by ameloblastoma(26.3%), odontoma (22.0%), cementoblastoma (3.2%), odontogenic myxoma/ myxofibroma (2.7%) and ameloblastic fibroma(1.6%). A maxilla-mandible ratio was 1:2.8. 117cases(62.9%) were found during the second, third, fourth and fifth decade with a peak in the third decade(19.9%).

2. JSOT surveyed 5231 odontogenic tumors and the most frequent tumor was ameloblastoma(33.4%), followed by keratocystic odontogenic tumor(28.8%), odontoma(24.7%), cementoblastoma(2.6%), odontogenic myxoma/myxofibroma(2.2%), odontogenic fibroma(2.0%), and adenomatoid odontogenic tumor (0.9%). A male-female ratio was 1:1.03, and maxilla-mandible ratio was 1:3 and the most affected site was the molar region of the mandible (52.7%). 3528 cases(67.6%) were found during the second, third, fourth and fifth decade with a peak in the second decade(21.9%).

3. In foreign countries, the most frequent tumor was ameloblastoma (36.9%) and keratocystic odontogenic tumor(36.2%), followed by odontoma (7.8%), myxoma/myxofibroma (4.1%), adenomatoid odontogenic tumor(3.3%), calcifying cystic odontogenic tumor(2.3%), cementoblastoma (1.8%).

**Conclusion:** The incidence of ameloblastoma and keratocystic odontogenic tumor was nearly same in Japan and other countries, but incidence of odontoma was very lower in China.

#### P-0124

### COLCHICINE-RESPONSIVE CHRONIC RECURRENT MULTIFOCAL OSTEOMYELITIS: A POSSIBLE VARIANT OF FAMILIAL MEDITERRANEAN FEVER.

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**Background:** Autoinflammatory diseases are caused by a dysfunction of the innate immune system, and include several disorders like familial Mediterranean fever and mevalonate kinase deficiency, among others. Chronic recurrent multifocal osteomyelitis (CRMO) is an autoinflammatory disease of the pyogenic type, characterized by sterile bone inflammation in absence of microorganisms, autoantibodies and reactive T cells. Although it is defined as multifocal, it can manifest as unifocal and non-recurring lesions. The treatment begins with non steroidal

anti-inflammatory drugs, followed if not effective by corticosteroids and more recently, bisphosphonate therapy. The familial Mediterranean fever arises with recurrent episodes of fever and serositis, and response to colchicine treatment is one of the diagnostic criteria.

**Material and Method:** Here we submit a case report of colchicine-responsive CRMO in a pediatric patient. A five-year-old girl was referred with pain and swelling of the left mandible, without any sign of infection at the physical exam. Initial radiographs showed a sclerotic lesion in the left mandible, with associated hyperostosis. NSAIDs and antibiotics had no evident effect. A biopsy was performed under general anesthesia, whose results indicated a sub-acute osteomyelitis. Mandibular bone decortication in association with hyperbaric oxygen and antibiotic therapy administration were performed. A mild improvement was observed. Three months later the patient showed a recurrence with pain and swelling. Mandibular decortications and antibiotic therapy administration were again performed without any significant improvement. The result of all three biopsies showed a sub-acute inflammation of the jaw bone. The bone tissue cultures were negative for aerobic and anaerobic bacteria. Laboratory findings showed normal results. The 99mTc bone scintigraphy demonstrated significant uptake in the left mandible and discarded the presence of other lesions in the skeleton. Whole-body MRI confirmed this assessment. After evaluation by immunology, a colchicine therapy was started (1.0 mg/day). In a few weeks the patient showed significant improvement, without recurrence of the symptoms and notorious clinical remission of the bone lesion.

**Conclusions:** CRMO is a possible but rare manifestation of familial Mediterranean fever. In cases of children whit osteomyelitis of suspected autoinflammatory origin, colchicine treatment and genetic studies should be considered.

#### P-0125

### GIANT CELL LESIONS IN ORAL CAVITY

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**Introduction:** Giant cell lesions are uncommon in head and neck region. They are mainly located in maxilla and mandible and females are most commonly affected than males. All age groups seem to be affected with a relative predilection of age between 40 and 60. Giant cell lesions are classified as giant cell tumor, giant cell reparative granuloma, querubism and brown Tumor.

**Material and methods:** A descriptive and retrospective analysis about giant cell granulomas diagnosed at LPHU from January 2007 to February 2012 was performed using the database of the pathology department of La Paz University Hospital (LPUH).

**Results:** Thirty-four cases in twenty-six patients were identified. Age ranging from one year to eighty two . Patients were classified according to age, sex, lesion location, giant cell granuloma type, presence of hiperparatiroidism and type of treatment employed.

**Conclusions:** Although Giant Cell lesions are benign in a

few cases they may behave as locally destructive. Surgery is the treatment of choice in all types except in brown tumours. When treating brown tumours the first step is to control the hyperparathyroidism, deferring surgery to those cases that do not respond properly or even progress even though appropriate Parathormone (PTH) control.

**P-0126****INTRAOSSIOUS MANDIBULAR LIPOMA PRESENTING AS INFERIOR ALVEOLAR NERVE PARESTHESIA**

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Lipoma is a benign tumor consisting mainly of mature adipose tissue with no features of cellular atypia. It represents about 1% of all benign tumors in the oral cavity. There are few reported cases of intraosseous lipoma of the jaws in the literature. The authors report a case of a 45 years old man complaining of paresthesia of the right lower lip. Clinically there were neither swelling of the bone nor inflammation of the gingiva or teeth displacement. Reconstruction CT scan images revealed a well demarcated enlargement of the mandibular canal. Decompression of the inferior alveolar nerve was performed with no tumor evidence. The amount of cortical and bone marrow were analysed and at our surprise histological findings stated the presence of an intraosseous lipoma. Clinical and Radiological behaviour of the lesion is emphasized.

**P-0127****CONSERVATIVE TREATMENT IN UNICYSTIC AMELOBLASTOMA. A CASE REPORT**

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**Summary:** Unicystic ameloblastoma is described as a specific morphohistologic lesion with a less aggressive behavior and a lower recurrence rate than common ameloblastoma. The average age of incidence is the second decade of life. About the location, the mandible with prevalence of 95%, and within this, the third molar region and ramus is the most common, with 86% of cases. It is an odontogenic tumor, with aggressive and infiltrating behavior, and high capacity for recurrence. Regarding to histology is a benign polymorphic neoplasia, consisting in a proliferation of odontogenic epithelium located into a fibrous stroma. In contrast to its benign behavior, it presents a great tendency to recur, and a minimum but real potential for malignant transformation and metastasis.

**Case report:** We report a case of a 19 year old male referred by his dentist, with a hemifacial bulk. The OPG radiograph was performed in which evidenced a 6 cm cyst lesion of the right-ramus. We did the biopsy of the lesion and after diagnosis of ameloblastoma unicystic proceeded to conservative surgical treatment. The large size of the lesion according to the literature suggest us an aggressive treatment, but this case showed an intramural histopathologic subtype of growth, which did not invade the capsule and the underlying bone tissue, and that reason allowed a conservative treatment.

**P-0128****PTCH1 MUTATION AND ODONTOGENIC KERATOCYSTS LOCAL AGGRESSIVENESS: IS THERE A RELATIONSHIP?**

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Keratocystic odontogenic tumours (KCOT) are locally aggressive jaw lesions that may be related to PTCH1 mutations in isolation or in association with nevoid basal cell carcinoma syndrome. To clarify the role of PTCH1 mutation in KCOT aggressiveness, we assessed pathological cyst characteristics, KI-67 immunostaining, and somatic and germinal mutation on 16 KCOT from 9 unrelated patients. All PTCH1-mutation associated Tumours presented pathological aggressiveness criteria. KI-67 immunostaining was not associated with PTCH1 mutation. In this study, we demonstrated that KCOT harbouring a PTCH1 mutation present chorionic epithelial structure acting as a secondary germinal centre. PTCH1 mutation may play in this context his role of tumour suppressor.

**P-0129****CEMENTO-OSSIFYING FIBROMA OF THE INFERIOR JAW: A CASE REPORT AND LITERATURE REVIEW**

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**Introduction:** Ossifying Fibroma is included within fibro-osseous benign lesions, which are characterized by replacement of the normal bone architecture by fibroblasts, fibrous tissue and varying amounts of mineralized tissue. Among malignants, the most common is cemento-ossifying fibroma (COF) which origin is in the periodontal ligament cells.

Ossifying Fibroma is a neoplasm with two subtypes according to Eversole et al: Fibroma cement ossifying fibroma and juvenile ossifying fibroma that includes trabecular juvenile ossifying fibroma and juvenile ossifying psammatoide. Aggressive clinical behavior and higher trends to recurrence after excision is seen in juvenile ossifying fibroma.

Definitive diagnosis is rarely based only on pathological criteria and it is recommended that is based on the set of clinical, radiological and histological findings.

**Case report:** A 32-years old woman presented with increased mandibular deformity from 1 year. A panorex and CT study revealed a lucent unilocular lesion with calcifi-

cations inside. Biopsy yielded a diagnosis of cemento-ossifying fibroma. At the same time of the surgical excision of the lesion, a jaw functional and aesthetically reconstruction with bone graft for further rehabilitation on osseointegrated implants was achieved.

Two years after surgery, there was no clinical or radiological signs of recurrence

*Discussion:* There has been considerable controversy concerning the nosology and classification of benign fibro-osseous lesions, due in part to the varied histomorphologic patterns of stroma and bone in these lesions and the fact that similar or even identical microscopic features can be shared among two or more different entities.

The WHO classifies cemento-ossifying fibroma as a fibro-osseous neoplasm. These are non invasive slow-growing lesions and more common in women between the third and fourth decades of life. Due to the good delimitation of the tumour, surgical removal and curettage is the treatment of choice. Unlike juvenile ossifying fibroma with more invasive behavior and higher recurrence rate, requires more aggressive treatments.

This case presented clinical and radiological features of juvenile ossifying fibroma-like, despite histological diagnosis of cemento-ossifying fibroma.

The histological, differential diagnosis and treatment of this disease are reviewed.

*Conclusions:* Nowadays, COF continues to be the subject of numerous studies and discussions. It requires multidisciplinary approach and must be diagnosed with clinical findings, but should be supported as well, with complementary tests like imaging and histopathology in order to provide a definitive diagnosis.

#### P-0130

### SUCCESSFUL TWO STAGE SURGICAL-ORTHODONTIC TREATMENT OF KERATOCYSTIC ODONTOGENIC TUMOUR OF THE MANDIBLE IN TWELVE YEAR OLD GIRL – A CASE REPORT

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Keratocystic odontogenic tumour (KCOT) is a benign cystic neoplasm with potential of local destruction and recurrence after not enough radical treatment.

Two-stage surgical strategy is performed when enucleation may result in complications such as bone fracture, hypoaesthesia caused by damage of neural branches or destruction of surrounding teeth. During the first stage decompression is performed and following a few months, when radiological size reduction of the lesion is observed, the radical enucleation is carried out.

The aim of this study is to present a case of a twelve-year old girl with a huge KCOT of the paramedial region of the mandible which contained retained tooth 43 and caused impaction of teeth 44, 45. Tooth 84 was persisted. The displacement of lower incisors caused by a tumour growth was probably a reason of tooth 35 impaction.

After consulting the orthodontist, we decided to perform two-stage surgical treatment and orthodontic treatment simultaneously. The obturator was a part of orthodontic appliance and reached primarily to the level of impacted

teeth 44, 45. It was grinded each three weeks.

The follow-up radiographs showed that the size of the tumour was reduced and impacted teeth began to erupt. The surfaces of teeth 44, 45 were surgically exposed and orthodontic buttons were fixed to pull them toward occlusion and distally.

After six months enucleation was performed followed by the extraction of tooth 43.

After two-year follow-up we obtained very good functional and aesthetic result.

The patient remains for the follow-up on regular basis.

The case is a good evidence for usefulness of two stage surgical treatment of KCOT in some cases and for benefits of close interdisciplinary surgical and orthodontic cooperation.

Such treatment requires strict discipline of a patient, especially when performed in adolescence.

#### P-0131

### MIDFACIAL DEGLOVING APPROACH FOR THE SUBTOTAL RESECTION & RECONSTRUCTION OF EXTENSIVE MAXILLARY FIBROUS DYSPLASIA

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*Backgrounds:* Although conservative shaving procedure can be done in mild disfigured fibrous dysplasia patients, total resection and reconstruction with bone graft is known to be ideal standard procedure in moderate to severe fibrous dysplasia. However, traditional buccogingival approach has many limits for complete resection and reconstruction of the lesions. Thus we have applied midfacial degloving approach for treatment of maxillary fibrous dysplasia.

*Methods:* Midfacial degloving approaches were used for 5 patients with maxillofacial fibrous dysplasia. The study includes 4 male and 1 female patients. The ages of the patients were between 12 and 23 years. Follow-up of the patients was 10 months in average. Midfacial degloving approach is through the bilateral buccogingival sulcus incision from 2nd premolar to 2nd premolar teeth. Wide subperiosteal dissection along the anterior wall of the maxilla and pyriform aperture over the level of the infra-orbital foramen are performed. Bilateral circumferential nasal vestibular incision and dissection could make it possible to deglove the skin of the middle third of the face over the infraorbital rim bilaterally. After wide exposure, total or subtotal resection and reconstruction with iliac bone graft were done for the buttress stabilization.

*Results :* As compared with traditional unilateral buccogingival approach, much wider dissection and resection were possible without any additional visible scar on the face. The midface degloving approach provided us with visualizing up to the medial maxillary wall, pterygoid junction, nasofrontal suture, infraorbital rim and laterally to the temporal process of the zygoma. Subtotal or total resection of the lesions and reconstruction with bone graft were possible in all 5 patients.

*Conclusions:* Midfacial degloving approach seems to

provide much wider visual field and dissection area that make it possible to resect the maxillary fibrous dysplasia lesions near totally. This approach can be better choice for subtotal resection and reconstruction of the extensive maxillary fibrous dysplasia.

**P-0132**  
**FIBROUS DYSPLASIA (CHERUBISM) /CLINICAL OBSERVATION/**

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Fibrous dysplasia (cherubism) (described in 1933 by Dr. Jones. Kingston) is one of a number of tumor-bone diseases. It is a rare autosomal dominant disease due to gene mutations, in which the bone is replaced by a large number of fibrous tissues. The disease is usually diagnosed in childhood and is associated with the identification of the facial skeleton deformities and malocclusion.

In 1996, a patient of our clinic, Dzhagaryan G., a male, 6 years old had had complaints of face tumor (face cherub) as well as deformation of the dentition and the violation of the act of chewing. After clinical-laboratory, genetic and histological analyses the diagnosis was: Fibrous dysplasia of the jaws (cherubism).

From 1996 to 2006 periodically under general anesthesia was performed curettage of bone cavities of the jaws with curettage of the fibrous tissue in order to reduce the volumetric impact on the cortical layers of the facial skeleton and remove germs of permanent teeth, abnormally located in the thick fibrous tissue. In the upper jaw had a good effect, and by 2002 the growth of fibrous tissue in the upper jaw and tumor in the upper jaw had been suspended. However, it wasn't noted a special effect in the lower jaw. In 2011 at age 21 years, it was decided to carry out orthognathic bimaxillary surgery on the progeny of the lower jaw to correct class III occlusion and on the basis of aesthetic considerations (gigantic lower jaw), one stage resection of the outer cortical layer of the lower jaw. The operation was performed under general anesthesia, the postoperative period was uneventful.

Observation after a year: stable functional and aesthetic result, the absence of recurrence. It is planned to restore dentitions with dental implants.

**P-0133**  
**MELANOTIC NEUROECTODERMAL TUMOR OF INFANCY: PRESENTATION OF A CASE**

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The case of a 10-month-old healthy infant referred due to a rapidly growing tumor on the right side of the mandible. The surgical excision was performed under general anesthesia.

The lesion was entirely enucleated. The pathology of the lesion confirmed a melanotic neuroectodermal tumour of

infancy. The histologic aspects of the tumor were typical for the entity: two cell populations, one pigmented melanocyte-like cell, the other small neuroblastic-like cell. Prompt diagnosis and surgical resection are essential for cure.

**P-0134**  
**MANDIBLE DESMOPLASTIC FIBROMA IN MALE ADOLESCENT.**

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**Introduction:** Desmoplastic fibroma is a rare benign tumor that affects frequently to a long bones, being rarely the cases described affecting to maxillary bones. It usually appears in childhood and adolescence age, without sex predominance. Of unknown etiology, usually growth fast, producing a hemifacial asymmetry and a limitation in many cases the oral aperture. Diagnostic imaging reveals an expansive and destructive bone lesion usually a large size. The definitive diagnosis is established for the histopathological study. Although it's a benign clinical entity, due to its great capacity of local destruction and relapse, the treatment of choice is the aggressive surgery with subsequent reconstruction. The use of radiotherapy, is reserved to cases in which surgical excision is not possible. The follow-up of these patients must be long term.

**Case Report:** 14-year-old man, who comes to consultation of maxillofacial surgery by a tumor at left hemifacial site of two months of evolution, progressive limitation of the oral opening and pain. In the Orthopantomography appears a large cystic lesion with destruction of the jaw body and branch ipsilateral with affection of the Temporomandibular joint (TMJ). The study with a three-dimensional scan showed a lesion which destruction of the mandibular branch, ATM and left zygomatic arch. After the biopsy of the lesion, the excision of the tumor was made, with mandibular zygomatic arch reconstruction in the same time using a fibular free flap, without any complications intra-postoperative time. The patient received radiotherapy postoperative

The histopathological diagnosis concluded that it was a jaw desmoplastic fibroma. The patient after one year of follow-up is disease-free.

**Conclusion:** Despite the benign nature of the Desmoplastic fibroma, due to his great aggressiveness and its high capacity of recurrence must carry out aggressive resection of the tumor. Other alternative treatments such as radiotherapy or chemotherapy should be taken into account, but due to the low incidence of this tumor pathology in the maxillofacial territory, there is no conclusive data regarding their effectiveness. New reconstructive techniques through microvascular free flaps, improving the aesthetic and functional results in our patients.

**P-0135**  
**DIFFUSE SCLEROSING OSTEOMYELITIS OF THE MANDIBLE SUCCESSFULLY TREATED WITH PAMIDRONATE:A LONG-TERM FOLLOW-UP REPORT**

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**Background:** Diffuse sclerosing osteomyelitis of the mandible (DSOM) is an uncommon chronic inflammatory disease of bone refractory to conventional treatments including antibiotics, NSAIDs, hyperbaric oxygen therapy, curettage and decortications, and prolonged disease may require resection of the mandible. The etiology and pathogenesis of this disease are incompletely understood. In recent years, several reports have suggested that bisphosphonates are useful for the management of DSOM. We present a case of DSOM of 15 years' duration that remarkably responded to a single infusion of pamidronate, a nitrogen-containing bisphosphonate, resulting in a clear decrease in pathologic changes, close to that of normal bone architecture.

**Case report:** A 61-year-old woman was referred to our clinic with a chief complaint of continuous pain and swelling of the right side of the mandible in 1993. On clinical examination, the patient had spontaneous pain and diffuse swelling, and panoramic radiography showed diffuse sclerosis with occasional osteolysis in the right side of the mandible. The clinical diagnosis was DSOM. The patient received the administration of antibiotics and NSAIDs and decortication repeatedly. Although the symptoms relieved transiently, they recurred 3 or 4 times per year. Histopathological examination revealed sclerotic bone with fibrosis. The bone lesion was gradually enlarged by 2004. Therefore, we tried an intravenous infusion of 45 mg of pamidronate in 2005. Three days after the infusion, pain resolved completely. Accumulation in <sup>99m</sup>Tc scintigraphy nearly disappeared after 3 years, and panoramic radiography showed a decrease of pathologic changes, close to normal appearance of bone trabeculae. The patient has remained free of symptoms for 6 years.

**Conclusion:** Pamidronate therapy is very useful for DSOM refractory to conventional treatments, resulting in the changes to normal bone architecture.

#### P-0136

### RADIOTHERAPY AS AN ATTEMPT FOR TREATMENT OF AN AGGRESSIVE KERATOCYST IN THE LOWER JAW: A CASE REPORT

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Keratocystic odontogen tumor (KOCT), previously described as benign cystic lesion, is now explained as a benign neoplasm, because of the behavior of recurrence and its aggressive nature. We demonstrate and discuss a clinical course of a tumor located in the left mandible. During this period of time several radical surgeries had been performed caused by multiple recurrences of the KOCT including fistulation and infections. Even if the last histological results showed the squamous epithelium lining to be similar to squamous cell carcinoma, a malignancy could never be certainly demonstrated. According to the radiological findings the lesion was growing up from the primary mandibular region into the area of pterygopalatine fossa. There are no earlier data of treating KCOT neither with radiation nor chemotherapy. A radiation treatment was nevertheless performed due to the

patient's poor general condition and his denial to further surgical inventions in addition to the tendency of the cystic lesion to recur and demonstrate infiltrative growth pattern macroscopically. Unfortunately, radiotherapy showed no significant effect on the further progression of the cystic tumor and an infiltration of the orbital region and the skull base was seen at last. The patient finally died due to cardiovascular failure six years after the first diagnosis.

#### P-0137

### THE USE OF AN ULTRASONIC BONE CURETTE IN THE SURGERY OF JAW TUMOURS INVOLVING THE INFERIOR ALVEOLAR NERVE.

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**Background:** Preservation of lip sensation is crucial in ablative surgery of mandibular tumours. When tumour control does not necessitate sacrifice of the inferior alveolar nerve (IAN), as in some cases of benign tumours of the lower jaw, attempts may be made to spare the nerve. The authors present and discuss their experience with an ultrasonic device in the treatment of benign tumours of the jaw in correspondence of the IAN.

**Materials and methods:** Five patients with tumoural lesions involving the IAN underwent surgery with an ultrasonic surgical device (Sonopet Omni Surgical System; Stryker, Kalamazoo, MI).

**Results:** Fine, delicate movements allowed the surgeon to remove bone without damage to surrounding tissue. Three of 5 patients had no intraoperative or postoperative complications that could be attributed to the Sonopet. Two cases were partial failures. In 1 case, postoperative dysesthesia was encountered, and in the other case, intraoperative transection of the nerve occurred.

**Conclusion:** The Sonopet ultrasonic bone curette proved to be highly useful in surgical procedures close to the IAN because it does not produce heat or cause mechanical injury to the neurovascular bundle. Application of this instrument may provide improved ability to preserve sensibility of the chin and lower lip in patients affected by lesions in proximity to the IAN.

## 2. BENIGN TUMOURS & VASCULAR LESIONS

### P-0201

#### A RARE DIAGNOSIS OF AN ORAL SOFT TISSUE LESION

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Myxomas are benign, infiltrative neoplasms which very rarely occur in the oral soft tissues. We report a case of a 14 year old female patient presenting to the oral maxillo-facial department with a translucent, sessile lesion on the inner lip where a provisional diagnosis of a mucocoele was made. The lesion was subsequently excised and a definitive diagnosis of a soft tissue myxoma was confirmed histologically. The squamous mucosa showed a well-circumscribed, unencapsulated area within the sub-mucosa composed of myxoid tissue with evenly distributed thin vessels and scattered histiocytes. A wider excision was later carried out to ensure complete removal of the tumour.

This report reviews the current literature available regarding this pathology and highlights the importance of considering a myxoid tumour as a differential diagnosis for an intra-oral soft tissue lesion.

### P-0202

#### SUBLINGUAL SCHWANNOMA. CLINICO-PATHOLOGIC FEATURES.

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Schwannoma or neurilemmoma of the oral cavity is an exceedingly rare entity. Schwannomas are generally slow-growing benign lesions that apparently originate from Schwann cells. We report a 68 years-old woman presented for evaluation of progressively pain left floor of mouth mass for 3 months. The lesion was firm and it was not attached to adjacent tissues. Computed tomography showed a hypodense 30 x 20 mm lesion in left sublingual space. We performed a incisional biopsy under local anaesthesia. Pathologic analysis showed a spindle shaped tumour cells with short bundles. Immunohistochemical (IHC) examination for S-100 protein was done and intense positive stain in tumoural cells was showed. Based on clinical features, pathological exam and IHC analysis, schwannoma was the initial diagnosis. The lesion was totally resected under general anesthesia and lingual nerve was totally dissected from the mass. Definitive microscopic examination showed a tumour surrounded by a true capsule composed of compressed fibrous tissue. Antoni A and B areas were differentiated in specimen. Those pathologic features confirmed diagnosis of schwannoma. No signs of recurrence were observed after 3 years of follow-up.

### P-0203

#### PHOSPHATURIC MESENCHYMAL TUMOUR WITH ONCOGENIC OSTEOMALACIA

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Phosphaturic mesenchymal tumour is a rare clinicopathologic syndrome that is characterized by hyperphosphaturia, hypophosphatemia, and normal serum calcium level induced by neoplastic lesion. This poster reports a case of phosphaturic mesenchymal tumour arising in the floor of mouth with oncogenic osteomalacia.

### P-0204

#### TREATMENT OF VASCULAR MALFORMATIONS OF THE MAXILLOFACIAL AREA USING ND:YAG AND DIODE LASERS.

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**Introduction.** Conventional methods of treating vascular malformations of the maxillofacial area have demonstrated poor efficacy and many side effects. The best results were achieved in the treatment of patients with the use of laser technologies.

**Aim of the study.** Improving the efficacy of surgical treatment of patients with vascular malformations of maxillofacial area using diode and Nd:Yag lasers.

**Materials and methods.** Nd:Yag laser (wavelength 1064 nm) and diode laser (wavelength 980 nm) were used for non-contact and intralesional obliteration. The laser light is delivered by an optical fibre diameter of 300 µm. Devices were used in pulse modes. Treatment was conducted under local anaesthesia. Laser radiation was transmitted into the lesion directly through the overlying skin in case of non-contact obliteration. In case of intralesional obliteration laser radiation delivered through the intravenous conductors. Changes in the size and vascularisation of the lesion as well as the energy required for these changes were evaluated clinically. Colour Doppler ultrasonography was used for an accurate diagnosis in order to acquire additional information about vascularization and flow type, location and type of vascular pedicles, as well as the lesion volume.

**Results:** We have treated 68 patients with this pathology. Vascular malformations healed after non-contact obliteration in 14 days under coagulation layer. Patients noted the absence of pain or discomfort in the area of impact during and after laser surgical treatment. Long-term follow-up showed neither functional nor cosmetic shortcomings. Size reduction varied from 45% to 95%. No complications were observed.

**Conclusion:** Laser surgical treatment of vascular malformations is an effective method, reducing healing duration, causing less trauma. Color Doppler ultrasonography represents an important device for diagnosing and postoperative evaluation of the results. Thus, results afford grounds for recommendation of diode and Nd:Yag lasers for the treatment of patients with vascular lesions.



**P-0205****SCHWANNOMA OF THE CERVICAL SYMPATHETIC CHAIN: A RARE CAUSE OF HORNER'S SYNDROME**

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Schwannomas are benign tumours arising from the perineural cells located in the peripheral nerve sheath. These neoplasms have a wide distribution of origin, but have a predilection for certain sites such as the roots of spinal nerves and the auditory nerve, and many arise in the head and neck. In the parapharyngeal space, schwannomas may arise from the last 4 cranial nerves or the autonomic nerves, the vagus being the most common site. Schwannomas that originate from the cervical sympathetic chain are a rare subgroup of these tumours and most often appear as an asymptomatic, solitary neck mass. Preoperative diagnosis may be difficult. Computed tomography (CT), magnetic resonance imaging (MRI), magnetic resonance angiography (MRA), and ultrasound (US) are useful. Surgical excision is the treatment of choice for this tumour, with recurrence being rare. A postoperative ipsilateral Horner's syndrome may be expected after removal of such a tumour, due to the division of the cervical sympathetic chain. However, the existence of Horner's syndrome before surgery is uncommon, with only 6 documented cases previously reported in the literature. We present the 7th case and review the literature. A 57-year-old Caucasian woman presented with a sessile, non pulsatile, painless mass approximately 4cm in diameter on the left side of her neck. Clinical examination showed ptosis and miosis of the left eye, and dryness of the left side of the face, consistent with Horner's syndrome. It was further confirmed by the apraclonidine test. MRA and CT scans of the skull base and neck revealed a large mass in the left poststyloid parapharyngeal space splaying the internal and external carotid arteries. This tumour was anteriorly displacing the internal carotid artery and internal jugular vein together without separating them (in contrast to schwannomas of the vagus nerve, that may show a separation between the internal jugular vein laterally and the common carotid artery or internal carotid artery medially). US-guided fine-needle aspiration cytology was positive for schwannoma. The tumour was excised through a transverse cervical approach. The diagnosis of schwannoma was confirmed by pathologic examination. The postoperative course was uneventful.

**P-0206****LATERAL CERVICAL APPROACH COMBINED WITH POSTERIOR THORACOTOMY FOR THE GROSS TOTAL RESECTION OF GIANT NEURILEMMOMA OF THE CHEST INVOLVING THE NECK.**

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**Introduction:** Neurilemmomas are benign tumours arising from the perineural cells located in the peripheral nerve sheath. They were first described by Verocay in 1908.

**Case report:** A 57-year-old woman presented with a swelling of the left side of the neck. Physical examination revealed a sessile, non pulsatile, painful mass approximately 5 cm in diameter on the left side of her neck and another similar mass approximately 10 cm in diameter on scapular region who were first noticed about 3 months and 5 years earlier respectively. Both masses have grown slowly ever since. Clinical examination only showed paresthesia of the left hand. Computed tomography (CT) and magnetic resonance imaging (MRI) of the neck and chest revealed a single giant mass with clear borders, with a true size of 12 x 6 x 4 cm. This lobed mass present a cervical part (between sternocleidomastoid muscle, paravertebral muscles and levator scapulae muscle), dorsal part connected with the first mass (between trapezium muscle, paravertebral muscles, subscapular muscle and posterior thoracic wall) and an intramediastinal part near to left lung apex. This mass don't infiltrate the supra-aortic vessels, and connects with the others mass through the second intercostal space. The mass seems to arise from C7-D1 spinal nerve. The biopsy of the cervical swelling was positive for neurilemmoma. Gross total resection of the tumour was made via an Ariyan lateral cervical approach combined with posterior thoracotomy. The diagnosis of neurilemmoma was confirmed by histopathologic examination. The postoperative course was uneventful, except temporary Horner's syndrome.

**Discussion:** Neurilemmomas are benign, slow-growing neoplasms (but malignant cases have been reported) originating in the myelin-producing Schwann cells of the nerve sheath. Most neurilemmomas are asymptomatic at the time of presentation. Pain and neurological symptoms are uncommon unless the lesion becomes large. Imaging tests are necessary to assess the location, size and extension. Differential diagnosis must be made with lymphoma, paraganglioma, teratoma or meningioma. Definitive diagnosis will be performed by histopathologic examination, showing characteristics Verocay bodies. Treatment of choice is gross total resection whenever possible.

**P-0207****AGGRESSIVE FIBROMATOSIS OF THE HEAD AND NECK AT PAEDIATRIC AGE. A CLINIC CASE AND REVIEW OF THE LITERATURE.**

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**Introduction.** Tumour desmoide is a rare benign mesenchymal neoplasm in the Paediatric age group originated mainly from the connective tissue of muscle and aponeurosis. Often poorly diagnosed as fibroids, reactive processes or fibrosarcomas of low degree. It is characterized by slow growth, locally aggressive nature, high rate of recurrence without ability to metastasize.

**Material and methods.** 7 Year-old girl with a right paramandibular tumour of a year of evolution. It is characterized by slow growth and painless, trismus and mandibular latero-deviation to the left during the oral opening. Imaging showed tumour of soft parts in maseteric region with periostic reaction in the mandibular body. The biopsy was

reported as tumour desmoide.

**Results.** By a Risdon approach, tumour excision and Split cortical mandibular body were done without preserving the marginal branch of the facial nerve. The pathology reported aggressive fibromatosis without bone affectation. She currently presents marginal paralysis and disease-free.

**Conclusions.** According to the literature since 1960-2005 37 cases have been reported, 89% treated through surgery, chemotherapy 8%, 2% of spontaneous regression; and in a 78% cases there was no recurrence. Desmoides of head and neck tumours are difficult to treat because of the proximity or involvement of vital structures, infiltrative nature and tendency to recurrence. Negative margins surgery is the treatment of choice, however, on many occasions, this implies mutilating surgeries. Therefore in these cases as well as those with any affected surgical margins, the use of chemotherapy cytotoxic drugs can be an alternative. Since they are tumours of low incidence, prospective multicentre studies are needed to clarify the role of adjuvant treatments for children with these tumours.

#### P-0208

##### CERVICAL VAGUS NERVE SCHWANNOMA

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Schwannomas are benign neoplasms of the peripheral nerves originating in the Schwann cells. Neck schwannomas are rare and usually originate from the vagus, hypoglossal nerves, the cervical sympathetic chain and the brachial plexus. The most common sign is an isolated swelling at the lateral aspect of the neck. Neck pain and cranial nerve impairments may present.

Computerised tomography, magnetic resonance imaging and fine needle aspiration cytology are helpful in reaching a diagnosis. Surgical excision is the treatment of choice.

A case of large cervical vagus nerve schwannoma occurring in a male patient is presented with its management preserving the responsible nerve.

#### P-0209

##### CERVICAL ECTOPIC THYMUS: A CASE REPORT

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**Introduction:** Congenital thymic cysts are uncommon and often misdiagnosed as either branchial cleft or cystic hygromas.

**Case report:** We report the case of a 6 years old boy with ectopic thymic tissue presenting with a soft, fluctuating mass in the left side of his neck. Surgical excision revealed an ectopic thymic cyst. The histopathologic fea-

tures of thymic cysts are diagnostic.

**Conclusions:** Despite its infrequent occurrence and often asymptomatic presentation, ectopic cervical thymus masses should be included as a rare cause of cervical masses in the pediatric population. Awareness of this diagnosis will allow for appropriate preoperative diagnostic studies.

#### P-0210

##### GIANT OROFACIOCERVICAL LYMPHANGIOMA – PRESENTATION OF A CASE

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**Objective:** Orofacial Lymphangiomas are a rare events and difficult to treat. Therapy regimen varies between medical, lasertherapeutical and surgical interventions.

**Patients and Methods:** We present a case of a giant orofaciocervical lymphangioma detected by antenatal ultrasound diagnostics. The tumour infiltrated the head and neck as well as the tongue and the oro- and hypopharyngeal space. The infant was intubated immediately after birth. Therapeutic approaches were obtained with repeated OK432-injections, whereupon acute local inflammation occurred. Surgical resection of extensive parts of the tumour and disposition of a long-term tracheostomy led to some improvement. Progredient contingents of the tumour in tongue and hypopharynx, however, were not resectable.

**Results.** Almost one year after birth, the child still suffers extensive tumour mass localized in tongue, floor of the mouth and the hypopharyngeal space. Long-term tracheostomy and resection of comprehensive amount of the lymphangioma facilitated temporary demission from the hospital for the little patient. Further MRI-examinations will show if further surgical intervention must be discussed. This paper shows photographic documentation and discusses the clinical characteristics of the case.

#### P-0211

##### ADVANCED PLANNING OF DIAGNOSTICS, TREATMENT AND REHABILITATION IN PATIENTS WITH ARTERIOVENOUS MALFORMATIONS OF HEAD AND NECK

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**Aim:** Advancement in planning diagnostics, treatment and rehabilitation in patients with arteriovenous malformations (AVM) of head and neck

**Materials and methods:** 48 patients with AVM of head and neck were treated. AVM most frequently was localized in frontotemporal, temporoparietal, buccal and labial region. Combined investigation of patients was performed, including clinical, ultrasound and X-Ray examination and optional methods were applied such as digital subtraction angiography, magnet resonance imaging and multispiral computer tomography with or without intravenous contrast

media injection, depending on site and size of the lesion. Plan of treatment included total malformation excision with or without preoperative embolization, and immediate restoration of postoperative defect in one or several stages.

**Results:** Multispiral computer tomography with and without contrast media injection was included in diagnostic procedures in 16 cases, magnet resonance imaging in 3 cases, digital subtraction angiography in 8 cases. Excision of AVM with local flaps grafting was performed in 26 patients, with immediate free split-skin grafting from abdominal region without preoperative embolization in 13 patients, with preliminary embolization in 6 patients. Additionally expansion technique was fulfilled in 3 cases. After performing malformation excision, postoperative defect was immediately restored by transfer of vascularized musculocutaneous radial graft in 2 cases and with vascularized musculocutaneous thoracodorsal graft in 1 patient.

Good aesthetic and functional results were observed in most patients (93,75%), as no massive intraoperative haemorrhage or symptoms of continuing malformation growth were detected and the face border in the site of the postoperative defect was fully restored.

**Conclusions:** In our opinion, the plan of diagnostics, treatment and rehabilitation in patients with AVM of head and neck which is presented allows to gain good clinical results.

Multispiral computer tomography with intravenous contrasting and 3D-reconstruction of pathological vessels is essential for evaluating true volume of AVM and for developing a detailed plan of its surgical excision with minimal intraoperative haemorrhage.

Application of digital subtraction angiography with preoperative embolization continues to be the optimal method of preparing the patient for the surgical treatment, as it significantly reduces pathological blood supply.

Using restorative methods of treatment allows to achieve good aesthetic and functional results. Long-term dynamical observation helps to detect signs of potential continuing malformation growth in proper time.

#### P-0212

### CLINICAL PICTURE AND TREATMENT OF THE BRANCHIAL CYST.

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**Introduction:** The arising of branchial cysts is bound up by some authors with the antenatal disorder of the thymus gland duct obliteration others believe that branchial cysts arise out of the branchial fissure remains. Materials and methods: 335 branchial cyst patients (BCP) admitted to the maxillo-facial department of the municipal clinical hospital №21 within the period of 1984 through 2007. The age of the patients varied from 14 to 74, among them: males – 148 (44,2%) females – 187 (55,8%), the average age being 31,7 years old.

**Results:** Analysis of the statistical data revealed that the majority of visits to a doctor of BCP patients falls within the age varying from 14 to 40 – the total being 259 (77,3%) patients. The distribution of patients was analysed depending on their blood group according to the ABO system. There were 113 (33,7%) BCP patients of the 1st group, 128 (38%) of the 2nd group, 75 (22,4%) of the 3rd

group and 19 (5,7%) of the 4th group. The duration of the disease varied from 2 days to 20 years. The time interval from the first symptoms to the visit to the doctor upto three months was observed in 115 cases (34,3%) and from three months to 3 years it was observed in 179 cases (53,4%). Thus 294 (87%) BCP patients appealed for medical aid within three years. It was revealed during the histological examination of the material that the cyst membrane in the majority of cases (326 patients) is lined with a multilayer flat epithelium of different thickness ranging from three to 10 cell layers. Malignant change of the cyst membrane diagnosed after the histological investigation was observed in 4 patients (1,2%) of whom 3 being males and one – woman, the average age made up 46,8 years old.

**Conclusion:** The aetiology of the branchial cyst has not been established up to the present time and cystectomy of branchial cysts is the only effective method of treatment.

#### P-0213

### VAGAL PARAGANGLIOMA IN 11-YEARS OLD CHILD: CASE REPORT

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**Introduction:** Paragangliomas are rare tumors of neural crest origin. They are generally benign, slowly growing and characterized by strong vascularisation. They may occur from the skull base to pelvic. Head and neck paragangliomas are originating from the paraganglia or glomus cells within the carotid body, vagal nerve, middle ear, jugular foramen, and other locations. Vagal PG's most commonly arise from the inferior nodose ganglion though they may occur all along the cervical vagal nerve. They are more common in females (ratio 3:1), most patient becomes symptomatic between in the third or fourth decade. Only a few cases have been reported in the literature in the pediatric age group less than 14 years of age, primarily as case reports. Etiology is mainly unclear, approximately 30 % of all head and neck paragangliomas are hereditary and associated with some syndromes. Syndromes associated with mutations of succinate dehydrogenase subunit B, C and D. SDHB mutations are at higher risk of multicentric and/or metastatic spread. SDHC mutations tumors are predominantly benign and unifocal. Histologic criteria are not accepted as a definite sign of malignancy.

**Case report:** 11 years old boy presented with an asymptomatic right-sided neck mass that has increased slowly for last three months. At another department tumor was presumed to be a haemangioma. and an attempt of surgery was delayed due to heavy bleeding.

Multiphase CT angiography demonstrated a solid, but hypervascularised tumor with an anterior displacement of ACC. A modified neck dissection was performed, the tumor was completely removed together with the vagal nerve and the lower part of sympathetic chain and jugular lymphatics. Post-operative recovery was uneventful except for a mild hoarseness. Biopsy reported an intravagal paraganglioma. Indium-111 pentetreotide scanning, was performed twice in a period of two years follow up and did not demonstrate any presence of tissue with the receptors that bind to somatostatin.

*Discussion:* Cervical masses in pediatric age include various conditions: vascular, inflammatory and neoplastic. CT and MR are the imaging procedures of choice. Curative treatment option is surgery. The main risk of surgical morbidity are deficits of the lower cranial nerves. Alternative options include radiotherapy and stereotactic radiosurgery. In the presented case, we have chosen surgical removal. Histological findings are not specific for malignancy exclusion and long-term follow-up is important. In our case in a two years follow-up, there has been no evidence of recurrence or occurrence of distant spread nor any permanent neural deficit.

### 3. BISPHOSPHONATE RELATED DISEASE

**P-0301**

#### MANDIBULAR PATHOLOGICAL FRACTURE DUE TO BRONJ. CLINICAL AND SURGICAL STRATEGY

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**Background:** The Bisphosphonate – Related Osteonecrosis of the Jaw (BRONJ) is by now a well known phenomenon. The clinical patterns are classified into three degrees and there are many clinical and surgical protocols. The most frequent and severe are those patients receiving intravenous bisphosphonates to treat bone metastasis, severe osteoporosis or plasmacytoma. The authors observed in their clinical practice a considerable increase of BRONJ in patients receiving oral bisphosphonates and report a very interesting case.

**Clinical case:** R.R., female, 85 years old, 08.01.2010 mandibular pathological fracture in the site of the 3.7 where there were retained dental roots and an area of osteonecrosis and bone sequestrum (grade II). The patient had received two years of oral ibandronate (150 mg/week) to treat a very severe osteoporosis associated with intra spongiouse fractures and vertebral pain. Abundant oedema and inflammation of the gingival mucosa, exposed bone and pus discharge were present in the site of 3.7 where the palpation showed preternatural motility of the jaw and pain. We used panoramic dental radiography and CT scan to study the patient. 09.04.2010 after 3 months stopping the intake of ibandronate we decided to perform a surgical treatment: extraction of the dental roots, sequestrectomy of the bone necrosis, careful and delicate curettage, reduction of the fracture, fixation with titanium miniplate and use of autologous PRP.

**Discussion AND conclusion:** BRONJ presents many problems in the management of the treatment of the patients. The surgical treatment of these patients is very controversial and many times is unsatisfactory. The authors decided to present this report because caused by an oral intake of bisphosphonate and because the surgical treatment was inevitable. The two year follow-up support this therapeutic choice, the panoramic dental radiography showing good bone reorganization without structural alterations.

**P-0302**

#### PREVENTION OF BRONJ IN PATIENTS WITH DENTAL EXTRACTIONS- SHREWSBURY EXPERIENCE

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**Introduction:** Bisphosphonate-related osteonecrosis of the

jaw (BRONJ) after dental extractions is a common complication of oral and intravenous bisphosphonates that seriously affects the quality of life of patients undergoing such treatment and produces significant morbidity.

Bisphosphonates decrease bone turnover by disabling osteoclast and osteoblast function. They may also inhibit intraosseous blood vessel formation, as is the case with radiation treatment. However, unlike osteoradionecrosis, increasing angiogenesis with hyperbaric oxygen does not appear to alleviate bisphosphonate osteonecrosis.

Currently, prevention is the only known way to address this complication. Complete prevention is not possible, but the patient's risk can be decreased by ensuring that invasive dentoalveolar treatment is not required. A complete and up to date medical history is required for all patients.

Although BRONJ can develop with dentoalveolar surgery intervention, including periapical and periodontal surgery and implant placement, tooth extraction is considered the single intervention responsible for most BRONJ cases and is seen in up to 86% of cases of BRONJ.

**Patients and Methods:** In this prospective study, consecutive subjects treated with oral and intravenous bisphosphonates who needed tooth extraction underwent a protocol aimed at reducing the risk of BRONJ. The study started in January 2011 and is still ongoing. We treated 71 patients so far, with single or multiple extractions. Extraction protocol includes: Drug holiday- stop bisphosphonates for 3 months prior to extractions, commence 0.2% chlorhexidine mouth wash rinse day prior and continue 2 weeks after. Antibiotics 1g Amoxicillin the morning before extraction and the night after extraction and the following day 1 g Amoxicillin morning and night, a 4 week review, and if the sockets healed, patients restart bisphosphonates. Patients that are allergic to Penicillin take Clindamycin 600mg bd.

Only one patient developed BRONJ, and was treated with mouth washes for longer, and healed in 2 months. 2 patients already had BRONJ when they came to us, and now are healed.

**Discussion:** The preventive protocol adopted by us prevented local and systemic infectious complications by means of mechanical, antibacterial, and antibiotic measures.

Our findings indicate that the protocol is effective and easy to use. In all cases we performed atraumatic tooth extraction and sutures with vicryl rapide. Our protocol is based on common procedures and drugs, and can be adopted in the routine practice of any dentist or oral surgeon.

**P-0303**

#### BONE CHANGES INDUCED BY MODULATION OF RANKL AND IMMUNE RESPONSE IN A MOUSE MODEL OF ONJ.

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**Introduction:** Osteonecrosis of the jaws (ONJ) is a relatively new condition, mainly associated to use of intravenous bisphosphonates on bone cancer patients (primary

or metastatic). Receptor activator of nuclear Kappa-B ligand (RANKL) is a key cytokine closely related of neoplastic bone disorder. Others RANKL modulators have been related directly or indirectly to occurrence of ONJ (anti-angiogenic and immunosuppressive drugs). RANKL expression and immune response seems to be an interesting strategy for study of unknown patho-physiology of ONJ. We hypothesize that the immune response is an important regulator of RANKL expression and consecutively in development of ONJ. The aim of this study was to characterize the bone changes after a long-term use of RANKL inhibitor and immunosuppressive therapy in mice.

**Materials and Methods:** 24 12 week old adult mice (C3H) were randomly divided in 4 groups and treated systemically (s.c.) for 8 weeks: group A (100 mg/Kg of Zoledronic acid (ZOL) (s.c.) twice a week), group B (5 mg/Kg dexamethasone (s.c.) weekly), group C (an association of ZOL and dexamethasone in the same doses) and group D (control group treated with vehicle). A surgical procedure on the left maxillary first molar was performed at day 21 of treatment. All the animals were euthanized at day 56 of protocol. Micro computed tomography (BV and ratio BV/TV), histology (TRAP, OSX and RANKL immunodetection) and histomorphometry analysis were then carried out.

**Results:** We show an increase of bone density parameters when ZOL is used as single treatment (group A). On the contrary, a decrease is observed under single dexamethasone protocol (group B). Furthermore, a bi-therapy group (group C) shows an intermediate response. A heterogeneous expression of RANKL cytokine is observed.

**Conclusions and Perspectives:** Bone changes are related on long-term use of high-dose of ZOL, dexamethasone as well a surgical trauma. Dexamethasone decreases bone density and it's a regulator of RANKL expression. The role of immunosuppressive drugs is an important component to consider in the development of a murine model for ONJ and potentially a target of therapy.

#### P-0304

### BISPHOSPHONATES-RELATED OSTEONECROSIS OF THE JAWS USING SPONTANEOUSLY DIABETIC TORII RATS

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**Background:** Bisphosphonates (BPs) are a widely used class of drugs that are effective in the treatment and prevention of hypercalcemia of malignancy and skeletal events associated with multiple myeloma, bone metastasis from cancer, and osteoporosis. However, reports of BP-related osteonecrosis of the jaws (BRONJ) have generated great concern regarding the side effects of these drugs. Few animal models with risk factors contributing in the development of BRONJ have been reported in the literature. Diabetes mellitus is one of the systemic risk factors.

We studied the side effects of BP on extraction socket healing in Spontaneously Diabetic Torii (SDT) rats, which is established model of non-obese type 2 diabetes.

**Materials and methods:** We used Female Sprague-Dawley (SD) rats and SDT rats aged 6 weeks. Zoledronic acid (ZA)-treated SD and SDT groups were treated with an intravenous injection of bolus of ZA (35µg/ml) every 2 weeks. Maxillary left molar teeth were extracted at 22 weeks after initiating the treatment. Rats were euthanized 2, 4 or 8 weeks after tooth extraction, and maxillary tissues were collected (n=6). Calcein was administered prior to sacrifice to label active formation sites. Histological examination was performed, and the serum samples collected, when rats were euthanized, were used to measure N-terminal cross-linking telopeptide of type 2 collagen (NTX).

**Results:** The blood glucose level of the SDT rats reached 600mg/dl or more at 16 weeks of age. Bone exposure to the oral cavity was observed in the tooth extraction side of only the ZA-treated SDT group (6/6: 100%) at 8 weeks after tooth extraction. During our measures of calcein labeling in the maxilla of the SDT rats, we observed double calcein labeling. There were no significant differences due to ZA treatment. The NTX levels were decreased in the ZA-treated SD group compared with the control SD group.

**Conclusion:** The study demonstrated the development of BRONJ-like lesions after tooth extraction in SDT rats treated with ZA. It was suggested that inhibition of bone formation and oral mucosal cell wound healing might play a significant role in the prevalence of BRONJ.

#### P-0305

### ORAL BISPHOSPHONATE INDUCED OSTEOCHEMONECROSIS OF THE MANDIBULAR CONDYLE

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**Introduction:** Bisphosphonate related osteochemonecrosis of the jaws (BRONJ) is now a well know complication of bisphosphonate use. Current literature reports that the risk of BRONJ occurring is less than 0.1% in patients on oral bisphosphonates. BRONJ involving the mandibular condyle following administration of short term oral bisphosphonates has not been reported in the literature to date.

**Case presentation:** We present a case report of a 69 year old Caucasian woman with a brief history of oral bisphosphonate use. She developed BRONJ of the mandibular alveolus which subsequently spread to the mandibular condyle following extraction of a lower wisdom tooth.

This case was further complicated by neurosurgical intervention to drain an ipsilateral cerebral abscess containing similar organisms to the osteonecrotic mandible. Definitive treatment was achieved by hemimandibulectomy. This case highlights the potential pitfalls and possible complications of conservative, non-operative management of BRONJ.

**P-0306****ALENDRONATE REDUCES PERIOSTEAL PERFUSION IN THE CRANIAL BONE OF RATS**

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**Introduction:** Since 2003 the incidence of bisphosphonate-associated osteonecrosis of the jaws has steadily been increasing. Symptoms range from circumscribed gingiva lesions up to manifest osteonecrosis of extended jaw sections leading to large bone resection. However the pathophysiology of BRONJ still remains unexplained. This study analyzes the influence of alendronate on periosteal microcirculation.

**Methods:** Head chambers were implanted into 24 Lewis rats upon preparation of the periosteum. The animals were randomly assigned to three experimental groups (n=8). Preoperatively alendronate was administered (three times a week 205µg/kgBW i.p.) for two weeks (group 2) and for six weeks (group 3). Rats without bisphosphonate application served as controls (group 1). Angiogenesis, neovascularization and inflammation was repeatedly assessed by means of intravital fluorescence microscopy during a 14 days trial period.

**Results:** Upon a two-week application of alendronate a significantly reduced periosteal perfusion was assessed (3.67±0,39 ratio of perfused and non-perfused microvessels) compared to controls (5.88±1,34). After 14 days perfusion continuously decreased (2.7±0.14 vs. 4.45±0,20). After six week application of alendronate an even further significant decline of perfusion was observed in comparison to two-week application (2.55±0,12 on day 0; 2.15±0,15 on day 14).

**Discussion:** The study demonstrates that alendronate significantly reduces periosteal perfusion in the desmal cranial bone of Lewis Rats. This effect is amplified upon six weeks of bisphosphonate application. Consequently the reduction of periosteal perfusion could represent a crucial factor in the pathophysiology in the development of BRONJ.

**P-0307****MANAGEMENT OF PATIENTS SUFFERING FROM BISPHOSPHONATES RELATED OSTEONECROSIS - BASED ON AUTHORS' CLINICAL EXPERIENCE AND AVAILABLE SCIENTIFIC RESOURCES."**

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The authors of this essay are presenting in detail adverse effects of prolonged bisphosphonate (BF's) therapy, based on latest scientific evidence.

Metabolic bone disorders are more commonly recognised in their early stages nowadays, thanks to still developing diagnostic methods available at specialist consulting centres. As a result, modern means of treatment are introduced in a form of chronic and often aggressive regimen. Such is the practice among elderly patients, whose general

medical condition is frequently compromised. In these patients, bisphosphonates are a key element of highly effective therapy. However, even most up-to-date remedial means have certain side effects. Numerous sources state that the most common complication is bone necrosis, especially in patients undergoing oral surgical procedures. Moreover, BRON/BRONJ - Bisphosphonates Related Osteonecrosis of the Jaws can develop spontaneously in non-operated patients. Physicians who prescribe such medications, should inform their patients of possible harm these drugs might cause. It is of great importance, to adequately prepare patients on bisphosphonates for dental surgical interventions - and this often involves drug holiday for up to 6 months, as suggested by some researchers. The authors would like to emphasise the fact, that even a standard tooth extraction could initiate BRON as it is a surgical procedure too. Those operated without proper arrangements are at risk of developing osteonecrosis, which requires prolonged treatment that often gives no positive results.

**P-0308****ORAL BISPHOSPHONATE - RELATED OSTEONECROSIS OF THE JAW IN PATIENTS WITH OSTEOPOROSIS**

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**Objectives:** Osteonecrosis of the jaw is a rare but serious complication of bisphosphonate therapy. It occurs especially in oncological patients, but also much less frequently in patients with metabolic bone diseases. The highest estimated prevalence of these lesions in patients treated for osteoporosis is 0,10%. There is still no ideal consensus for the treatment, the emphasis is therefore placed on preventive measures.

**Material and Method:** The retrospective medical records review (Jan 2005 - Apr 2012) of patients with bisphosphonate-related osteonecrosis of the jaw (BRONJ) treated in the department of maxillofacial surgery in Pilsen was performed. Diagnostic criteria were according to the working definition established by the AAOMS. Oncological patients as well as rheumatological patients receiving intravenous bisphosphonates were excluded.

**Results:** 14 patients with osteoporosis receiving oral bisphosphonates were identified in a group of 37 patients with BRONJ. 9 patients with postmenopausal osteoporosis, 1 patient in addition with concomitant rheumatoid arthritis and 4 patients with rheumatoid arthritis and glucocorticoid-induced osteoporosis. Three patients suffered from advanced BRONJ of the 3rd stage. Different type of therapy was indicated. Conservative approach was performed in 12 patients. Radical resection of non-vital bone to viable bleeding bone margins was made in 2 patients. The area of the necrotic bone was completely healed and covered by healthy mucosa in 10 patients. In remaining 4 patients the therapy led to an asymptomatic state but these patients were lost in follow up. In all except 5 patients the drug holidays and alternative treatment instead of bisphosphonates was indicated. The poster presented

includes other baseline characteristics of the study population (gender, concomitant risk factors, initiating factors, localization, clinical stage, type of bisphosphonate and duration of its treatment).

**Conclusion:** Oral BRONJ in patients with osteoporosis is a rare pathological condition but there is a high prevalence of osteoporotic patients receiving bisphosphonates. These lesions can't only significantly impair the quality of life but also the treatment of the underlying disease. The most serious course of oral BRONJ was detected in patients with concomitant immunosuppressive medication.

#### P-0309

### TREATMENT OF BISPHOSPHONATE-RELATED OSTEONECROSIS OF THE JAW IN PATIENTS WITH I.V. AND PERORAL BISPHOSPHONATE THERAPY

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**Introduction:** Bisphosphonates (BPs) have been used for management of bone metabolic diseases. Currently their therapeutic use has increased, as have their adverse effects, the most important being bisphosphonate-related osteonecrosis of the jaw (BRONJ). The physiopathology of BRONJ still remains unclear, and its treatment uncertain. Although the literature provides several treatment options, there is no defined protocol. The aim of our study was to estimate the incidence and treatment outcomes of BRONJ in patients on i.v. and peroral BPs.

**Material and method:** 24 patients treated with i.v. or peroral BPs, requiring extractions of unsalvageable teeth, were included in the study. Classic and atraumatic extractions with orthodontic elastics were performed and occurrence of BRONJ was evaluated. Symptomatic patients with BRONJ received antibiotic treatment and intraoral or extraoral incisions were performed in the acute phase. After resolution of acute symptoms, local surgical debridement of necrotic bone and covering of the defect with mobilization of local tissues was performed. Data were obtained retrospectively and different measures were assessed.

**Results:** Between 24 observed patients, women were predominant in 66,7%, average age was 70,6 years, 50% of patients were treated with i.v.BPs. The mean time of i.v. BP treatment was 33 months and of roral BP treatment 32,3 months. In 18 patients classic and in 6 patients atraumatic extractions were performed with orthodontic elastics. 11 patients developed BRONJ after classic extraction, 6 of them were successfully treated with systemic antibiotic therapy and local surgical debridement of necrotic bone with covering with local tissues. The rest developed BRONJ and still have bone exposure, although the same therapy was used, 4 of them were on i.v. BP treatment. When atraumatic extraction with orthodontic elastics was used, there was no BRONJ. Mandible was affected in 64,3% of patients.

**Conclusion:** Our study revealed that BRONJ is more common in patients with i.v.BP therapy after classic extractions. Our experience with treatment of BRONJ is that

the best extraction results come with atraumatic extraction with orthodontic elastics, which should be considered in patients with i.v. BP therapy. However, there is still no defined protocol for evaluation of patients on BP therapy.

#### P-0310

### ZOOM IN OSTEONECROSIS OF THE JAWS: IMAGING OF THE BONE USING CT AND MICRO-CT

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Bisphosphonates-associated osteonecrosis of the jaws (BONJ) is an uncommon but potentially serious complication of intravenous bisphosphonate therapy in patients with cancer and haematological malignancies.

We performed a study using computed tomography (CT) and micro computed tomography (micro-CT) of bisphosphonate related osteonecrosis of the jaws to see its parallelism between conventional radiological signs and the analysis of bone mineral density (mbd) carried out by both devices. The aim of this study is to know whether any difference exists between micro-CT and CT in BRONJ, analysing its results and to seek its potential application in osteonecrosis.

**Material and Method:** two patients with mandibular osteonecrosis by zoledronic acid were treated. In both cases CT demonstrated the existence of a bony sequestrum. Local excision of the osteonecrosis tissue was performed, and histological findings supported the diagnosis. Several sections of the osteonecrosis bone were analysed by micro-CT.

**Results:** micro-CT images showed serious trabecular bone destruction with an important demineralization of all sections analysed.

**Conclusion:** micro-CT is an emerging technique for the assessment and analysis of three-dimensional trabecular bone structure, which can be particularly useful in BONJ. It complements conventional CT scans, and gives us relevant information such as trabecular thickness or bone mineral density, at the time micro-CT makes measurements with high accuracy about the degree of bone demineralization.

#### P-0311

### BISPHOSPHONATE RELATED OSTEONECROSIS OF THE JAWS: DEVELOPMENT OF AN EXPERIMENTAL MODEL IN RATS TREATED WITH ZOLEDRONIC ACID

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**Introduction:** Bisphosphonate-related osteonecrosis of the jaws (BRONJ) is a pathology of increasing frequency, but the pathophysiology is not understood and who's man-



agement can be difficult, mainly in cases of high-grade necrosis (stage 3).

The aim of this study was to find a reproducible experimental model that directly relates chronic bisphosphonate administration with the development of osteonecrosis with or without tooth extraction, with no other drug involved.

**Material and Methods:** 52 male Wistar rats of 6-8 weeks were used in the study. Two successive models were designed with animals randomly allocated in groups of 2-5 (control or study group). Different doses (0,1 or 1 mg/kg) of Zoledronic Acid (ZA), routes of administration (intra-peritoneal or intravenous) and duration of the treatment were tested. A single dose of ZA was administered in first model (n 32) and 1 or 3 doses a week during 9 weeks, in second model (n 20). 3 molars of the right upper jaw were extracted under general anaesthesia.

Presence of osteonecrosis was determined by clinical, histological and radiological examination. Findings were compared between ZA group and controls, and between non-extracted and extracted hemi-jaws of each group.

**Results:** Highest incidence (66%) of radiological findings suggestive for osteonecrosis (bone sclerosis, trabecular bone marrow thickening and disorganization, cortical disruption) was detected in the animal group treated with 0,1mg/kg ZA intraperitoneal, 3 times a week, for 9 weeks, with extractions being performed in the 8th week. This group presented the most representative histological findings: necrosis (80%), lack of bone remodelling (100%) and an average of 45% of the osteoclast founded in controls.

No clinical differences were observed between groups. No radiological or histological finding suggestive of osteonecrosis were found in non-extracted jaws.

**Conclusions:** This study provides a new animal model of BRONJ after Zoledronic Acid administration and dental extractions, achieving bone changes similar or superior to previous studies, highlighting the dental extraction as the most important etiological factor in this disease. This animal model will be useful for further studies of BRONJ treatment strategies.

#### P-0312

### RISK FACTORS IN BISPHOSPHONATE RELATED OSTEONECROSIS OF JAWS

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Bisphosphonate therapy is known by oral surgeons mainly because of their relation to jaw osteonecrosis. Numbers of these drugs prescriptions are rising and it is also becoming common that prescription is made by general practitioners.

Osteonecrosis is probably the worst complication of bisphosphonate treatment. Because healing of osteonecrosis sites is poor, surgery and other therapy of osteonecrosis significantly decreases the quality of life, prevention is most important. Risk of this complication is higher in several general medical conditions. The low urinary calcium excretion, hypovitaminosis D, malnutrition, recent

glucocorticoid therapy or chemotherapy are the most dangerous. Locally the most common cause is minor oral surgery, like tooth extraction, during the usage of bisphosphonates. It's reasonable to make radical dental restoration before using these drugs. Other local risk factors are smoking, previous radiotherapy of head and neck and poor dental hygiene.

Risk factors are important also in oral surgery. Many therapy failures could be predicted and patient should be informed well of his risk factors and need of cooperation.

#### P-0313

### AWARENESS OF BISPHOSPHONATE-RELATED OSTEONECROSIS OF THE JAWS IN HEALTHCARE PROFESSIONALS

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**Aims:** To promote the awareness of bisphosphonate-related osteonecrosis of the jaws (BRONJ) to healthcare professionals and to highlight the need for UK national guidelines for appropriate management.

**Materials and Methods:** Two different questionnaires were created to assess the knowledge of healthcare professionals on BRONJ and their attitudes towards preventing its occurrence. These were sent to 254 general dental practitioners (GDPs) and 240 medical consultants in Northamptonshire.

**Results:** Approximately 20% of questionnaires were returned from both groups. 93.3% and 70.4% of GDPs and medical consultants were aware of BRONJ, respectively. 6.7% of GDPs had received referrals for pre-bisphosphonate dental assessment. 15% of medical consultants referred patients prior to bisphosphonate therapy. GDPs had inconsistent regimens of managing patients on bisphosphonates, emphasising the need for evidence-based UK guidelines. There was no statistical difference in awareness between GDPs who had qualified within and without the years since discovery of BRONJ. It is reassuring that longer-qualified GDPs have been keeping up-to-date with their professional development. Due to the low numbers collected, the survey has been distributed again electronically to dentists, consultants and general medical practitioners to increase sample size. This will be incorporated into the results and updated in time for presentation.

**Conclusion:** High proportions of dental and medical professionals are aware of BRONJ. However, knowledge on prevention and management of the condition was relatively poor. Further research at a national level will be invaluable for developing UK guidelines. Current work is in progress to increase the sample size.

#### P-0314

### BISPHOSPHONATE RELATED OSTEONECROSIS OF THE JAWS. STUDY OVER A PERIOD OF FOUR YEARS (2007-2010)

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**Introduction:** Osteonecrosis of the jaws is increasing worldwide in patients treated with bisphosphonates.

**Aims:** To study patient characteristics in subjects with bisphosphonate related osteonecrosis of the jaws (BRONJ).

**Material and methods:** In the Cluj-Napoca Clinic of Cranio-Maxillofacial Surgery, fifty two cases with BRONJ have been treated over a period of four years (2007-2010). The BRONJ has been diagnosed according to the AAOMS guidelines as being a non-healing exposed bone in the maxillofacial region, without healing tendency in patients treated with oral or intravenous bisphosphonates.

**Results:** Thirty-six patients (69.2%) were females (age range 32–87 years, median 64 years); and 16 (30.8%) were males (age range 30–81 years, median 73.5 years). Thirty patients (57.7%) received an intravenous bisphosphonate and twenty two patients (42.3%) received an oral bisphosphonate. The bisphosphonate type used was ibandronic acid (Bonviva) in four cases (7.69%), alendronate sodium (Fosamax) in 14 cases (26.92%) and zoledronic acid (Zometa) in 34 cases (65.38%). The mean bisphosphonate treatment period was 19.1 months in subjects with intravenous bisphosphonate administration (SD=8.2) and 27 months in subjects who received bisphosphonates orally (SD=13.0, p=0.01). The average period until occurrence of maxillofacial symptoms was 6 months (range 0.5–24 months) in subjects with intravenous bisphosphonates and 12.26 months (range 0.25–36 months) in subjects with oral bisphosphonates (p=0.01). The ratio of jaw involvement was mandible/maxilla: 2/1.

**Conclusions:** The bisphosphonate prescribing practitioner and the dentist should monitor patients during and after treatment to reduce the risk of BRONJ. The risk of BRONJ is very high twelve months after oral administration and six months after intravenous administration in patients who have a trigger point in the jaws area. A proper monitoring of patients receiving bisphosphonates can reduce the risk of osteonecrosis and can prevent complications.

**Key words:** bisphosphonates, jaw osteonecrosis, osteoporosis, cancer.

#### P-0315

### BISPHOSPHONATE-RELATED OSTEONECROSIS OF THE JAW- RETROSPECTIVE STUDY AND COMPARISON OF 2 CURRENT CLINICAL CLASSIFICATIONS

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**Aim:** Bisphosphonate-related osteonecrosis of the jaw (BRONJ) is difficult to manage and often recurs. This study focusses on the clinical classification of patients, comparing the current classification of AAOMS and DOESAK and related therapeutic recommendations. **Conclusions** are drawn regarding the recurrence of disease, time of hospitalization, comorbidity, bacterial infection, complaints and extend of the necrotic lesion.

**Materials and Methods:** 50 patients treated between 2008 and 2012 in the Department of Oral- and Maxillofacial

Surgery, University Hospital of Luebeck, Germany were retrospectively classified according to AAOMS and DOESAK. Multiple logistic regression analysis was used to determine independent factors associated with above mentioned criteria.

**Results:** AAOMS and DOESAK classification correlate significantly with slight discrepancies in the lower grading. Time of hospitalization correlates significantly with the two clinical classifications, whereas the recurrence doesn't seem to depend on the classified stage. Comorbidities don't influence the extent of disease.

**Conclusions:** Both AAOMS and DOESAK classifications represent practical clinical tools to classify BRONJ-patients. The time of hospitalization rises with the grade of classification. Many other factors seem to be variable and don't influence the time of hospitalization and treatment strategy significantly.

#### P-0316

### RESOLUTION OF BISPHOSPHONATE-ASSOCIATED OSTEONECROSIS OF THE JAW AFTER TERIPATATIDE THERAPY

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Strategies for the treatment of the bisphosphonate –related osteonecrosis of the jaw (BRONJ) have been proposed by the American Association of Oral and Maxillofacial Surgeons and the Canadian Association of Oral and Maxillofacial Surgeons. The treatment should be conducted according to the stage of BRONJ. This includes patient education, antibacterial mouth rinse, antibiotic therapy, pain control, surgical debridement/resection, an appropriate oral hygiene and so on. Six recent studies have demonstrated that teriparatide (recombinant human parathyroid hormone 1-34) therapy has the potential for resolution of BRONJ.

We report the case of teriparatide therapy for BRONJ. A 78-year-old Asian woman suffered from pain in the mandibular area for five months after extraction of her premolars, in spite of being given antibacterial mouth rinses and antibiotic therapy. She had been treated for her osteoporosis by a weekly dose of 35 mg alendronate for a period of 66 months. Clinical diagnosis was BRONJ. In addition to conventional treatments, off-label use of teriparatide was adapted to achieve the cure of BRONJ. Bone formation marker and bone resorption marker monitoring was made during the therapy.

Six months of treatment were needed for clinical resolution. The bone formation and resorption markers were remarkably increased at 1 month, and some formation and resorption markers became more than double at 6 months. Nine months after discontinuation of therapy for BRONJ, CT showed subsequent osteogenesis occurring. Teriparatide increases bone one turnover. Daily injections of teriparatide 20µg have the potential of anabolic bone deposition although both the anabolic and catabolic reactions are enlarged. There is a difference in the kinetics of change over the first 6 to 9 months of therapy with Para-

thyroid hormone. Bone mineral density rapidly decrease after discontinuation of teriparatide. However, bone formation of the mandible had continued after withdrawal of teriparatide. We suggest that teriparatide therapy for BRONJ should be for at least 6 to 9 months, because it is the best anabolic period and discontinuation of teriparatide does not lead to decreased bone formation.

**P-0317****BISPHOSPHONATES ANTI-ANGIOGENIC POWER IN THE DEVELOPMENT OF BP-ONJ**

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**ObjectiveS:** The bisphosphonate-associated osteonecrosis of the jaw (BP-ONJ) is an adverse side effect of bisphosphonate (BP) treatment. One theory of BP-ONJ aetiology seems to be the negative influence of these agents on angiogenesis. This in-vivo study analyzes the effects of bisphosphonates on angiogenesis in a 3D matrigel plug assay in a nude mice model.

**Materials & methods:** 40 nude mice, weighing between 26-28 grams, were splitted randomly in 5 groups (n=8) and treated with either the non-nitrogen containing (NN-BP) clodronate (21µg/g body weight), or the nitrogen containing (N-BP) ibandronate (0.085µg/g body weight), pamidronate (1.3µg/g body weight) or zoledronate (0.06µg/g body weight) starting one week before the matrigel plug implantation in the dorsal midline and lasting for another 2 weeks. The control group was treated with sodium chloride solution.

Microvessel density (MVD), microvessel area (MVA) and microvessel size (MVS) in matrigel-plugs were detected by immunohistological staining.

**Results:** All bisphosphonates induced a statistically significant decrease of MVD (p each<0.001).

**Conclusion:** The stronger influence on MVD by the N-BP compared to NN-BP may be an explanation for lower occurrence of BP-ONJ after treatment with NN-BP's. Ibandronate induced a strong increase of MVS with a reduced MVD what might result in an only fractionally reduced perfusion giving an explanation for the lower occurrence of BP-ONJ in patients receiving ibandronate compared to patients receiving other N-BP.

**P-0318****TREATMENT OF PATIENTS WITH OSTEONECROSIS OF JAWS WITH A BACKGROUND OF DRUG ADDICTION**

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**Objectives.** The aim of our study is to demonstrate the main principles of combined treatment of patients with osteonecrosis of jaws with a background of drug addiction.

**Introduction.** Osteomyelitis of the jaws and its clinical manifestations are well described in literature and are well known for dentists and maxillofacial surgeons. The occur-

rence of osteonecrosis of the jaws with a background of drug addiction and, consequently, the development of bone loss, is a difficult clinical situation even for an experienced doctor.

**Methods.** 29 patients between the age of 23 to 35 with osteonecrosis of jaws have been treated at our clinic from 2009 to 2012. These patients were active drug users and patients in remission and had been taking pethidine for 1-5 years. 1 patient was suffering from HIV-infection, the rest of them – from HCV and HBV infection. 19 patients had osteonecrosis of the lower jaw, 2 patients – osteonecrosis of the upper jaw, 8 patients – osteonecrosis of the upper and lower jaws. We have seen tooth extraction as the trigger of the disease in 27 clinical cases. As the consequence of tooth extraction and alveolitis, affected bone parts steadily increased. As the result of that, the manifestations of osteonecrosis of jaws appeared and despite treatment it spread over the whole bone. We have developed combined treatment protocol for such category of patients which includes the use of immunomodulators, antibiotics of a wide spectrum of action, desintoxicative and symptomatic therapy, physiotherapy and hyperbaric oxygen therapy. The surgical stage of combined treatment is sequesterectomy or necrectomy, and in some cases – jaw resection.

**Results.** The combined treatment of patients with osteonecrosis of jaws on the background of drug addiction including immune status examination and further immunocorrection provides satisfactory results.

**Conclusion.** Drug addiction is a serious medical, ethical and juridical problem of modern life all over the world. Its treatment in complex with psychological and social rehabilitation is extremely important.

**P-0319****AN AUDIT OF THE PATHWAY TO PREVENT BISPHOSPHONATE RELATED OSTEONECROSIS OF THE JAW (BRONJ)**

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**Introduction:** There is no gold standard in stopping the occurrence of bisphosphonate related osteonecrosis of the jaw (BRONJ) but one can aim to reduce BRONJ occurring by ensuring all dento-alveolar surgery is carried out before commencing bisphosphonate therapy. A fast-track referral system was therefore set up to ensure patients were seen and treated before starting bisphosphonates.

**Aims and objectives:** The aim of this audit was to assess the rate of success in prevention of BRONJ via a fast-track referral system. The Oral and Maxillofacial Surgery (OMFS) and the Urology and Oncology departments at Homerton University Hospital devised a fast-track referral system to enable dental assessments and treatment before bisphosphonate therapy. Urgent referrals were faxed to OMFS who then prioritized these patients to be seen. Urgent surgery was carried out followed by regular reviews for those with unrestorable dentitions. Some pa-

tients requiring other dental treatment were referred to the community dental services. Dentally fit patients were given preventative advice. Patients already started on bisphosphonates had their atraumatic extractions carried out by a senior surgeon and the patients were given pre-, peri- and post-operative chlorhexidine rinses and post-operative antibiotics. The sockets were sutured and they were reviewed regularly.

**Method:** A database of all patients on/requiring bisphosphonate therapy referred for assessment on the OMFS clinic was created. Further information was obtained from clinical notes, correspondence and telephone reviews.

**Results:** Of the 66 patients, 39 were either before or after the commencement of IV bisphosphonates, 23 on oral bisphosphonates and 4 unknown. 33 were referred prior to starting bisphosphonates, 30 after and 3 unknown. 31 were seen before starting bisphosphonates, 32 after and 3 unknown. 45 patients required surgery, of which 10 were treated before starting bisphosphonates, 25 after and 10 unknown. 26 had post-operative reviews and 6 had telephone interview. 3 patients developed BRONJ. One had surgery carried by his general dental practitioner and two had surgery in secondary care. All 3 were taking IV bisphosphonates for metastatic cancer and had their surgery after starting bisphosphonates.

**Conclusion:** Fast-track referral for specialist assessment and subsequent treatment prior to bisphosphonate therapy leads to very low risks of BRONJ.

#### P-0320

### PRESENTATION OF A LARGE ANIMAL MODEL OF BISPHOSPHONATE RELATED OSTEONECROSIS OF THE JAW

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Bisphosphonate related osteonecrosis of the jaw (BRONJ) is rare but potentially severe, and the aetiopathology and risk factors are poorly defined, let alone fully understood. To date, it has not been possible to induce BRONJ in a large animal model, a shortfall this study aimed to redress. Ten two-year-old adult Göttingen minipigs were split into two groups. Five pigs (group 1) were administered intravenously a weekly dose of a bisphosphonate (zoledonate 0.05 mg/kg body weight) and five pigs (group 2) served as controls (no bisphosphonate treatment). After 6 weeks, both groups were subjected to tooth extractions in the upper and lower jaw and the bisphosphonate administration (group 1 only) continued for a further 10 weeks. Clinical and laboratory parameters were monitored during the entire experiment; thereafter, the jaw bones were subjected to macroscopic, radiological (CT) and histological (HE staining) investigations.

Whilst the extraction sites in the control group healed within two weeks, all animals taking bisphosphonates (group 1) suffered from exposed bone and impaired wound healing, indicators that are synonymous of macroscopically advanced osteonecrosis. Radiological and in

particular histological investigations confirmed the presence of ONJ in animals from group 1 (but not group 2). It was shown, that the administration of bisphosphonates specifically and reliably induces BRONJ. The ability to study BRONJ in miniature pigs, animals with a bone structure and jaw dimension comparable to humans, might improve our knowledgebase regarding the aetiopathology, the prophylaxis and potentially uncover new therapies of BRONJ.

#### P-0321

### PROLIFERATION AND METABOLISM OF OSTEOBLASTS AFTER ADMINISTRATION OF BISPHOSPHONATES IN VITRO

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**Introduction :** Bisphosphonate related osteonecrosis of the jaws (BRONJ) with its growing incidence is often associated with resistance to therapy. Concerning pathophysiology of BRONJ, the role of osteoblasts, influencing bone remodelling and bone healing, is controversial. **Aim** of the present study was to investigate the influence of the aminobisphosphonate zoledronic acid (ZO) on the proliferation and metabolism of osteoblasts.

**Material and methods :** Bovine osteoblasts were cultured under standard conditions after administration of tissue-equivalent concentrations of ZO (0.01 µM, 0.1 µM, 1 µM, 10 µM, Control without ZO). Differences between control and ZO-groups were evaluated using CellCount (measurement of vital cells), MTT-assay (mitochondrial metabolism) and immuno- and fluorescence-staining at days 1, 3, 6, 10 and 14. Statistical analysis was performed using ANOVA and posthoc Tamhane T2-test.

**Results :** Until day 3 we observed a non-significant tendency of inhibition of proliferation by ZO (CellCount). From day 6 on until the end of the study at day 14, inhibition reversed to a statistically significant level

**Conclusion :** Zoledronate-application caused promotion of proliferation and metabolism of osteoblasts, but the clinical course of BP-ONJ shows that improved wound- and bone-healing could not be deduced from these results. Our results can be interpreted as impact of bisphosphonates on the balance between different cell lines involved in the BRONJ pathomechanism. Further clinical and in-vivo studies including cellular and molecular mechanisms should be performed to resolve these theories.

#### P-0322

### CASE REPORTS OF THE UTILITY OF MAJOR MAXILLOFACIAL RESECTION IN IMPROVING THE QUALITY OF LIFE OF PATIENTS WITH HIGH STAGE BISPHOSPHONATE RELATED OSTEONECROSIS OF THE JAWS.

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The management of bisphosphonate related osteonecrosis of the jaws (BRONJ) has proved to be a complex issue in

contemporary maxillofacial practice. In high stage presentation the condition is characterised by severe pain and associated suppuration that leads to a significant decrease in quality of life for sufferers. Management of the condition has frequently been conservative involving regular wound lavage in an attempt to bring local infection under control. However treatment can be prolonged for a number of years and involve multiple visits to specialist clinics, and is only successful with resolution in a minority of cases. For a small number of patients major resection of the affected jaw is the only viable option. However, it is not possible to offer reconstructive treatment for such patients: primary reconstruction is limited by the presence of local sepsis and secondary reconstruction is limited by poor bone healing biology. This may discourage a number of maxillofacial surgeons from offering major resection to these patients. This case series shows that patients with high stage BRONJ often have a very poor quality of life. It also demonstrates that despite attendant morbidities, major resection without reconstruction is effective at improving quality of life.

We present 2 cases of BRONJ (one mandibular and one maxillary) managed by near sub-total resection of each jaw. In the mandibular case, resection of the mandible from angle to angle was undertaken in 2 stages with a tracheostomy to protect the airway from posterior movement of the unsupported tongue. The patient was decannulated 2 weeks postoperatively. In the maxillary case, sub-total bilateral anterior maxillectomy was undertaken at a single operative intervention. Despite major surgery leading to transformation of function and appearance, both of these cases showed a positive rise in University of Washington head and neck quality of life indices and patients reported being free of BRONJ related symptoms.

Major resective surgery should be considered an option for patients with high stage osteonecrosis. In the cases here it has proven to be safe for the patient and effective as it has relieved many distressing symptoms whilst maintaining acceptable oral function.

#### P-0323

### INFLUENCE OF DENTURES IN THE INITIAL OCCURRENCE SITE ON THE PROGNOSIS OF BISPHOSPHONATE-RELATED OSTEONECROSIS OF THE JAWS

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**Objectives:** Development of bisphosphonate (BP)-related osteonecrosis of the jaws (BRONJ) has become an increasingly serious problem in a subset of patients, especially those receiving intravenous preparations. BRONJ also developed in patients who received oral BPs, although the incidence was extremely low. Most cases of BRONJ occurred after dental procedures such as tooth extraction, periodontal surgery, implant surgery and delivery of incompatible dentures and were refractory to conventional treatment, including debridement, antibiotics, and hyperbaric oxygen therapy. However, there are few

reports regarding the association between dentures and BRONJ. This retrospective cohort study was conducted to investigate the influence of wearing dentures in the initial occurrence site on the prognosis of BRONJ.

**Materials and Methods:** A written questionnaire regarding the prevalence, therapy and outcome of jawbone lesions during 2006-2008 was mailed to 248 institutions with the oral and maxillofacial surgery department in Japan in 2008 by the Committee of Survey and Planning of the Japanese Society of Oral and Maxillofacial Surgery.

**Results:** Among 263 patients diagnosed as BRONJ by the working definition of the AAOMS, no answer was obtained about the use of denture in 13 patients. Ninety-nine patients wearing dentures had significantly shorter duration until occurrence than 151 patients not wearing dentures. In addition, remission of BRONJ affecting the mandibular canine and premolar region in denture-wearing patients was significantly harder. Furthermore, poor oral hygiene status was found to affect significantly the prognosis of BRONJ in denture-wearing patients. Alcohol habit also delayed remission, but high body mass index (BMI) promoted remission.

**Conclusion:** Wearing a denture in the initial occurrence site of BRONJ was shown to influence the prognosis of BRONJ, especially in mandibular denture-wearing patients.

#### P-0324

### NONRESOLVING OSTEOMYELITIS OF THE MAXILLA AND MAXILLARY SINUS AFTER LONG-TERM USE OF ORAL BISPHOSPHONATES

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Bisphosphonate-related osteonecrosis of the jaw (BRONJ) is a complication of Bisphosphonate (BP), medications used for treatment of osteoporosis, multiple myeloma and cancer bone metastasis. Manifestations of BRONJ include bone necrosis, exposure to the oral cavity, inflammation suppuration and pain with nonspecific radiographic changes.

**Case history:** A 64-year-old woman had been treated with oral BP since 1991 for arthritic pain and osteoporosis. There were no other medical problems, no other medications used, she did not smoke nor drink alcohol.

In 2005, the left maxillary molars had been extracted. The extraction site failed to heal, but she continued to use BP. Eighteen months later she presented with swelling and pain, suppuration and an area of 2x1 cm of exposed necrotic bone in the left posterior maxilla and oroantral fistula (OAF).

Panoramic radiograph showed partial opacification of the maxillary sinus, unhealed extraction site, and sclerosis of adjacent maxillary alveolus. Histopathological analysis diagnosed osteomyelitis associated with actinomycosis, consisted with BRONJ.

**Treatment:** BP was discontinued, followed by 7 months of PO antibiotics and weekly irrigations with chlorhexidine 2%. The wound seemed to be completely closed but within 2 months signs and symptoms and OAF recurred. Treatment continued with antibiotics daily rinses and weekly

irrigation with Chlorexidine 2% and several repeated sequesterectomies, however, the patient still had pain. A course of 30 hyperbaric oxygen treatments were administered. Three years after the onset symptoms improved, and sequestered bone was no longer visible. However, the OAF was still present, requiring irrigations, and the radiographs still showed bony abnormality.

In 2010, removal of the necrotic bone was performed (partial maxillectomy) from the area of 21 to the tuberosity, reaching bone with blood supply macroscopically. She was under close follow up for the next 2 years.

In 2012, clinical and radiographic examination revealed resolution of the disease.

An unusually severe BRONJ of 5 years duration associated with 15 years oral BP use is presented.

**Keywords:** Bisphosphonates, osteonecrosis of jaw, osteomyelitis.

### P-0325

#### DEXRAZOXANE SHOWS CYTOPROTECTIVE EFFECTS IN ZOLEDRONIC ACID-TREATED HUMAN CELLS IN VITRO AND IN THE RABBIT TIBIA MODEL IN VIVO

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**Introduction:** Bisphosphonates are important and effective drugs in oncology and osteoporosis therapy. They accumulate in the bone matrix becoming released and active by bone resorption. This leads to effective inhibition of tumour cells and bone degradation. A side effect of bisphosphonates, similar to other drugs like denosumab, is osteonecrosis of the jaws (ONJ). This problem mostly occurs after tooth extraction.

We studied the cytoprotectant dexrazoxane known from anthracycline chemotherapy for cytoprotection in nitrogen-containing bisphosphonate treated cells and in the rabbit tibia model to evaluate a possible value in ONJ management.

**Materials & methods:** Human osteoblast (HOB) P2 cells and Human gingival fibroblast (HGF) P2 cells were treated with zoledronic acid (50 µmol/L) and the cytoprotectant dexrazoxane (600 µmol/L). Analysis included cell viability testing with MTT assay and morphology analysis using CellTracker™ Green CMFDA. A biomaterial carrier (Bio-Oss Collagen) was implanted in the rabbit tibia of 6 female chinchilla bastard rabbits on both sides with drill hole defects (d:3.2mm). Implants were loaded with 25nmol zoledonic acid, with and without 300 nmol dexrazoxane and unloaded in a control group. Analysis included histological examination of undecalcified samples with toluidine blue staining after 10 days.

**Results:** In vitro experiments showed a significantly higher MTT activity in cells treated with zoledronic acid together with dexrazoxane compared to the same cells treated with the bisphosphonate alone in t-test (HOB: p=0.0003; HGF: p below 0.0001) and one-way ANOVA. Cell morphology changes were consistent with these results. In vivo results showed newly formed bone trabeculae directly growing

towards the implanted hydroxylapatite particles and cortical bone interface resorption activities in the control and the experimental group only.

**Conclusion:** The study suggests a possible value of this patented technology for BRONJ therapy and prevention with local or systemic application.

## 4. BONE HEALING AND OSTEOGENESIS

### P-0401

#### THE USE OF AUTOLOGOUS MESENCHYMAL STEM CELLS, COLLAGENOUS MEMBRANE, PLATELET RICH PLASMA AND HYDROXYAPATITE IN THE OSTEOGENESIS AUGMENTATION IN STOMATOSURGERY PATIENTS

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**Introduction:** Bone augmentation or new bone formation is a frequent problem in stomatosurgery. Different managements and protocols were developed for solving this problem. In the last decade, the use of different bone substitutes (autologous or synthetic) and also the use of stem cells were introduced.

**Material and Methods:** The authors developed a new concept based on combination of autologous bone marrow derived mesenchymal stem cells (BM-MSCs), hydroxyapatite, collagenous membrane and platelet rich plasma (PRP) in cleft palate (CP) patients (n=12) and in sinus lift patients (n=15). The new concept was realized in patients, where all standard therapeutic procedures failed. CP patients (all of them originally cleft lip and palate) were in the age of 20 – 56y with the diagnosis of unilateral (n=6 all left) or bilateral CP (n=6). The sinus lift patients (osteotomy of maxilla or mandible) were in the age 34 – 70y (mean age 53). Bone defects were treated with autologous BM-MSCs expanded in vitro (according to growth activity) for 2 – 5 weeks. Morphology and flow cytometry was used for their verifying. Undifferentiated BM-MSCs were seeded onto collagenous membrane (COLADERM) and immediately before implantation, the BM-MSC cell suspension was mixed with mechanically crushed hydroxyapatite, calcium and PRP as source of growth factors. Finally, the suspension of BM-MSCs was injected into the wound area. The closure of oro-nasal communication were realized as two layer plastics by mucoperiosteal flaps or lingual flap.

**Results:** A very good and fast wound healing in all patients was observed. No post surgery complications were recorded. Formation of new bone-like structure in treated territory was verified by OPG and CT 6 month and more lately. Some of these patients are completely cured, in present.

**Conclusion:** According to obtained results, the use of autologous BM-MSCs in combination with extra cellular matrices (Coladerm and hydroxyapatite) and PRP could be the way for CP and also sinus lift treatment in the future. Of course, further clinical studies are needed. **Acknowledgment:** This study was supported by a grant of Ministry of Health Slovak Republic, No. 2007/36-UK-07.

### P-0402

#### SELF-ACTIVATED MESH DEVICE USING SHAPE MEMORY ALLOY FOR PERIOSTEAL EXPANSION OSTEOGENESIS

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Alveolar bone augmentation is one of the standard treatments for dental implantation when alveolar bone volume is insufficient. Considering the ideal conditions for acquiring sufficient bone, a complete capsule under the periosteum is required. The present study evaluated the use of this self-activated shape memory alloy (SMA) device, with a focus on its effects in the region under the periosteum. **Materials and methods**) Twelve Japanese white rabbits were used in this study. The form of the mesh device was 5mm width, 25mm length and 0.275 mm thickness. The pre-curved form was designed that the middle point was 4mm above from the baseline. The device was inserted under the periosteum at the forehead. In the experimental group, the device was pushed, bent, and attached to the bone surface and fixed with a titanium screw. In control group, the device was only inserted under the periosteum. After 14 days, the screw was removed and the mesh was activated in the experimental group. Rabbits were sacrificed 5 and 8 weeks after the operation and newly formed bone was histologically and radiographically evaluated. **Results**) No complications related to the materials used at the sites of intervention, before, during, or at the end of the experimental phase or infection within or around the device were observed in any animal. The quantitative data by the area and the occupation of newly formed bone indicated that the experimental group had a higher volume of new bone than the control group at each consolidation period (P

**Conclusion**) The use of self-activated devices for the periosteal expansion technique may make it possible to avoid donor site morbidity, trans-skin activation rods, any bone-cutting procedure, and the following intermittent activation procedure.

### P-0403

#### INFLUENCE OF THE MIXING RATIO OF A-TCP TO AUTOLOGOUS BONE ON THE BONE REGENERATION PROCESS IN THE BONE DEFECT AREA AROUND IMPLANTS

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#### Objectives

α-TCP granules were mixed with crushed autologous bone, and used as a bone-filling material in the alveolar bone defect area around implants. We evaluated the influence of differences in the mixing ratio.

**Materials and Methods:** Female dogs (Beagle) were used as experimental animals. The bilateral mandibular premolar teeth were extracted, and, after osseous healing, a bone defect was produced in the alveolar bone in the tooth extraction area using trephine bars pouring saline solution, and an implant was placed.

Regarding experiments, crushed autologous bone was

used to fill the bone defect area in one group, the mixing ratio of  $\alpha$ -TCP to crushed autologous bone was set to 3:7 and filling was performed in one group, it was set to 1:1 and filling was performed in one mixture group, it was set to 7:3 and filling was performed in one mixture group, and  $\alpha$ -TCP was used for filling in one group. No filling was performed in the control group.

The wound area was set to be a complete closed wound, and the experimental animals were sacrificed 2, 4, and 8 weeks after surgery to histologically observe each group. Undecalcified ground samples were produced, and observed after performing H-E and Villanueva's Goldner staining to evaluate the amount of bone formation.

**Results:** Autologous bone group: newly generated bone was confirmed from the second week. Thereafter, the amount of bone serially increased.

$\alpha$ -TCP group: the remaining of  $\alpha$ -TCP granules was observed between 2-4 weeks after surgery, and the invasion of soft tissue was confirmed.

At the 8th week, almost all the  $\alpha$ -TCP granules were absorbed, and the formation of new bone around the  $\alpha$ -TCP granular absorption area was confirmed. The  $\alpha$ -TCP group showed marked bone formation, in comparison with the control group. The autologous bone group showed clear bone formation, in comparison with the  $\alpha$ -TCP group. Furthermore, in the mixture groups in which autologous bone and  $\alpha$ -TCP were mixed, favourable bone formation through mixing with autologous bone was noted, and changes in the amount of bone formation with the mixing ratio were confirmed.

#### P-0404

### ACUPUNCTURE CORRECTION OF MANDIBLE BONE TISSUE METABOLISM CHANGES AS A RESULT OF TRAUMATIC INJURIES OF LOWER ALVEOLAR NERVE

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The rate of inferior alveolar nerve traumatic injury is increasing due to developments in endodontics, implantology, orthognathic surgery. If this complication occurs, it leads to as sensory disturbances, a denervation syndrome of denervated mandibular bone tissue. Denervation syndrome interferes with bone reparation and worsen prognosis.

**Aim** of the study. Experimental study of the influence of acupuncture on mandible bone tissue metabolism in the case of traumatic injury of inferior alveolar nerve.

**Objects and methods.** Experimental model of inferior alveolar nerve traumatic injury was made in 24 Chinchilla rabbits, which were divided in 2 series. The treatment of first group was the standard complex and the acupuncture was added in treatment of the second one. Acid and alkaline phosphatases activity in the blood serum was assessed before operation and at the 7, 14, 21, 28 days after in U/l.

**Results.** Preoperative level of acid phosphatases activity was  $7.66 \pm 0.27$ . At a 7 days It's increased significantly to  $10.74 \pm 1.06$  in the 1-st series. It shows that destructive process in the mandible takes place. At the 14, 21 и 28

days it's  $8.93 \pm 0.79$ ,  $10.10 \pm 2.57$ ,  $8.98 \pm 0.74$  and hadn't significant difference from the preoperative level

In the 2-nd series at the 7 days level of acid phosphatases activity decreased to  $7.23 \pm 0.79$ . It shows that compensatory mechanism begins to work quickly and prevents bone tissue resorption.

Preoperative level of alkaline phosphatases activity in the blood serum of experimental animals was  $66 \pm 0.27$ . At a 7 days It's increased significantly to  $76.19 \pm 9.39$ , and decreased to  $52.86 \pm 2.11$  at 14 days,  $54.23 \pm 8.78$ , at 21 days. At 28 days data was close to preoperative level –  $69.80 \pm 7.38$ .

At the 2-nd series decreasing of alkaline phosphatases activity to  $50.36 \pm 3.45$  takes place at the 7 days. At the 14 days data increase to  $60.68 \pm 3.09$ , at 21 days –  $78.96 \pm 8.24$ , at 28 days –  $74.17 \pm 9.41$  and didn't differ significantly from preoperative level.

**Conclusion.** Acupuncture influences the effect of traumatic inferior alveolar nerve injury on the metabolism of mandibular bone.

#### P-0405

### TREATMENT WITH GRANULATED OSTEOINDUCTIVE IMPLANT MATERIALS

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**Relevance:** Bone defects in the jaws remaining after the removal of foci of chronic odontogenic infection reduce the bone structure strength, worsen dental function leading to impaired chewing and often make functional tooth replacement impossible. One of the important problems in modern oral and maxillofacial surgery is the replacement of the defects and the creation of optimum conditions for predictable bone regeneration in the area of surgical intervention and prevention of pyoinflammatory complications.

**Aim** was to improve the methods of employing granulated osteoinductive implantation materials.

**Objects and methods.** We examined 24 patients divided into two groups by 12 persons. Standard method of filling the bone defects with osteoinductive implantation materials was used in group I. Group II was treated by our method of treatment with osteoinductive materials and consisted of following instillation of the jaw-bone defects with 0,02-1% solution of potassium permanganate after the removal of benign tumour. Then, the defect was filled with granules of osteoinductive implant materials mixing them with the patient's blood clot and sealing the mixture with plugger. When the defect was filled, a muco-periosteal flap was laid in place and covered with a sterile cloth and x-ray examination was carried out to make sure that the defect of the jawbone was filled uniformly and air pores were missing in its compounds. When the air pores found, they should be removed with the dental probe and bayonet plugger.

Then, during the removal of benign tumour of the jaw, muco-periosteal flap was fixed with single interrupted suture.

**Results.** The number of complications occurred in patients



in group 2 was reduced and consisted 1 (8,3%) whereas in the group I the number of complications was 4 (33,3%).

*Conclusion.* Using this technique reduces inflammatory complications after surgery when granulated osteoinductive implant materials are applied. It significantly reduces the cost of treatment and rehabilitation of patients with defects of the jaw bone and therefore has socio-economic importance.

#### **P-0406**

### **THE USING OF OSTEOGENIC MATERIAL "COLLOST" FOR FILLING BONE DEFECTS IN RECONSTRUCTIVE MAXILLOFACIAL SURGERY**

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Today the oral and maxillofacial surgery uses a lot of osteogenic materials. In our practice, we successfully use the material "Collost" on the basis of collagen of the I type.

*Materials and Methods:* 70 patients treated at hospital-based oral and maxillofacial surgery of Sechenov First MSMU: 12 patients were with a diagnosis of odontogenic cysts of the upper (4 cases) and lower (8 cases) jaw, 35 patients with mandibular fractures within the dental arch, dystopic impacted third molars of the lower jaw (14 cases), maxillary sinus wall defects of the different nature (5 cases), oroantral fistula (5 cases).

Surgery was performed as follows: the jaw cysts- cystectomy, removing of a tooth with filling material defect "Collost" (balls); fractures of the lower jaw within the dental arch - osteosynthesis with removing of a tooth and filling of cavity of the bone using material "Collost" (cords and / or powder diluted on saline); dystopic impacted third molars on the lower jaw, removing of the tooth and filling defect with material "Collost" (cords and small membrane); oroantral fistula- elimination of junction with the plastic oroantral fistula with local tissues and the using of membranes "Collost."

*Results:* Patients recovered well. Swelling at the site of surgery in all groups of patients was moderate. Sutures were removed at 7-9 days.

In carrying out the control X-ray and CT studies in 1 month a rapid start osteoreparative process after implantation of the material "Collost" occurred regardless of the type of pathology, and it was located in the centre of the defect, not on its periphery.

After 3 months the process of osteointegration and biodegradation were continued, defects were half filled with newly formed bone.

After 6 months almost no defects were detected on the X-ray examination. Clinically, signs of bone cavity in any group of patients were not found.

*Conclusion:* The using of osteogenic material "Collost" showed excellent results during reconstructive surgery for filling bone defects of the jaws. We recommend using it for filling bone cavities, regardless of their nature and volume.

#### **P-0407**

### **ROLES OF COMP-ANG1 IN BONE FORMATION AND HEALING.**

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*Objective:* The purpose of this study was to observe the role of COMP-ang1 in bone formation and the healing process.

*Materials & Methods:* An Osteocalcin(OC)-Cre mouse and a Floxed allele mouse were cross-bred. Then COMP-ang1 inducible mice were produced which can uniquely induce the expression of COMP-ang1 from osteoblast. By targeting generated mutant type mouse (MT) and wild type littermate(WT), at 10-week-old and 18-week-old, the formation differences between mandible and calvaria were observed using micro-CT and histology findings. After putting defects on the calvaria of MT and WT, the differences in the healing process were observed through micro-CT.

*Result:* MT, as compared to WT, increased the thickness and density of cortical bones and the bone marrow of cancellous bones has decreased accordingly. For the calvaria of WT, cancellous bone layers were clearly present in the outer and inner layer of cortical bones. But for the calvaria of MT, cancellous bones disappeared and merged as single thick cortical bone. Differences between WT and MT could not be identified in the healing process of the calvarial defects model despite of the clear role of COMP-ang1's in the bone formation process.

*Conclusion:* COMP-ang1 cannot affect the bone healing in defect while COMP-ang1 can play a role in promoting the formation of cortical bones in the bone formation process.

## 5. CLEFT SURGERY

### P-0501

#### REPAIR OF CBCL WITH SEVERELY PROTRUDING PREMAXILLA WITH A PREMAXILLARY SETBACK AND VOMERINE OSTECTOMY IN ONE STAGE SURGERY

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**Objectives:** Owing to logistic problems from providing a preoperative orthopedic treatment at our centre, the primary repair of the complete bilateral cleft lip (CBCL) with a severely protruding premaxilla in one stage surgery is very difficult, essentially because a good muscular apposition is difficult, forcing us into doing a premaxillary setback to facilitate subsequent bilateral lip repair and thus achieve satisfactory results. We achieve this by a reductive osteotomy on the vomeropremaxillary suture.

When labial repair is performed at the same time as premaxillary setback, the blood supply of the premaxilla is impaired, with the risk of premaxillary necrosis.

**Material and methods :** 4 patients with CBCL and severely protruding premaxilla underwent premaxillary setback by vomerine Osteotomy at the same time as lip repair in the past 24 months. The extent of premaxillary setback varied between 9 and 16 mm. The required amount of bone was removed anterior to the vomero-premaxillary suture. The premaxilla was immobilized in only 1 patient, a 4-year-old male, who was operated on secondarily after several previous operations in another centre.

We did an additional simultaneous gingivoperiosteoplasty in all patients, achieving adequate stability of the premaxilla in its new position to be able to close the alveolar gap bilaterally.

We have examined the position of premaxilla and dental arch between 6 and 24 months.

We did not perform primary nose correction, because this increased the risk of impairing the already compromised vascularity of the philtrum and premaxilla

**Results:** We did not have any ischemic episode or vascular compromise of the premaxilla.

We achieved a good lip repair in all cases: adequate muscle repair, symmetry of the lip, prolabium and Cupid's bow, and good scars.

**Summary:** During follow-up, the premaxilla was minimally mobile. Doing this vomerine Osteotomy, we don't know how it will affect the subsequent growth of the premaxilla and restrict the natural maxillary growth.

Applying this alternative treatment for children with CBCL and protruded premaxilla without any preoperative orthopaedic treatment, we can successfully perform, in a single-stage surgery, a good primary lip repair at our centre.

### P-0502

#### PRIMARY LENGTHENING OF THE SOFT PALATE BY USING THE WAVY INCISION PROCEDURE - A LONG-TERM FOLLOW-UP

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**Background:** The problem with soft palate repair in CP is shortness of the soft palate, hypoplasia of velar muscles and a soft tissue deficit. Primary intravelar veloplasty should enable functional closure of soft tissues as well as lengthening of soft palate. The wavy incision procedure as a modification of the intravelar veloplasty allows lengthening of the soft palate in combination with intravelar veloplasty. Long-term results are necessary to underline the advantages of this technique.

**Methods:** In 15 patients with complete hard and soft palatal clefts in the soft palate (study group) the wavy incision procedure was carried out using wavy types of incisions at the cleft margins in combination with intravelar veloplasty. In the control group 22 patients underwent closure of soft palate using straight line incisions in combination with intravelar veloplasty. In all patients soft palate clefts were closed within 11 (+/- 1) months of age.

Within 3 years of age hard palatal clefts were closed secondary. In long term follow-up breathing and speech are analyzed in all patients between 3 years of age and 13 years of age. Speech pathologists used standardized techniques for evaluation of speech (A-I probe according Gutzmann, tonometry) and primary dysfunctions (tongue rest position, swallowing (Payne-technique)). Statistical observation was done using U-tests ( p<0.05).

**Results:** We found that the palatal wavy incision procedure was easy to perform, closing of three layers was possible even in wide palatal clefts. No postoperative fistula happened. Lengthening of soft palate was achieved of about 56% (24-83%) in average, measured at the end of surgery. Patients of the study group showed physiologic results in voice (A-I probe) 3 years postoperatively (control group: 67 %!). 13 years postoperatively 99% showed physiologic voice results (control group: 86 %).

In the study group 60% show physiological articulation three years postoperatively (control group 25 %) and 97 % within 13 years of age (control group: 75 %). Statistical evaluation revealed significance.

**Conclusions:** The wavy incision procedure combined with intravelar veloplasty enables successful postoperative results in cleft palate. Even long term examinations have shown superior functional results in comparison to intravelar veloplasty.

**P-0503****COMPARISON OF THE ESTHETIC OUTCOMES OF LIP AND NOSE IN CHILDREN WITH UCLP IN TWO CENTRES**

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**Introduction:** The goal of treatment of unilateral cleft lip and palate patient (UCLP) is to achieve aesthetically perfect result with normal morphology and function of the affected structures.

**Aim:** We evaluated esthetical outcomes of the lip and nose obtained with two different treatment protocols in two centres.

**Materials and methods:** In centre A they use preoperative orthopaedics with the plate and nasal stent from birth to 6 months of age and Tenisson method for the lip repair at 6 months. In centre B Millard method is used for the lip closure, performed at 3 months of age without any form of preoperative orthopaedics. Center A participates with 34 and centre B with 37 non-syndromic consecutive children with UCLP older than 6 years. Aesthetics of the lip and nose was evaluated using numerical scale, separately for the white and red lip, the scar, symmetry and position of the nasal ala and nasal triangle. Rating was performed by two evaluators from each centre on frontal and basal view pictures. For each variable points were scored. **Results** were statistically analyzed using Mann-Whitney rang test and Wilcoxon test, reliability of raters was tested with Cronbach's Alpha test.

**Results:** Statistically significant differences between centres were found for white lip ( $p=0,000$ ), red lip ( $p=0,000$ ), the scar ( $p=0,000$ ), and nasal ala ( $p=0,051$ ) in favour of centre A. Differences for the nasal triangle was not statistically significant ( $p=0,196$ ). The reliability between the raters was high.

**Conclusion:** It seems that lips from centre A look better, between the noses there is no difference. It is not clear if the difference is associated with the method of the lip repair or with the presurgical orthopaedics used.

**P-0504****COMPUTER-ASSISTED EVALUATION OF PRE- AND POST-OPERATIVE DIFFERENCES IN CLEFT LIP AND PALATE BY 3D-SURFACE SCANNING**

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**Introduction:** Two-dimensional documentation (e.g. photo) and plaster masks are still very common tools for documentation and planning of surgical interventions in cleft lip and palate surgery. Deficiencies of these methods are their subjectivity and related significant errors. Three-dimensional (3D) surface documentation and continuing computer-based processing could improve the objectivity for the pre- and post-surgical objective evaluation immense. The aim of this study was a computer-assisted pre-

and post-surgical evaluation of the lip cleft and palate closure in infants as well as a quantitative and qualitative presentation of the results.

**Method:** 19 patients (3-10months) with different manifestations of either a cleft lip or a cleft lip and palate were scanned with a T-Scan© (Steinbichler) in the operating theatre directly pre-operatively, post-operatively and seven days post-operatively. A refined evaluation scheme exploiting the full 3D-information of the surface scans was developed consisting of special post-processing, registration, and visualization for the sake of a quantitative comparison of the pre- and post-operative condition. Measurements of the pre- and post-operative surface differences were visualized using a physical colour scale. Furthermore, the mean value of the surface differences as well as the standard deviation and maximal distance were evaluated.

**Results:** By the developed procedure, a basis for quantitative evaluation of the surface differences was provided. The mean values of the surface differences were in the range of  $D=(0,67 \pm 0,17)$  mm, the maximal distance was in the range of  $A=(7,21 \pm 4,47)$  mm.

**Discussion:** Visualisation of pre-and post-operative facial surface scanning and its comparison could identify the surgically corrected regions. Post-operative changes of the tissue were also visible. The developed method can be applied for improvement of the surgical planning and post-operative evaluation of the surgical quality. Based on this very positive outcome, next steps are standardization of the overall procedure including a refined error analysis.

**P-0505****A LONG TERM RESULTS OF THE CLINICAL SURVEY OF PATIENTS WITH CLEFT LIP AND/OR PALATE TREATED IN TARTU UNIVERSITY HOSPITAL.**

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**Introduction:** Clefts of the lip and/or palate are among the most common congenital malformations. In Estonia the incidence of clefting is 1 per 700 live births. The purpose of the study was to present the incidence of cleft lip and/or palate and epidemiological factors causing development of cleft lip and palate.

**Material and methods:** This study included 291 cleft lip and palate patients and the information for statistical analyses was gathered from Tartu University Hospital treated from 1980-2009.

**Results:** 20.3% of the patients had a cleft lip (CL), 36.1% of the patients had a cleft palate (CP), and 43.3% of the patients had a cleft lip and palate (CLP). The ratio for different cleft types CL:CLP:CP was 1:2:2. In unilateral CLP and CL cases, the left side was affected 2.2 times more frequently than the right side. Out of 291 patients 167 were male (57.1%) and 124 were female (42.9%). Boys had a CLP nearly 2.1 times more often the girls. CP was more common for girls (60%) than for boys (40%). 34% of children had multiple malformations. Out of 278 children 67 (24.1%) had the same type of pathology in the family. 15.5% of children with clefts were born premature. In cases of children with clefts, the mother's age exceeded

30 years in 28.4% of cases and father's age in 43.1% of cases. 42.8% of mothers received medications during the first trimester of pregnancy, 32.7% had had viral infections, 21.2% had done hard physical work, 13.8% had had the threat of miscarriage, 22.7% had suffered from toxemia of pregnancy, 15.1% had had concurrent diseases.

**Conclusion.:** The result of the study show a high occurrence rate of CP (CL:CLP:CP-1:2:2) which is similar to the studies conducted in Finland and Sweden. Epidemiological studies conducted on a cohort of patients from Estonia yielded gender related results comparable with those obtained in other countries.

#### P-0506

### NON-REMOVABLE APPLIANCES IN THE EARLY ORTHODONTIC TREATMENT OF INFANTS WITH UNILATERAL CLEFT LIP AND PALATE.

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**Topicality:** The outcome of primary surgery for congenital cleft lip and palate depends directly on the gap between the fragments of the alveolar process on the maxilla and the upper lip, as well as on the configuration of the maxilla.

**Materials and methods:** Experimental theoretical studies were undertaken prior to this research: 1) a computer model of the cleft structures in the middle face area and of the orthodontic appliance was developed; 2) medical and technical requirements for the non-removable appliance were determined; 3) characteristics of the following materials were compared: steel, silicone, nitinol – for the range of acceptable loading; 4) an active moving element was designed. 96 infants of breastfeeding age were evaluated for the need for preoperative orthodontic treatment. Patients found to have a unilateral cleft lip and palate, 62 in total, required orthodontic treatment in 100% of cases. Every case of early orthodontic treatment in infants with congenital cleft lip and palate was reviewed on an individual basis, as was the choice of method and appliance type. The criteria for placement of a non-removable appliance were: 1) a gap between the fragments of 10 mm or more; 2) age 5.5 months and beyond. Infants with unilateral cleft lip and palate, 37 in total, were aged in the range from 7 days to 4 months and had a gap between the alveolar process fragments of 6 to 24 mm. The design of the orthodontic appliance depended on the size and movement vector established using computer modelling. The non-removable orthodontic appliance was placed under general anaesthesia. Treatment with the non-removable orthodontic appliance lasted 5 to 10 days. Removal of the orthodontic appliance was performed under general anaesthesia, simultaneously with primary cheilorhinoplasty.

**Results:** Patients in whom non-removable orthodontic appliances were placed had their preoperative preparation period reduced twofold, completely normalized anatomical shape of the maxilla, the gap eliminated, fewer orthodontic office visits, and no complications in the postoperative period.

**Conclusion:** Use of non-removable orthodontic appliances with a nickel-titanium active element allows significant reduction of the preoperative preparation time in infants with congenital cleft upper lip and palate, and also provides an opportunity to form the alveolar process of the maxilla at any time.

#### P-0507

### CHALLENGES IN SECONDARY CORRECTION OF UNILATERAL CLEFT LIP-NOSE DEFORMITY – CASE REPORT AND LITERATURE REVIEW

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**Objectives:** The characteristic unilateral cleft lip-nose deformity (CLND) represents a stigma of the cleft patient and one of the most challenging reconstructive problems in rhinoplasty.

Despite the current trend toward primary nasal reconstruction, the majority of patients still benefit from additional nasal surgery at the end of growth.

The secondary unilateral CLND is characterized by the left features of the primary deformity complicated by the influence of facial growth.

Common features include short and deviated columella, asymmetric tip and nostrils, discontinuity of the orbicularis muscle, absence of a philtral column, cleft side deviation of the columella, septum, dorsum and tip, malposition of the lower lateral cartilage and posterior displacement of the cleft alar base. We present a case report of a secondary unilateral CLND treated by open rhinoplasty and discuss the challenges and available treatment options.

**Material and Method:** Case report of an 18 year-old Caucasian male patient, with unilateral CLND. Previous surgeries included primary cleft and nose correction, alveolar cleft bone grafting, cleft lip revision and Le Fort I maxillary advancement. The patient underwent open rhinoplasty with transverse transcolumellar and bilateral reverse-U incision. Surgery included septal resection leaving 10mm dorsal and caudal L-strut, reposition of the septum with suture anchorage, columellar strut graft with septal cartilage, cephalic resection of the noncleft alar cartilage, cleft alar cartilage release from the pyriform and upper lateral cartilage, alar strut and alar contour grafts, inter-domal suture, release and V-Y advancement of nasal lining and cleft alar base-wedge excision.

**Results:** The early post operative course was uneventful. The patient was satisfied with the aesthetic and functional results.

**Summary:** The characteristic unilateral cleft lip-nose deformity (CLND) represents a stigma of the cleft patient and one of the most challenging reconstructive problems in rhinoplasty.

The goal of surgery is to optimise the shape and function of the nose in a way that attention is drawn away from the typical CLND. Correction usually needs open rhinoplasty, with extensive grafting and suture techniques. Despite this a perfect nose is difficult to obtain, these are the patients who most benefit from rhinoplasty and are often the most grateful.

**P-0508****MANAGEMENT OF ANTERIOR FISTULAE WITH A PREMAXILLARY ROTATED FLAP IN BILATERAL CLEFT PALATE SEQUELAE.**

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Attempts at closure of anterior palate fistulas using local tissue have resulted in a high rate of failure. In addition most of the patients have associated maxillary collapse which must be corrected prior to surgery. A premaxillary rotated mucosal flap to close the nasal plan is developed. prior to fibromucosal flaps application to consolidate palatal tightness. Technical details are underlined and results are exposed. Almost no detrimental after-effects occurred at the donor site. The buccal premaxillary inverted flap was found to be a useful alternative to a tongue flap in case of bilateral cleft palate anterior fistulae.

**P-0509****COMPLEX CORRECTION OF COMPLETE CLEFT LIP WITH SEVERE PROMINENT PREMAXILLA USING LIP ADHESION AND NAM DEVICE**

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*Purpose:* Recently, Nasoalveolar Moulding(Grayson, 1992), Latham appliance(Millard and Latham 1990), etc. are frequently used to correct protruded premaxilla with a complete cleft palate. However, the effectiveness of the methods above can be doubtful when the premaxilla is protruded, an alveolar cleft presents without a cleft palate, and the lateral segment is collapsed. In this study, 3 cases of patients whose premaxilla is protruded over 1.0cm than the lateral segment showing an alveolar cleft without a cleft palate, and collapsed lateral segment are reported.

*Method:* We examined 3 cases with a complete cleft lip with severe prominent premaxilla without 2nd cleft palate, whose premaxilla was protruded over 1.0 cm in maxillary dental arch from May 1999 to February 2006. In case 1, definitive cheiloplasty was done to a 3-month-old without any preoperative care. In contrast to case 1, definitive cheiloplasty was done to a 6-month-old patient who previously had additional nasoalveolar moulding after lip adhesion when 2~3 week-old in each case 2 and 3. In those three cases, we compared the differences between photographs of first, 2nd and the third case.

*Result:* Comparing photographs of the symmetrical shapes of the nasal cartilage and the length of the columella of each case, it can be stated that the complex usage of both lip adhesion and NAM device is more effective (in case 2 and 3). In case 1, the nasal cartilage transformation condition was slightly improved and the length of the columella was same as that of preoperative (1.5mm). In case 2, the nasal cartilage was symmetric, and length of the columella increased from 1.0mm to 4.5mm resulting in better symmetry. In case 3, the shapes of the cartilage and the lengths of columella were symmetric. However, the shapes of nostril were asymmetric especially the degree of asymmetry was bigger in the affected area. The premaxilla in case 3 was corrected to a normal dental arch 6-month after lip adhesion.

*Conclusion:* In a case where a patient with a complete cleft lip with severe prominent premaxilla without a cleft palate, the condition of premaxilla protrusion can be corrected by using a lip adhesion and NAM device. The usage of a lip adhesion and NAM device can result in more than 1cm backward movement of the premaxilla. Also, using NAM device can improve the length of columella and the correction of the nasal cartilage.

**P-0510****A CASE REPORT: CORRECTION OF NASAL OBSTRUCTION WITH CRISS-CROSS INCISION**

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*Introduction:* Nostril narrowing or obstruction can occur as a complication after complete cleft lip and palate surgery. It can disturb air passage and deform the nasal structures, hence surgical correction is needed. We describe a successful case with criss-cross incision in correcting the unilateral nasal obstruction.

*Case report:* A 20-year-old woman visited to CNUH for left nostril obstruction. She had a cheiloplasty at 1 year of age and a palatoplasty at 5 years of age for left cleft lip and palate. Unfortunately postoperative scar contracture led to a complete unilateral nasal obstruction. It began 5mm above the nares as a continuation of nasal skin and facial CT revealed a 10mm-thickness extension toward nasal cavity. A cruciform incision was made on the outer surface of the scar and dissection was performed with care not to injure the inner surface. As a result 4 fan-shaped skin flaps were developed. After bending them backwards another cruciform incision line was designed on the inner surface, which was rotated an angle of 45 degrees compared with the former. After elevating another 4 fan-shaped flaps 8 fan-shaped flaps were interlocked each other. An additional alveolar bone graft from iliac crest was performed for alveolar cleft and scar revision was done for previous operative scar of upper lip.

*Result:* The wound healed without complications such as necrosis and disruption. And there was no external nasal deformity. Left nasal airway kept patent. She was satisfied with the shape and function of the nose.

*Conclusion:* Surgical correction of complete nasal obstruction with zigzag-shaped incision is minimally invasive procedure devoid of external nasal deformity or visible scar. So it can be a useful option for complete nasal obstruction.

**P-0511****EXPERIENCE OF MEDICAL AID PROJECT FOR CLEFT LIP AND PALATE PATIENTS IN NINH BINH PROVINCE, VIETNAM**

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**Purpose:** We have been carried out a medical aid project for CLP patients in Ninh Binh Province, Vietnam. In this paper, we report the aim, outline, and results of our project.

**Method:** Ninh Binh Province is located in the northern part of Vietnam and about 100km far from Ha Noi city. The Province has a lack of hospitals where surgical treatment for CLP patients can be conducted. The purpose of our project is technical and financial support, surgical treatment for untreated CLP patients and education for Vietnamese medical staff. To achieve these purpose, we carried out medical activities 12 times between 1998 and 2011.

**Results and discussion:** We registered 382 CLP patients, and examined 603 patients. According to the medical requirement, we performed 335 cleft surgeries safely and successfully with Vietnamese staff under general anaesthesia. From our assessments of the efficacy of technical transfer, we recognized their ability to perform primary cleft surgery under general anaesthesia safely and successfully. It needs further consideration about the control of maxillary growth and instruction of secondary surgery.

**Acknowledgement:** This project was performed under the support of Japan Postal Saving for International Voluntary Aid and Official Development Assistance, Ministry of Foreign Affairs.

#### P-0512

##### THREE GENERATIONS WITH ORAL CLEFTS

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**Introduction:** Oral clefts are one of the most common birth defects in humans. The birth prevalence in Kosovo is 0.8 per thousand and they also have one of the highest rates of familial recurrence of any class of birth defects.

**Material and methods:** The exact cause for cleft lip and/or palate is not known. It is postulated that environmental, genetic chromosomal factors may be responsible for the occurrence of this anomaly with all its variations, autosomal recessive, autosomal dominant and X-linked inheritance patterns have been described. If the cleft is part of an autosomal dominant syndrome, the recurrence rate can be as high as 50%.

We present a family with three generations with oral clefts.

Grandmother with CLP (bilateral) and Van der Woud syndrome,

Daughter, unilateral cleft lip and Van der Woud Syndrome and her son with bilateral CLP.

Son with Van der Woud Syndrome but his two children with cleft palate.

**Results:** All of them have undergone surgical treatment except grandmother where the palate was not done.

**Summary:** The majority of clefts appear to be due to combination of genetics and environmental factors. The risks of recurrence of a cleft condition are dependent upon many

factors, including the number of affected relatives, the race and sex of all affected persons, and the severity of the clefts.

#### P-0513

##### RADIOGRAPHIC ASSESSMENT OF PRIMARY AUTOGENOUS ALVEOLAR BONE GRAFTING IN PATIENTS WITH CLEFT LIP, ALVEOLUS AND PALATE

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**Background:** Orofacial clefts are one of the most common congenital anomalies with a prevalence for complete unilateral and bilateral cleft lip and palate of 1:1000 and 0.4:1000, respectively.

**Objective:** The purpose of this study was to compare the results in terms of initially cleft width, existence or absence of a lateral incisor using radiographic analysis.

**Methods and materials:** After primary osteoplasty with calvarian bone at an average age of 24 months (4 to 56 months) radiographic assessment was carried out in 31 patients with 40 alveolar clefts. The bone formation in the grafted area was assessed using dental radiographs taken 66 months on average (13-114 months) after primary bone grafting. According to the Abyholm classification patients were assigned to 4 groups (index I to IV) with index I and II being rated as success.

**Results:** We observed success (index I and II) in 76 % and poor results (index IV) in 14%. The causes for the poor results were an alveolar cleft width of 11 to 12mm in three cases, an extraction of a decayed deciduous tooth 17 month after bone grafting in one case and a traumatic transplant loss in another case. The non existence of a lateral incisor and a broad cleft are related to poor results.

**Conclusion:** Radiographic assessment seems a promising method in analyzing the success of primary autogenous bone grafting.

#### P-0514

##### BUSAN MODIFICATION FOR CLEFT PALATE REPAIR

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**Purpose:** The surgeon's goal in treating palatal cleft patient is to establish anatomic and physiologic environment conducive to the development of normal speech while avoiding disturbance to the facial growth. We developed a modified technique on the basis of Badach's two-flap palatoplasty for the purpose of minimizing the disturbance to the maxillary growth, with permitting radical dissection and exact repositioning of levator muscle. The purpose of

this study is to report the early results of our modified palatoplasty technique.

**Materials and Methods:** From 2002 to 2011, 106 patients have undergone palatoplasty with our modified method (93 patients with incomplete type and 13 patients with submucous type). Surgical technique is similar to two-flap palatoplasty basically, but we did not incise on anterior portion of hard palate distinctively and spared the intact nasal side mucosa. Using loupe magnification, radical dissection and repositioning of levator muscle were done. Early complications including postoperative bleeding, airway problems, wound dehiscence, palatal fistula and flap necrosis were evaluated retrospectively. Among them, speech assessment was done in 28 patients and cephalometric analysis were done in 26 patients who have undergone their palatoplasty before the age of 24 months and followed up after the age of 4 years.

**Results:** Palatal fistulas were found in 3 patients (2.8%) and repaired by surgical intervention. Except them, other patients experienced no complication such as postoperative bleeding, airway problems, wound dehiscence or flap necrosis. At the research of long-term results, no patients had velopharyngeal dysfunction requiring secondary corrective surgery. Mean values of SNA, SNB and ANB in cephalometric analysis of 26 patients were 81.16°, 78.47° and 2.87°, which suggested this method brought out superior results compared with other ones although we could not conduct statistical analysis.

**Conclusion:** Our new modification method showed low incidence of early postoperative complication. Even in speech evaluation, we had better results compared with former reports on occurrence of velopharyngeal dysfunction. Although we need an additional study on postoperative midface growth, we expect that our modified method based on Two-flap palatoplasty can be a treatment of choice for palatal clefts with incomplete and submucous type.

#### P-0515

### THE APPLICATION OF THE RIGID EXTERNAL DISTRACTOR (RED II) FOR PATIENTS WITH CICATRICAL DEFORMITY OF THE UPPER LIP, THE UPPER JAW AFTER THE SURGERY OF THE CLEFT LIP AND PALATE

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**Introduction.** The problem of rehabilitation of patients with cicatricial deformity of the upper lip and the upper jaw after the surgery of the cleft lip and palate is up to date. Such patients have underdevelopment and distal position of the upper jaw due to the presence of scarring.

**Material and methods.** We examine several hundred patients a year with a scar deformation of the upper lip, alveolar process of the upper jaw, hard and soft palate after the surgery of congenital cleft. The majority patients had underdevelopment with distal position of the upper jaw. Patients received combined orthodontic and surgical treatment. One stage of treatment after orthodontic training was the upper jaw osteotomy of the Le Fort I type and the forward advancement with production in orthognathic ratio. Retention mouthguards were made in the postopera-

tive period. Three patients had a backwards dislocation of the upper jaw as a result of significant scar changes. These patients received secondary surgery with the unit RED II with the distraction setting of the upper jaw in orthodontic ratio and a retention period of 4 months. The removable retention mouthguards were made in the postoperative period.

**Results.** As a result of treatment with the apparatus RED II, we have not observed a relapse within a year.

**Conclusion.** We recommend to use the extraoral distraction apparatus with orthognathic surgery for patients with cicatricial deformity of the upper lip and the upper jaw after the surgery of congenital cleft, for a significant displacement of the upper jaw forward and to prevent relapse.

#### P-0516

### LONG-TERM RESULTS OF MAXILLARY DISTRACTION OSTEOGENESIS IN CLEFT PATIENTS: 2-YEARS EXPERIENCES USING INTERNAL DEVICES

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The use of distraction osteogenesis (DO) is a useful alternative to orthognathic surgery for correction of complex maxillofacial deformities. Distraction osteogenesis has been used to treat extreme maxillary hypoplasia in cleft lip and palate (CLP) patients. Authors present their experience with internal distraction of the maxilla in cleft patients. The correction of maxillary hypoplasia when large movement is required and localized scarring from previous surgeries is present continues to be a problem for maxillofacial surgeons. The necessity to advance the maxilla more than 6 mm is better and it is safe to use gradual lengthening of the midface and results in greater stability compared with conventional orthognathic surgery. The authors present a group of cleft patients after advancement of the maxilla from 8 to 15 mm. The average amount of advancement was 10,5mm and stable results were achieved.

Maxillary distraction osteogenesis using internal device in CLP patients with severe maxillary hypoplasia became an alternative method with long-term stability.

#### P-0517

### EFFECT OF PALATAL LENGTHENING BY CLEFT PALATE REPAIR ON THE SPEECH OUTCOME

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**Background and purposes:** Our purpose was to analyse the degree of contribution to the speech outcome of palatal lengthening by examining the relationship between extent of palatal length change after cleft palate repair and postoperative speech outcome score.

**Methods:** Fifty-four patients with incomplete type cleft palate from January, 1997 to December, 2008 were selected those who could undergo postoperative speech scoring at 4 years of age by "Simple Method of Speech Evaluation in the Korean Patient with Cleft Palate". All the patients had an operation before 18 months by various methods

and other postoperative complications such as palatal fistula, flap necrosis and velopharyngeal dysfunction were investigated by retrospective medical record review. Authors measured palatal length in straight and curved length. ; straight - from the meeting point between the centre of the two medial incisor teeth to the uvular tip, curved – against palatal surface ; before and immediately after the cleft palate repair. Statistical analysis was done between each straight, curved palatal lengthening width (mm, %) and postoperative speech score by Spearman's correlation coefficient method.

**Results:** In statistical analysis between each straight, curved palatal lengthening width (mm, %) and postoperative speech score, all P values were more than 0.05 and we could not find any correlation. There were no specific immediate postoperative complications including severe bleeding, infection, fistula formation and flap necrosis.

**Conclusion:** In this study, we have identified that no correlation existed between the extent of postoperative palatal lengthening and speech outcome. Although further research is needed, we carefully conclude that accurate muscle repair is more important in cleft palate repair to achieve better pronunciation rather than palatal lengthening.

#### **P-0518**

### **PEEK ISOELASTIC MAXILLO-FACIAL IMPLANTS FOR PROSTHETIC REHABILITATION OF AN ADULT PALATAL CLEFT – BEING HANDICAP WITHOUT OTHER SOLUTION SINCE LOSS OF NATURAL TEETH**

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A patient suffering all her life from a complete large palatal cleft, and who was treated with a removable obturator for over 50 years, lost her last natural teeth and prosthetic abutments.

The alveolar ridge was completely resorbed, leaving a knife edge crest of bone which did not offer enough retention for an obturator-prosthesis.

Conventional implant techniques in patients with knife edge ridges require multiple procedures, involving bone grafts and soft tissue flaps. These carry risks of complications that not seen in the basal implant technologies such as those using isoelastic materials such as the PEEK-PERSO-implants.

We proceeded in a single operating session to incorporate 7 basal PERSO-B implants using impressions for a temporary prosthesis which an obturator was fixed on.

We present the successful result after 1 year and show step by step the procedure which may be useful in similar cases.

#### **P-0519**

### **IS OROFACIAL CLEFT FORMATION INFLUENCED BY SMOKING AND ALCOHOL?**

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*<sup>1</sup>University of Pretoria*

**Objective:** The purpose of this study was to evaluate whether alcohol usage or smoking by the mother, during the first trimester, affect the degree of cleft expression.

**Design:** A retrospective study.

**Setting:** Tertiary Clinical care at the University of Pretoria, South Africa.

**Patients, Participants:**

Records of 3336 patients attending the cleft lip and palate clinic, between August 1983 and March 2010, were reviewed. The study group included patients with syndromic and non-syndromic CL, CLA, CLAP, hP, hPsP,sP and COMBI clefts, with or without oblique or transverse facial (or Tessier) clefts.

**Main outcome Measure(s):**

Hypothesis prior to evaluation of data, theorized that alcohol and smoking by the expecting mother does exacerbate orofacial cleft expression.

**Results:** 90 Patients were affected by maternal alcohol usage or smoking. Comparing the percentages of cleft distribution of the whole group (3336) with patients affected by maternal alcohol usage, the following was noted: CL 5.7%:3.6%; CLA 12.8%:7.1%; CLAP 40.2%:46.4%; hP 0.7%:0%; hPsP 16.5%:32.1%; sP 18.3%:10.7%; Oblique 1.6%:0.0% and combinations of different orofacial clefts (COMBI), 4.3%:0%. Evaluating the effect of smoking, the subsequent statistics were achieved: CL 5.7%:10.9%; CLA 12.8%:4.7%; CLAP 40.2%:39.1%; hP 0.7%:0%; hPsP 16.5%:12.5%; sP 18.3%:20.3%; Oblique 1.6%:1.6% and combinations of different orofacial clefts (COMBI), 4.3%:10.9%.

**Conclusion:** Alcohol usage by the expecting mother in the first trimester of pregnancy contributed to a higher prevalence of the hPsP clefts (32.1%) in infants. In the group of infants affected by mothers who smoked, a high percentage of COMBI clefts (10.9%) and CL (10.9%) were noted.

**Key words:** orofacial cleft, smoking, alcohol.



## 6. CRANIO-MAXILLO-FACIAL TRAUMATOLOGY

### P-0601

#### DENTOALVEOLAR TRAUMA - IN DEPARTMENT ANALYSIS TO IMPROVE TREATMENT STRATEGY

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**Objectives:** Dentoalveolar trauma is the second most common cause of dental inflammatory processes in patients who attend our oral and maxillofacial emergency service. The aim of the study was retrospective analysis of dentoalveolar trauma cases treated in our department during last 5 years, in order to identify possible areas for improvement.

**Material and Method:** Between May 2007 and April 2012, 336 patients with dentoalveolar trauma were treated in emergency service in our department by 13 different doctors. The treatment strategy, follow-up and treatment results were closely analyzed.

**Results:** The treatment modality differed based on the experience of doctor providing the treatment, more frequently in complex cases. More than ¾ of patients primarily treated in our clinic continued their treatment and follow up out of our department without any feedback on the primary treatment. As a consequence we completed uniform dentoalveolar trauma guidelines for our department based on AO Surgery References and International Association of Dental Traumatology guidelines. We created a dentoalveolar trauma questionnaire to be filled after primary treatment to provide systemized information, schedule follow-up and guarantee the future cooperation between our department and personal dentist continuing the treatment.

**Summary:** Dentoalveolar trauma is a basic and common duty in oral and maxillofacial departments, but the treatment strategies differ between departments and vary even in a single department. We hope the proposed dentoalveolar trauma guidelines and questionnaire will unify the treatment strategies and simplify the follow up in our department resulting in best possible treatment outcomes. Both proposed dentoalveolar trauma guidelines and questionnaire will be discussed on the ground of Slovak Association of Oral and Maxillofacial Surgery in order to improve the cooperation between departments and dentists on national base.

### P-0602

#### IS THE INITIAL MANAGEMENT OF DOG BITES TO THE HEAD AND NECK REGION BEING CARRIED OUT ADEQUATELY?

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<sup>1</sup>Northampton General Hospital

Dog bites have increased by 40% in the last 4 years in the

NHS. They have a high chance of infection due to the large quantity of micro-organisms transferred from the oral cavity of the canine. Any delay in treatment can make the victim be at risk of rabies, tetanus and other infections, and as well as a decreased cosmetic result.

The BNF (2009) states that the initial management of a dog bite is:-

- 1) Debridement thoroughly of the wound
- 2) Tetanus vaccine if not up to date already
- 3) Co-Amoxiclav as the antibiotic of choice and if allergic to penicillin then Doxycycline and metronidazole.

The aim is to audit the initial management of dog bites to the head and neck region in Northampton General Hospital.

A retrospective audit is to be conducted establishing if the current guidelines for the management of dog bite injuries to the head and neck region were being followed. All dog bites to the head and neck region in the year 2011 are to be recorded and the results recorded using a proforma.

The initial management whether debridement, tetanus check and correct antibiotic is to be checked. Other factors investigated are the age of the victim, breed of dog, relationship to the dog and the time delay between incident and treatment.

The results will hopefully provide insight whether the initial management is carried out adequately and whether there is any correlation between dog bites and certain age groups or breeds of dog.

### P-0603

#### EFFECTIVENESS OF REMOVAL OF WISDOM TEETH TO REDUCE INFECTION RATE IN MANDIBULAR ANGLE FRACTURES

Chai Sanapala<sup>1,\*</sup>

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The decision to leave or remove wisdom teeth when repairing angle fractures of the mandible has mainly been due to surgeon's preference. The main reasons for removing wisdom teeth are to remove any sources of infection and factors that could cause delays in healing. The reasons against removing wisdom teeth are to aid in reducing the fracture and also strengthening the fracture of the mandible initially.

A clinical audit was carried out to determine the effectiveness of removing wisdom teeth to reduce infection rates in mandibular angle fractures.

**Method:** Between 1/01/09 and 1/01/11, all patients with angle fractures of the mandible in-line with a wisdom tooth had their details recorded. Patients with post-operative infection between the time period had other factors investigated that could be a risk to infection.

**Gold Standard:** Overall 11% derived from the literature

**Results:** Overall 69 patients were recorded with a mean age of 26, 90% being men. Infection rate post-operatively was 7%. 94% had no complicating medical conditions, 80% were smokers and the waiting times for the operation was on average 11 hours. 75% of the patients with infection had their wisdom tooth removed.

**Consideration:** Infection on admission, complicating medical conditions, poor oral hygiene, smoking, waiting time till operation and type and duration of post-operative antibiotics.

**Conclusion:** The infection rate was comparable to published rates and the results show a high chance of post-

operative infection when the patient is a smoker and have had their wisdom tooth removed. Although the results show a high correlation, a larger sample and further risk factors need to be assessed.

#### P-0604

### COMPARATIVE BIOMECHANICAL EVALUATION OF MONO-CORTICAL OSTEOSYNTHESIS SYSTEMS FOR CONDYLAR FRACTURES USING PHOTOELASTIC STRESS ANALYSIS

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Fractures of the condyle account for 20–30% of all mandibular fractures, and are therefore one of the most common facial injuries. Precise evaluation of the mechanical stresses that develop in a fractured mandible is essential, particularly for the testing of systems currently used for stabilisation of the condylar fragment. Photoelastic stress analysis can be used to visualise alterations in the strain that is induced in the mandible by a fracture, and in the osteosynthesis materials used to stabilise it. This method, used on currently used osteosynthesis materials, showed that stabilisation of a subcondylar fracture with a single miniplate does not provide enough stability, whereas the use of two miniplates – properly positioned – offers sufficient stability in all loading conditions. A microplate may be used as a tension-resisting plate with equally good results.

#### P-0605

### PRIMARY STABILITY OF SELF-DRILLING OSTEOSYNTHESIS MINI-SCREWS – AN EX VIVO STUDY

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#### Introduction –

For osteosynthesis in the facial bones, self-tapping and self-drilling mini-screws are commonly used. Mechanical data suggests that self-drilling screws might have a higher primary stability, which is essential for success. Data comparing the primary stability of the two types of screws are not available in the literature. The purpose of our study was to compare the primary stability of self-tapping versus self-drilling mono-cortical mini-screws in different bone qualities in an ex vivo model.

#### Methods –

Self-tapping / pre-drilling and self-tapping / self-drilling mono-cortical mini-screws (Medartis, Germany; 1.5 x 5 mm) were placed in fresh porcine bone. Three different bone densities, quantified by ultrasound transmission velocity, were included. Placement sites were the mandible (very dense; VD), pelvic bone (medium dense; MD)

and scapula (less dense; LD). Six screws of each type placed in close localisations. Torque was recorded by a customized handheld torque screwdriver (Mecmesin, Germany) with a digital output device. Measurements were obtained for the screwing and unscrewing process. Data were analysed descriptively.

#### Results –

In descriptive analyses, torque measurements were higher for the self-tapping / self-drilling screw for insertion as well as removing processes (VD mean insertion torque: 19.5 Ncm (±1), MD: 20 Ncm (±5.2), LD: 18.3 Ncm (±2.7); VD mean removing torque: 20.1 Ncm (±1.7), MD: 21.3 Ncm (±9.8), LD: 19.3 Ncm (±2)) compared to the self-tapping / pre-drilling type (VD mean insertion torque: 14.5 Ncm (±1.9), MD: 15.5 Ncm (±6.6), LD: 18 Ncm (±4.3); VD mean removing torque: 15.1 Ncm (±1.7), MD: 17.5 Ncm (±12.3), LD: 17.1 Ncm (±4.3)).

#### Conclusion –

The higher torque of the self-tapping / self-drilling screws reflects the better primary stability independent to the respective bone density. Optimal mechanical stability from a clinical point of view still has to be defined.

#### P-0606

### FACIAL TRAUMA SURGERY STATISTICS IN LISBON CENTRAL HOSPITAL

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**Background:** Facial trauma is the basis of the majority of surgeries performed at our Department of Maxillofacial Surgery, as a consequence of road accidents, sports accidents, falls, assaults and suicide attempts.

Our department is one of the few facial trauma reference centres in Portugal and is the only autonomous maxillofacial surgery department in Lisbon; therefore our geographical referral area is very extensive, leading to high numbers of patients.

The department has 16 nursing beds, 11 doctors and 9 residents. There are always two maxillofacial surgeons alternately committed to integrate, on the basis of their physical presence, the emergency team of our hospital, which is open 24 hours a day, 7 days a week.

After being treated at the emergency department, the patients who receive indication for surgery are normally operated on within 24 hours directly in the emergency operating room.

**Purpose:** To quantify and discriminate all trauma surgeries in the last 57 months in the Central Lisbon Hospital Centre.

**Method:** This is a retrospective review of 4389 patients surgical treated in the maxillofacial department at Central Lisbon Hospital Centre from 1.1.2007 to 23.9.2011. The data of 2086 patients with facial trauma were selected as object for analysis. Patients were classified according to characteristics of facial trauma.

**Results:** 2086 patients with facial trauma underwent a surgery in our department in the last 57 months, corresponding to 47,5% of the total surgeries performed, an average of 36,6 trauma surgeries per month.

The most frequently encountered trauma were nasal fractures (30%), followed by mandible fractures (28,8%),

zygomatic fractures (18,5%), isolated soft tissue wounds (5,8%), orbit fractures (5,2%), maxilla fractures (1,1%), gunshot trauma (0,4%) and frontal sinus fractures (0,3%). Among all trauma surgeries, 9,8% correspond to late sequelae repair.

**Conclusion:** Facial trauma is the most common surgery in our maxillofacial department, an average of 37 facial trauma patients operated every month, where almost 60% of them were associated with nasal and mandibular fractures.

Performing surgeries in emergency operating room leads to a more effective treatment, fewer surgical complications, less hospitalization days and a significant reduction of the costs.

#### P-0607

### UNILATERAL CORONOID HYPERPLASIA FOLLOWING ZYGOMATIC BONE FRACTURE: A CASE REPORT AND LITERATURE REVIEW

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Coronoid hyperplasia is defined as an abnormal bony elongation of histologically normal coronoid process. This may occur as unilateral or bilateral, and the main clinical features of this condition is progressive limitation of mouth opening. Facial asymmetry can be present with prominent zygoma in unilateral coronoid hyperplasia. Coronoid hyperplasia can be misdiagnosed as temporomandibular joint disorder, therefore, computed tomography is essential for exact diagnosis and proper treatment.

A 48-year-old man visited to department of oral and maxillofacial surgery in Ajou University Hospital for mouth opening limitation. MIO (maximum interincisal opening) was only 10mm. He had trauma history of zygoma 30 years before. Intraoral coronoidectomy and active physical therapy were done to solve the mouth opening restriction. The outcome is successful, MIO was maintained about 30 mm 1 year after surgery.

Therefore, we report a case of unilateral coronoid hyperplasia occurred after zygomatic bone fracture, and successful treatment outcome.

#### P-0608

### ANALYSIS OF MANDIBULAR FRACTURES AND INTERMAXILLARY FIXATION SCREWS

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**Introduction:** Epidemiological factors of mandibular fractures have been well described nationally, however data for our local area is absent. Although methods of fixation for these injuries has been extensively described, the recent introduction of modern methods of intermaxillary fixation (IMF) has altered our local clinical practice. IMF screws have been established as a method of establishing occlusal stability, however to date, local data on the success and complication rates of these methods remain unreported.

We aimed to review patient demographics and aetiological

factors for mandibular trauma locally. With the goal of improving the standard of clinical care we also audited the methods of IMF utilised.

**Methods & Subjects:** A retrospective study was undertaken of all patients undergoing surgical management of mandibular fractures at University Hospitals Coventry and Warwickshire Hospitals NHS Trust between April 2011 and April 2012.

Data collected included patient demographics, mechanism of injury and methods of IMF utilised. The incidence of both general complications relating to fracture healing and occlusal stability were recorded, along with complications directly related to IMF screws.

**Results:** One hundred and thirty-four patients were included in the study, of which 121 (90.3%) were male. The average age of the cohort was 30 years (median 26). The commonest cause of injury was interpersonal violence, with a small number of patients suffering their injuries through sport and road-traffic collisions.

IMF screws were used in the treatment of 74 patients, along with osteosynthesis miniplates. Four patients were treated with IMF screws alone. No other methods of IMF were used during the study.

No patients returned to theatre for re-operation due to failure of IMF. Two patients (1.5%) had to undergo a second surgical procedure, however these cases occurred due to inadequate reduction and fixation.

**Clinical Relevance:** Our study confirms mandibular fractures remain an injury sustained by young males involved in interpersonal violence. This analysis demonstrated IMF screws to be a successful tool in the maintenance of occlusal stability during the treatment of mandibular fractures, with few complications.

#### P-0609

### SECONDARY CORRECTION OF A GUN-SHOT INJURY INDUCED COMPLEX FACIAL DEFORMITY: CASE REPORT OF A CHALLENGING CASE

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**Introduction:**

Gunshot injuries of facial region are rare and are often complicated by the site & volume of tissue destruction. In the UK, after surviving a gunshot injury, most patients undergo definitive reconstruction within a few months. We present the case of a man who sustained a gunshot injury of face in Afghanistan and reported to our unit 10 years later for facial reconstruction. The presentation will describe the complexity of the post-traumatic deformity; details of the reconstructive procedures done with one year post-operative follow up.

**Material & methods:**

**Case report:** A 32-year-old gentleman was referred to the department of OMFS for an opinion on his post-traumatic facial deformity. His presenting complaint included depression, trismus, facial deformity and neurosensory deficits. He reported to have sustained a high velocity gunshot

injury 10 years ago whilst he was in Afghanistan and had undergone primary surgery at that time. Due to the patient's unrealistically high expectations, this challenging case was managed with careful pre-operative counselling, stereolithography model planning and finally operated on to reconstruct hemi-mandibular continuity defect with a free iliac crest bone grafting and a submental island flap to augment & reconstruct the soft tissue deficit.

*Conclusion:*

The authors wish to highlight the challenges experienced in managing a complex facial deformity case presenting 10 years after a gunshot injury. The reconstructive surgery performed has been successful in rehabilitating him with respect to appearance, function and more importantly his psychological status.

**P-0610**

**CERVICAL AND MAXILLOFACIAL TRAUMA IN SEVERE POLYTRAUMATIZED PATIENTS.**

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*Introduction:* Maxillofacial and neck injuries are, in the context of polytrauma, usually a secondary problem.

*ObjectiveS:* To describe the incidence, demographics, aetiology, diagnosis and treatment of polytraumatized patients suffering maxillofacial and cervical trauma, included in our hospital trauma registry.

*Materials And Methods:* We performed a descriptive, retrospective, observational study of patients included in the Gregorio Marañón Hospital (Madrid) registry of severe trauma who presented maxillofacial and cervical injury during the period 2000 to 2011.

The initial care in our centre is performed by the emergency surgical team and anaesthesia, following protocols ATLS (Advanced Trauma Life Support) in recent years. The classification of lesions was performed according to the anatomical regions into 3 zones: mid-facial, mandibular, and cervical. We analyzed the different aetiologies, diagnostic tests and management guidelines.

*Results:* The study sample was 314 patients of which 229 were males (72.9%) and 85 women (27.1%) with mean age  $37 \pm 15$  years. Of the sample, 78% (247 patients) had no relevant medical history. The average time of transfer was 45 minutes. 156 (49%) patients had lesions affected the maxillofacial and neck area. In addition to those injuries most patients had associated injuries. The diagnostic method used in the 156 selected patients, was the CT (computed tomography) in 100 cases and radiographic bone series in 56 cases. Concerning to the treatment applied in 156 patients, 50 (32%) required surgical treatment and 106 cases (68%) non-surgical. Of the 50 patients who required surgical treatment, 24 cases needed urgent control of the airway or bleeding and 26 required delayed reconstructive surgery. 10 patients (6.4%) out of 156 showed injuries limited to the head and neck area.

*Discussion:* head and neck trauma is frequent in polytraumatized patients, but rarely demands urgent surgical treatment.

**P-0611**

**ANATOMICAL MODELS AND RESORBABLE PLATES IN TREATING PAEDIATRIC ORBITO-ZIGOMATIC FRACTURES.**

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The treatment of maxillofacial trauma in paediatric patients must take into account that the children's tissues are still growing and evolving: in view of this it has been often proposed the use of resorbable plates, that don't interfere with bone maturation and don't need to be removed. Nevertheless the use of biodegradable syntheses isn't yet established everywhere because of the difficulty of the modelling of them: the Authors present a case report about the utilization of these kind of plates in association with stereolithographic model in a 7 years patient with a orbito-zygomatic fracture.

The technique of the double stereolithographic model (the first one obtained from the TC scan of the fractured segments, the second one obtained from the TC scan of the first one model after osteotomies and reduction of the fractures) has allowed the surgeon to model the resorbable plates in a single attempt on the anatomical replication of the children's skull: in this way it has been possible for the surgeon to achieve an optimal conformation of the plates in a short time. In the end, the combined use of resorbable plates with stereolithographic model has permitted the surgeon to take advantage of the use of these plates, overcoming in the same time the problems linked to their modelling and reducing the duration of the surgery.

**P-0612**

**A REVIEW OF THE USE OF INTRA OPERATIVE AND POST OPERATIVE INTER MAXILLARY FIXATION (IMF) IN FRACTURED MANDIBLE MANAGEMENT.**

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<sup>1</sup>Queen Elizabeth Hospital, University Hospitals Birmingham NHS Trust

*Introduction*

The use of IMF (Inter Maxillary Fixation) intra operative-ly and post operatively in conjunction with open reduction internal fixation is a common practise in treatment of fracture mandibles.

*Aims and objectives*

1. Analyse the use of intra and post operative IMF devices in treatment of fracture mandibles in our unit.
2. Type of IMF device used
3. The time period IMF was used
4. Dental complications associated with use IMF devices

*Materials and methods:* Retrospective analysis of treated fractured mandibles in our unit from June to December 2010. Pan facial fractures and those managed conservatively were excluded. Operative notes, clinical records and radiographs were analysed.

*Results:* 128 patients with 213 fracture sites in the mandible were included. 60.9% had IMF used intra or post operatively which consisted of either IMF screws, Leonard

buttons, stock arch bars and custom arch bars. 33 patients required post operative IMF usage to guide occlusion:- 42% patients had stock arch bars, 27% had IMF screws, 27% had Leonard buttons, IMF fixation remained post operatively for 4-7 weeks and was used for patients with multiple fractures only. Complications of IMF fixation included fractured screws and teeth associated with self tapping IMF screws.

*Conclusion:* Multiple fractures generally require IMF fixation to help guide occlusion either intra or post operatively. Stock arch bars were used most frequently as they can be used across multiple fracture patterns without issues. Although IMF screws are easier to use they have a risk of causing dental complications.

#### P-0613

### INCIDENCE, AETIOLOGY AND PATTERN OF MANDIBULAR FRACTURES IN THE WEST MIDLANDS REGION

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*Introduction :* Interpersonal violence and road traffic accidents are the most common cause of mandible fractures quoted in the literature. The purpose of this study was to describe epidemiological trends of mandibular fracture experience in the Maxillofacial surgery unit in the Queen Elizabeth Hospital Birmingham, the largest maxillofacial surgery unit in the region.

*Aims:* To analyze the epidemiological data for mandibular fractures correlating gender, age, etiologic factors, anatomic location, and types of fracture's in our catchment area.

*Methods:* A database of patients aged over 16 years with mandible fractures between March 2009 and December 2011 was retrospectively reviewed. Patients' data including gender, age, mechanism of trauma, fracture site were analysed and compared with previously published data.

*Results:* There were a total of 932 patients with 1376 mandibular fractures. The two most common causes of injury were interpersonal violence (73%) and falls (9.8%). A total of 43.7% of the patients stated they were under the influence of alcohol or drugs at the time of injury. Fractures were predominantly situated in the mandibular angle (32.9%) condyle/subcondyle (26.5%) and in the symphysis/parasymphysis region (27.8%), males were most frequently affected with 90.1% of fractures occurring in men with a ratio of 10:1.

*Conclusion:* Our results are in contrast with current published data, the most common fracture site being the angle of the mandible followed by the symphysis/parasymphysis region. Possibly due to the high incidence of interpersonal violence which often involved the use of alcohol/drugs. We had a particularly high incidence of fractures occurring in males.

#### P-0614

### LATE SURGICAL TREATMENT OF MANDIBULAR CONDYLE FRACTURES

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Fractures of the mandibular condylar process are very common among fractures of the lower jaw. The condylar process fracture leads to a break in the continuity of the mandible therefore malocclusion, internal derangements of the temporomandibular joint (TMJ), restricted mandibular movements, ankylosis, (when occurring in children) disturbed mandibular growth, which inhibits function and compromises aesthetics. This has forced surgeons to attempt to treat such cases using a variety of treatment protocols ranging from non-invasive treatment, a relatively conservative approach with maxillomandibular fixation in early phases, to open surgical treatment which can be performed immediately or delayed. When the fracture causes malocclusions that cannot be fixed with orthodontics and prosthodontics or cannot be tolerated by the patient because of the severe TMJ pain, late surgical treatment becomes mandatory.

In this report, two cases of late surgical treatment of condylar fracture with different surgical techniques are presented.

#### P-0615

### A CROSS-BORDER TRAUMA AUDIT

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The maxillofacial department in Co Londonderry is unique in that it serves a population of 650,000 under the care of the Health and Social Care Trust in Northern Ireland and the Health Service Executive in the Republic of Ireland.

Previous studies indicate that the pattern, presentation and volume of facial injuries in the West of Ireland are different to that of the UK. We undertook a trauma audit to assess if this was true.

Retrospective data was collated over two six month periods in 2007 and 2010. Information was tabulated according to gender, age, source of referral, type and mode of injury. All had undergone GA for management of facial trauma.

The results were compared to the 1998 BAOMS UK National Facial Trauma Survey and the 2009 West of Ireland Facial Study.

While the volume of cases did not differ significantly between cycles (2007: 86, 2010: 88) the percentage representation from the North/South varied considerably. (53/43: 2007, 71/26: 2010). Interestingly this coincides with a period of recession in Ireland that saw the highest numbers of unemployed since records began in 1967.

Assault was consistently the most common cause of trauma followed by sporting injuries. As a result the male to

female ratio was higher than those of previous studies.(7:1) In areas where Gaelic games predominate there was a greater number of sporting associated trauma however between 2008 and 2010 there was a reduction in such referrals perhaps a reflection of recent immigration of young people from the West of Ireland.

**P-0616****THE ULSTER HOOK - A USEFUL IMF DEVICE**

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<sup>1</sup>*The Ulster Hospital, Dundonald, Northern Ireland*

Although the introduction of miniplating techniques in the treatment of Maxillofacial injuries has significantly reduced the need for Intermaxillary Fixation (IMF) it is still frequently necessary for short or medium term use.

In 1991 a prototype IMF hook designed for the provision of IMF was presented as a poster at the BAOMS meeting.

This device has been further developed at the Ulster Hospital and the final version has been in use in all the Northern Ireland Maxillofacial units since 1993.

Over 1,000 patients have been treated using the device. No complications related to its use have been recorded.

This paper describes the design and use of the device and discusses its advantages and drawbacks when compared to other techniques. Details of glove puncture rates and needlestick injuries will be presented.

The device has proved to be extremely useful when compared to other techniques and devices, especially in the provision of elastic traction when managing fractures of the mandibular condyle, both in the initial phase and after ORIF.

The device is available from Anaplastology Ireland Ltd, 9 Church Lodge, Moneyreagh, Co. Down, BT236ES N. Ireland. The Author has no financial or intellectual relationship with this company.

**P-0617****A SINGLE LAG SCREW CAN REPLACE A SECOND MINIPLATE IN ANTERIOR MANDIBULAR FRACTURES**

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<sup>1</sup>*Torrecardenas Hospital*

*Purpose:* To retrospectively review the outcomes of 105 patients in whom internal fixation of fractures of the anterior mandible was performed using 1 lag screw combined with 1 miniplate.

*Patients and Methods:*

The sample comprised 105 patients aged 5-72 years who underwent open reduction and internal fixation for fractures. All patients had a clinically mobile fracture of the anterior mandible. Surgery was performed before 24 hours in most cases (80%). Open reduction and internal fixation were performed for simple and displaced fractures of the

mandibular symphysis and parasymphysis. The procedure involved the combination of 1 cortical lag screw (length 12-14 mm) and a 2.0-mm 4-hole nonlocking miniplate in the fracture line. Intermaxillary fixation was used in fractures associated with condylar, angle, or complex fractures. Clinical and radiologic evaluations were performed 24 hours, 7 days, and 6 months after surgery. Intraoperative and long-term postoperative outcomes—clinical union, infection, duration of surgery, occlusion, and intraoperative surgical misadventure—were recorded.

*Results:* Radiologic follow-up revealed correct reduction and fixation in all 105 cases. One patient had infection of the bone plate—which was removed—and was treated with intermaxillary fixation and soft diet for 6 weeks with no complications. The mean time to union was 4 weeks; the fracture line was not visible after 6-8 weeks. Pretraumatic occlusion was re-established in all cases.

*Conclusions:* Fixation of anterior mandibular fractures using a cortical lag screw combined with a bone plate can achieve good stability, appropriate compression, and a feasible anti-rotation system, without the need for supplementary intermaxillary fixation. The use of a single lag screw and a bone plate offers several advantages compared with the traditional use of 2 bone plates. The technique is simple and easily performed, and its potential advantages include shorter surgery time, decreased cost, and improvement in functional rehabilitation, as well as reduced swelling, scarring, and mental nerve and lower-lip muscle dysfunction.

**P-0618****MANAGEMENT OF COMPLEX MAXILLOFACIAL TRAUMA : THE OMFS - RESTORATIVE INTERFACE**

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<sup>1</sup>*Barts and The London NHS Trust*

*Introduction:* Damage to the dentition and supporting tissues is a common sequelae of maxillofacial trauma and is well documented in the literature. The multidisciplinary management of complex facial injuries with liaison between restorative dentistry teams and oral and maxillofacial surgeons provide the patient with holistic rehabilitation and is limited by resource availability.

*Case report:* We present the case of a 24 year old male who was referred to OMFS by A&E following a fall of 20 feet from a stairwell. He presented with acute head injury, Lefort 1 pattern fractures and significantly damaged anterior and posterior teeth. Radiological assessment confirmed these clinical findings and indicated that the right upper molar teeth underwent shearing of the buccal roots and crown separate to the palatal root, injuries inconsistent with the vector of force sustained in the fall.

Following lengthy discussions and liaison with our Restorative dental colleagues we elected to use high tension mid palatal wiring to realign the buccal and palatal elements of the maxillary molar teeth at the same time as the Lefort 1 fracture repair. He then underwent root canal therapy and restorative rehabilitation in the post operative phase.

*Results:* The facial fractures healed uneventfully. The

patient retained the badly damaged teeth and the oral rehabilitation phase successfully ensured his occlusion and function was returned to the pre-morbid state.

*Clinical relevance:* A multidisciplinary approach in these cases involving both OMFS and dental specialties ensures optimal patient management and outcomes. We believe this model has an important role, particularly in cases where exodontia would be the only other and not necessarily preferred option.

#### P-0619

### CLICAL AND SURGICAL STUDY OF FRONTAL BONE FRACTURE- OWN EXPERIENCE

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The frontal sinus fracture is a rather rare complication of facial trauma. It is seen in 8% of all fractures of the maxillofacial region. It can affect the anterior and/or posterior wall, with or without involving the nasofrontal duct. It has a large potential for complications and its management remains a controversy.

The retrospective study of 10 patients with frontal sinus fractures is presented in terms of different epidemiological, clinical and surgical management.

Bicoronal or suprapalpebral approaches were performed with satisfactory aesthetic and functional results. No complications immediately after surgery and after follow-up were observed in all presented cases.

#### P-0620

### MANDIBLE COMMINUTED FRACTURE CAUSED BY FIREARM – EARLY APPROACH AND RECONSTRUCTION

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Treatment of maxillofacial firearm injuries is still controversial with regard to timing of management.

This case report is about a self induced fire arm facial injury, resulting in a comminuted mandible fracture and comminuted alveolar process fracture of the upper right maxillary bone.

Due to our field experience and to revision of specialized literature we can assume that definitive treatment of hard and soft tissue, when rendered in another subsequent operation leads to more difficult bone reduction because of scarring, and displacement of remaining segments, furthermore no significant differences are usually noted in terms of infection or other major complications regarding a early approach.

Thus, many firearm facial injuries, in selected patients, may be treated definitively and acutely with procedures designed to repair both bone and soft tissue injuries simultaneously aiming to restore bony continuity, aesthetics and function using the tissues at hand (especially in the mandible). Early treatment is advocated because the course of healing is not disrupted with another subsequent operation and because it may decrease hospital stay without increasing patient morbidity.

After stabilizing the patient in the ER an early approach using AOCMF load bearing principles with a 2.4 universal

reconstruction titanium plate and additional 2.0 plates were the choice for the mandible, 2.0 osteo synthesis plates were also used in the maxillary bone.

Due to the stability achieved with this internal fixation surgical technique. The patient began physical therapy only a week after the surgery, resulting in an earlier recovery of mastication and speech and satisfactory aesthetic outcome with lower costs, lower time of admission in a Maxillofacial Unit leading to a faster admission in a specialized Psychiatric Centre.

#### P-0621

### CLINICAL AETHIOPATHOLOGIC ANALYSIS OF SURGICALLY TREATED PATIENTS WITH FRACTURES OF UPPER PART OF THE FACE (FUP)

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*Introduction:* The changing nature of injuries, as well as the bones affected, and associated complications prompts for the clinical evaluation of patients treated in maxillofacial surgery clinics. Cyclic tests evaluating the effects of trauma, both in terms of the epidemiology of fractures and its diagnostics, induce searching for new effective treatments.

*Aim of the study:* The aim of the study is to present the effectiveness of the treatment methods of facial skull fractures, with the use of modern diagnostic methods.

*Material and methods:* The research method was the analysis of medical records of 1402 patients treated for Upper Face Fractures in the Department of Cranio-Maxillo-Facial Surgery of Medical University of Warsaw. Bone damages were evaluated intraoperatively and analyzed radiologically with assistance of computed tomography.

*Results:* Clinical studies have shown that in the lateral segment of Face's Upper Part (FUP) the Zygomatico Orbital Fractures (ZOF) were most frequently diagnosed, followed by Zygomatico Maxillo Orbital Fractures (ZMOF). In youth and children the most frequent fractures were Isolated Fractures of the Orbital Floor (IFO). Among patients with injuries in Central Part of the Face the most frequently treated were those diagnosed with Upper Face Dislocations (UFD), and the least with Orbital Nasal Dislocations (OND). The main cause of Upper Face Fractures was beating (40.5%). Subsequently, traffic accidents (32.2%), industrial accidents (10.3%) and during sport (8.2%). Applied treatment methods that were individualized and depended on diagnosis were satisfactory in 93% of cases.

*Conclusions:* Modern imaging methods based on computed tomography with 3D reconstruction are most helpful in the evaluation of bone injuries. Application of specific and appropriate surgical procedures depends on accurate classification of patients into one of five groups of fracture type (author's classification scheme) based on individual clinical and aetiopathological assessment. The principles of surgical treatment are full reconstruction of the fractured elements of the face and bite with simultaneous osteosynthesis of bones during single procedure.

**P-0622****ASSESSMENT OF AUTOGENOUS ABDOMINAL FAT AND HYDROXYAPATITE PASTE IN FRONTAL SINUS OBLITERATION AFTER SEVERE TRAUMATIC INJURIES: A PRELIMINARY REPORT**Reda F. Elgazzar<sup>1,\*</sup><sup>1</sup>University of Tanta, Egypt & University of Manitoba, Canada

**Objectives:** Frontal sinus fractures (FSF) are relatively uncommon maxillofacial injuries, making up only 5 to 15 percent of all facial fractures. Associated intracranial, ophthalmologic, and other maxillofacial injuries are very common. Frontal sinus obliteration (FSO) is a valuable operation for specific indications, particularly when the nasofrontal duct (NFD) patency is compromised. This is achieved in the majority of instances with preservation of the posterior wall. The aim of this study was to review our FSF patients treated by sinus obliteration and to evaluate the autogenous abdominal fat and hydroxyapatite paste as obliteration materials.

**Materials and Methods:** A total of 21 cases of FSF necessitated surgical intervention, other than cranialization. 10 (47.6%) patients were treated by open reduction and internal fixation only and therefore, excluded from this study. The NFD was found injured in the remaining 11 (52.4%) patients who were consequently treated by FSO. Six (55%) cases were obliterated by using free abdominal fat graft (G1) and 5 (45%) with hydroxyapatite (G2). Information about patients' demographics, rationale for obliteration, follow up, treatment outcomes and complications were reviewed and recorded for all patients. Postoperative CT scans were reviewed where available

**Results & Conclusion:** Eleven patients, 10 male and 1 female were treated by sinus obliteration. 7 (63.6%) patients had other facial injuries and 4 (36.3%) patients had other body injuries. The average follow up period was 18 months (range: 6 to 28). Four (36.3%) patients had chronic neuralgic pain as a result of injury and/ or surgery. None of the 2 groups had serious complications such as infection, meningitis or cystic formation. Both autogenous fat and hydroxyapatite materials showed comparable results in obliteration of FS after facial trauma, however, hydroxyapatite has the advantage of being limitless in terms of availability and has no donor site related morbidities.

**P-0623****TOOTH IN THE LINE OF MANDIBLE FRACTURE**Milyukova Daria<sup>1,\*</sup><sup>1</sup>I.M. Sechenov First Moscow State Medical University

The aim of this study was to develop a treatment plan for mandibular fractures in the tooth bearing area in order to decrease complication rate. In the department of maxillofacial surgery in the I.M. Sechenov First Moscow State Medical University 183 patients with the mandibular fractures in the tooth bearing area were treated. All the patients were divided into two main groups: patients with mandible angle fracture and patients with fracture in the tooth bearing area 3.7 - 4.7. In the first group depending on the clinical finding, X-ray, displacement of the fragments and position of the third molar it was found 6 types of mandibular angle fractures. Mandible angle fractures with or without dislocation of the fragments and third molar presented in the line of fracture were treated by open reduction and internal fixation with mini-plates, third molar was extracted and the alveolus was filled with «Col-

lost». Cases with no dislocation of the fragments and retained third molar in the line of fractures were treated just by inter-maxillary fixation. Histology was made for all the extracted teeth. In the second group electric pulp test was performed for all teeth in the mandible. It was found out that 41% of the patients have post-traumatic neuropathy of the nervus alveolaris inferior, for those patients it is more complicated to find out if the tooth in the line of fracture is vital. For the rest of the patients according to the record of the electric pulp test 11% of the teeth in the line of fracture were endodontically treated, for the reason that the pulp was necrotized. For the rest of the patients tooth was left in the line of fracture with no treatment. Finally we have developed indication and contraindication for endodontic treatment and the extraction of the tooth in the line of fracture. It was concluded that the overall complication rate was low and can be reduced further.

**P-0624****EPIDEMIOLOGY OF FACIAL TRAUMA INJURIES AT A PAEDIATRIC EMERGENCY DEPARTMENT IN SANTIAGO DE CHILE, BETWEEN 2006 AND 2009.**Carolina Collao González<sup>1,\*</sup>, Alonso Carrasco-Labra<sup>1,2</sup>, Hsiao Sung Hsieh<sup>1</sup>, Juan Cortés Araya<sup>1</sup><sup>1</sup>Department of Oral and Maxillofacial Surgery, Universidad de Chile, Santiago, Chile, <sup>2</sup>Health Research Methodology Program, McMaster University, Ontario, Canada

**Background:** Facial trauma is considered uncommon in the paediatric population worldwide, with only a few studies that have considered the subject from an epidemiological point of view. In Chile the epidemiological characteristics of facial trauma in children have not been studied extensively. The aim of this study is to describe the frequency and general characteristics of facial trauma injuries in a group of Chilean children aged 15 years or less.

**Material and methods:** Retrospective study of case series. Between 2006 and 2009, clinical records of 293,090 patients admitted to the Emergency Room of Children's Hospital Exequiel González Cortés, in Santiago de Chile, were reviewed. Data of patients with trauma injuries to the face were collected. The following parameters were evaluated: age, sex, day and month of hospital admission, cause of injury, anatomical location, type of injury and presence of associated injuries.

**Results:** A total of 7,617 records of patients who presented 8,944 injuries were found. The ratio of boys to girls was 1,7:1. Preschool age children were the most frequently affected (56,3%). The main cause of injury was falls (53,5%). Soft tissue injuries were the most common type of injury (90%), followed by the facial bone fractures and dentoalveolar trauma. Associated injuries occurred in 11% of cases, mostly cranial and ophthalmic injuries.

**Conclusions:** Facial trauma presents a significant frequency in the group of Chilean children studied. The results obtained in this retrospective study resemble those reported worldwide, especially in terms of sex distribution, cause and type of injury.



**P-0625****ZYGOMATIC COMPLEX FRACTURES. A 5-YEAR RETROSPECTIVE STUDY IN A MAJOR UK TRAUMA CENTRE.**

*Leandros Vassiliou<sup>1,\*</sup>, Alexander Hills<sup>1</sup>, Benjamin Templer<sup>1</sup>, Tajinder Lidhar<sup>1</sup>, Kathleen Fan<sup>1</sup>*

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**Introduction:** Zygomatic complex fractures constitute a significant proportion of trauma in Oral and Maxillofacial surgery and can lead to substantial functional, aesthetic and psychological complications. The aim of this study is to describe the prevalence, aetiology, classification, surgical approaches, fixation patterns and outcomes of zygomatic complex fractures within a period of 5 years.

**Material and methods:** We retrospectively analyzed all electronic databases (admission records, imaging, operative records and discharge summaries) at King's College Hospital within a 5-year period (2007-2011).

The data was statistically processed according to demographic information, mechanism of injury, type of fracture, surgical treatment and complications.

**Results:** A total of 874 midfacial fractures were analyzed in 444 patients (372 male, 72 female, ratio 5.2:1) who were treated in the Oral and Maxillofacial Surgery Unit at King's College Hospital within a 5 year period. Of these 232 (52.3%) involved the zygomatic complex. Only 15 patients displayed pure zygomatic arch fractures. The predominant ethnic group was white British. The commonest cause was interpersonal violence. The majority of patients underwent open reduction and one-point internal fixation with buttress plating, and only one case required post-operative removal of plate.

**Conclusion:** Interpersonal violence is the leading cause of maxillofacial fractures, which is consistent with the urban nature of the catchment area. One-point fixation often provides adequate stability and uncomplicated healing. Complex patterns of zygomatic fractures were seen in high energy injuries associated with panfacial trauma.

**P-0626****MASSIVE LINGUAL HAEMATOMA FOLLOWING TONIC-CLONIC SEIZURES IN A YOUNG PATIENT WITH LUPUS-RELATED COAGULOPATHY: MANAGEMENT, FOLLOW UP AND CLINICAL OUTCOME.**

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**Introduction:** The tongue is a highly vascular structure with a propensity for brisk haemorrhage as a result of trauma. Haemorrhage within the tongue can result in lingual haematoma formation and subsequent upper airway compromise. We present the case of a young patient with lupus-related coagulopathy in renal replacement therapy that suffered a tonic-clonic epileptic attack with self-injury to the tongue resulting in a massive lingual haematoma that required emergent orotracheal intubation and close follow-up.

**Case report:** 27-year-old male in renal replacement therapy since 2004, lupus-related Chronic Kidney Disease and failure of renal graft, admitted to Intensive Care Unit after acute neurological deterioration and tonic-clonic seizures during haemodialysis and hypertensive crisis. Patient presented with severe dyspnoea and massive swelling of the tongue, requiring emergent orotracheal intubation which was complicated by tongue bleeding and pro-trusion.

After airway management, physical exploration revealed a massive swelling of the tongue, dark-blue coloration and a cord-like induration over the right hemitongue which ended up in an ipsilateral mucosal and shallow muscle layer dilaceration.

**Discussion:** Lingual haematoma has been reported in literature related to thrombolytic therapy, antithrombotic treatment, trauma and seizures. To our knowledge, there are no reports of massive lingual haematoma in patients with lupus-related coagulopathy as a risk factor. Conservative management was advocated with 6-hour-interval periodic lingual massage and comprehensive photographic follow-up images are provided of its evolution.

**Conclusion:** Lingual haematoma can rapidly lead to a life-threatening situation requiring emergent airway management via orotracheal intubation or tracheostomy. Acute trauma to the tongue should be therefore closely observed in order to ensure an optimal patient control. Outcome with conservative therapy in our patient granted optimal recovery of the lingual function and tissues.

**P-0627****ATYPICAL GUNSHOT INJURY TO THE MAXILLOFACIAL AREA**

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Maxillofacial gunshot injuries in the area are now relatively rare. Often affect the soft tissues in isolation, but most injuries are combined hard and soft facial tissues. In the years 2003 to 2012 7 cases of gunshot wounds were treated in the maxillofacial region: 6 gunshot wounds were caused with a rifle in a suicide attempt. One of the gunshot wounds was caused by an arrow accidentally shot from a bow .

Gunshot injury, whether an arrow from a bow or crossbow are very rare and result from either an unfortunate accident or attempted suicide. In the literature, there are cases of suicide experiments, either successful or attempted in the process, but all of these cases were gunshot injuries with an arrow from a crossbow. In neither case was documented gunshot injury arrow from a bow.

The authors present a case of maxillofacial injuries to the firing of the bow as a result of misadventure in the game for children.

**P-0628****A 6-YEAR (2006-2011) RETROSPECTIVE REVIEW OF 705 PATIENTS PRESENTING WITH MIDFACIAL FRACTURES TO A MAJOR URBAN TRAUMA CENTRE (LONDON)**

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Fractures of the midface can lead to substantial long-term functional, aesthetic and psychological complications. The aim of this study is to clarify the prevalence, aetiology and midfacial injury patterns in an urban British population.

**Material and methods:** A 6-year retrospective review of 705 patients (587 male: 118 female) to the midface to a major urban trauma centre in London between 2006-2011. They had a total of midfacial fractures between them. Information was obtained from electronic departmental admission records, discharge summaries, imaging and operative records. This data was subsequently cross-referenced to ensure accuracy and included demographic information, aetiology, fracture site, injury patterns and complications.

**Results:** The average age of patients was 33 years old (median 29 year old) with males being 66.5% more likely to sustain midfacial injuries. The most affected race was white British (53%). Of those whose mechanism of injury was recorded, by far the commonest cause was interpersonal violence (44.6%), this was followed by Road traffic accidents (19.9%) and falls (16.25%). Accidents 18.7% and other causes (0.6%) made up the rest. Of the patients with midfacial fractures 41.6% had some degree maxillary involvement with multiple fractures being commonplace. 48.5% of patients presented with fractured zygomas 44.3% had nasal and 39.6% had orbital floor fractures.

**Conclusion:** Interpersonal violence is the leading cause of maxillofacial fractures, which is consistent with urban nature of the catchment area. Multiple fractures of the midface are commonly seen.

**P-0629****TREATMENT ALGORITHM FOR COMPLICATION MANAGEMENT IN ZYGOMATICOMAXILLARY FRACTURE**

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<sup>1</sup>Chungnam National University Hospital

Zygomaticomaxillary complex(ZMC) is an important structure projecting to the centre and lateral side of the face determining the basic outlines and symmetry of the face. These fractures are occasionally accompanied by early complications such as infection, haematoma, sinusitis, oral-antral fistula or ocular motion limitation, blindness, or late complications such as infraorbital nerve sensory deficit, diplopia, and facial asymmetry.

Because the zygomatic bone has relatively most complex shape three-dimensionally among the facial bones, the possibility of getting unsatisfactory result is very high, if not corrected considering its shape and symmetry of the face. To achieve the appropriate reduction of ZMC, the alignment of lateral orbital rim, infraorbital rim, zygomaticofrontal suture, zygomaticomaxillary suture, orbital

floor and zygomatic arch is important. The three buttresses consisted of ZF suture, infraorbital rim and ZM suture must be corrected precisely. Serious complications like asymmetry of the face may happen if the reduction of the fracture is done incorrectly. Also malunion or nonunion may result in the facial asymmetry. The realignment after the surgery can be evaluated by comparing ① Projection, ② Width, and ③ Rotation. If one of these values, compared with the normal and repaired area, has more than 2 mm differences we can define as facial asymmetry. The asymmetry can be corrected with implantation, bone or fat graft, filler injection and bone shaving. The osteotomy may be needed to mobilize the fused bone fragments. Accurate reduction and fixation is important at the first surgery. In the circumstances like lateral displacement of the zygomatic arch and severe posterior displacement of the malar eminence, or in situations of severely comminuted fractures require more precise and concentrated primary operation. After reduction, evaluations such as CT scans are essential. If the asymmetry resulting from over-correction or under-correction is found by the radiological study right after the surgery, early revision must be done. We present our treatment algorithm in ZMC fractures to prevent facial asymmetry.

**P-0630****USAGE OF RESORBABLE FIXATION SYSTEM FOR OSTEOSYNTHESIS IN PATIENTS WITH TRAUMATIC DEFECTS AND POSTTRAUMATIC DEFORMATIONS OF FACIAL BONES**

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Reconstructive operative procedures in patients with trauma of facial bones are among the most up-to-date problems in maxillofacial surgery. Today polylactide-based materials have appeared. They resorb within 2 years and allow bone fragments to consolidate. After that the material is fully resorbed.

In our study we used ultrasound resorbable system of plates and pins SonicWeld SX by firma "KLS Martin" for osteosynthesis of bones of facial skeleton. Plates and pins are made of polymer of lactic acid (PDLA) – this material is characterized by a high biological compatibility and significant level of biodegradation.

The aim of this study is to estimate the efficacy of usage of ultrasound resorbable system SonicWeld SX by firma "KLS Martin" during reconstructive surgical procedures in patients with traumas of facial bones.

**Materials and methods.** 31 patients of centre of dentistry and maxillofacial surgery of MSUMD with traumatic defects of bones of facial skeleton were operated on with the system mentioned above. 21 were diagnosed with defects and deformation of cheekbone and orbital complex (12 patients – lateral orbital wall and orbital floor, 5 patients – cheekbone, 4 patients – medial orbital wall), 3 patients – anterior wall of maxilla sinus, 4 patients with defects of superior orbital edge and frontal bone, 3 patients were diagnosed with various defects of alveolar part of maxilla.

**Results.** All the patients during the control X-ray examination showed stable position of autotransplantat, that provides good aesthetic results. Stability of fixation is comparable to the traditional methods. In time resorption was

seen from 9 up to 18 months. The use of this system can be positively characterized in terms of simplicity of use, reduced time of surgical procedures, absence of complications in early and late postoperative periods, hard definition of contour of plates, that allows to achieve good esthetical and functional results during osteosynthesis. That is why the use of this system in patients with trauma of maxilla-facial region will be continued.

**P-0631****SUBCONDYLAR FRACTURE TREATMENT VÍA TRANSORAL ROUTE WITH ENDOSCOPIC ASSISTANCE**

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**Introduction:** The treatment of subcondylar fractures of the jaw presents a major controversy. To date, we have used two basic techniques: open reduction and internal fixation or closed reduction with intermaxillary fixation. The choice of one technique or another, focusing on the positives and negatives in relation to the type of approach. Complications such as damage to the facial nerve branches, unsightly scars or bleeding from the maxillary artery or masseteric or retromandibular vein, make the technique of choice in many cases the most conservative. The evolution of minimally invasive surgery has allowed in recent years the development of new techniques in the maxillofacial area, such as endoscopic approach for reduction and fixation of these fractures allowing direct vision with minimal morbidity and good results.

**Objectives:** To show the results of endoscopic assistance, in the treatment of subcondylar fractures, as a preliminary study for our Centre experience.

**Material and Methods.** A series of 30 patients was studied retrospectively after treatment of subcondylar fractures. These patients were treated from August 2007 to May 2012 in The Hospital Universitario La Princesa. All patients were submitted to open reduction and osteosynthesis with an endoscopic assisted transoral approach. Two patients of the study needed conservative treatment due to the difficulty of performing the technique. The parameters analyzed were: occlusal alteration, mouth opening, pre-postoperative pain (according visual analogical scale) and postoperative radiographic images.

**Results:** In all cases we obtained and normal mouth opening (>35mm) in the one month postoperative follow up. Lateral and protusive excursions were conserved in the same period follow up. In one patient it was necessary to perform a surgical review by bad position the fragment observes in the radiograph study. Any patient developed external scars. Two patients had temporary paresis of the facial nerve and two in the lower tooth nerve.

**Conclusion:** The reduction and fixation of subcondylar fractures via endoscopic-assisted transoral approach constitutes the gold standard treatment with low morbidity and good results. With this technique we put together both advantages, reduction and fixation with a low morbidity rate.

**P-0632****AN EPIDEMIOLOGIC ANALYSIS OF 1,142 MAXILLOFACIAL FRACTURES AND**

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**Objective.** The aim of this study was to evaluate the incidence and etiology of maxillofacial fractures in the Greek population over the past 5 years. A comparison of findings with 2 earlier studies from the same department was also performed.

**Study Design.** Seven hundred twenty-seven patients treated for a total of 1,142 facial fractures in the period from 2005 to 2009 were included in a retrospective, clinical, and epidemiologic study. Cause, type, site of injury, gender, age, and nationality of the patient were the parameters evaluated.

**Results.** Road traffic accidents remained the most common cause of injury (50.8%) followed by assaults (26.3%), falls (13.8%), work-related injuries (3.2%), and sport injuries (3%).

**Conclusions.** Road traffic accidents remain the most frequent aetiology of maxillofacial fractures. Fractures of the facial skeleton caused by assault increased significantly in the period assessed. Concomitant injuries were most frequently associated with motorcycle accidents. (Oral Surg Oral Med Oral Pathol Oral Radiol 2011)

**P-0633****MANAGEMENT AND TREATMENT OF THE EDENTULOUS FRACTURED MANDIBLE**

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**Background:** Fractures of the atrophic and edentulous mandible are difficult to manage and treat due to the reduced vascularity and impaired healing of the mandible as well as patient co-morbidities. Treatment options include open reduction and fixation both intra and extra-orally. The rate of complication can be high.

**Aims:** To review the management and complications of edentulous mandibular fractures treated at King's College over the past 10 years.

**Method:** Patients with edentulous fractured mandibles were identified from the departmental database and their clinical records analysed retrospectively. Mandibular height (Luhr classification), site of fracture, patient age, medical history, mode of injury, method of management, outcome and complications were reviewed.

**Results:** 30 patients with an average age of 74.3 years with edentulous fractured mandibles have been identified over a 10 year period. 67% of this patient group are females. 80% of the cases were due to falls, the remainder due to assault and as a result of dental treatment. 71.4% of cases were managed surgically. The most significant complication that occurred was non-union in one case.

*Clinical Relevance:* 13% of all adults in the UK are edentulous. As a result of tooth loss, the mandibular alveolar bone becomes atrophic and is vulnerable to fracture. Though edentulous mandibular fractures are rare, they can prove to be problematic to manage. It is important for all maxillofacial surgeons and trainees to be aware of the appropriate treatment and complications for this patient group.

**P-0634****SURGICAL TREATMENT OF INTRACAPSULAR FRACTURES, THE WAY TO AVOID POSTTRAUMATIC TMJ ANKYLOSIS**

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Management of intracapsular fractures of the temporomandibular joint (TMJ) remains a source of controversy. Based on established literature, conservative treatment of intracapsular fractures increases the risk for TMJ ankylosis. This study will present acceptable functional and radiological results of surgical treatment of TMJ intracapsular fractures with more than 1-year follow-up. On the basis of presurgical arthroscopic evaluation of the status and position of the disc we determined the ideal surgical repositioning of the fragment and the disc. We believe that re-establishing the pretraumatic anatomic position of the TMJ components is the best way to avoid a possible posttraumatic TMJ ankylosis.

**P-0635****A RETROSPECTIVE ANALYSIS OF FRACTURED MANDIBLE CASES REFERRING TO THE SCHOOL OF DENTISTRY EGE UNIVERSITY: AN EPIDEMIOLOGICAL STUDY**

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We aimed to retrospectively analyze the epidemiological data of the patients with fractured mandibles that were referred to the department of Oral Surgery in the School of Dentistry at Ege University between 2005-2009, and compare with previous data from our clinic in the light of current literature. Case notes of patients with fractured mandibles were examined. Parameters like sex, age, aetiology, monthly distribution of the cases, fracture locations, type of fracture (single or multiple) were examined and shown on graphs. One hundred and twenty-eight fractured mandible cases (89 male, 39 female) were referred to our clinic between January 2005 and December 2009.

Falls were the number one aetiological factor effecting 43 patients (34%), followed by road traffic accidents effecting 39 patients (30%), and interpersonal violence effecting 31 patients (%24).

One hundred and seventy-five fracture lines were observed in 128 patients. Body of the mandible was the most frequently observed fracture location (n=44), followed by the condyle (n=42) and angle (n=39).

The most frequently observed fracture combination were parasymphysis + angle of the mandible seen in 9 patients (7%), followed by body of the mandible + the condyle, and body + angle of the mandible each seen in 8 patients (6%).

Analyses of trauma data on regional bases will enable the provision of a "health and safety act", and to provide medical preventive strategies suitable to the social structure of our multicultural society.

**P-0636****DIAGNOSTICS OF TEMPORAL MUSCLES CONDITION IN PATIENTS WITH ZYGOMATIC COMPLEX FRACTURES TREATED SURGICALLY WITH CORONAL ACCESS**

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The majority of patients to which coronal access was applied were found to have sunken temples after the operation, that possibly may be caused by a trauma of temporal muscle with significant misalignment of zygomatic bone, or the method of operative treatment itself.

*Purpose:* Study of possibility to use findings of computer tomography (CT) and electromyography (EMG) to assess the condition of temporal muscles in patients with zygomatic complex fractures (ZCF) for operative treatment of which coronal access was applied.

*Materials and Methods:* In 2008-2011, 12 patients with ZCF were examined with HCT and EMG. CT scans were made and studied before and 6-10 months after the operation. Sectional area (S, cm<sup>2</sup>) of temporal muscles and X-ray density of muscle fibers in Hounsfield Units (HU) was studied on the fracture side and on the healthy side. Method of global functional EMG was selected. Contractile function of frontal lobe of temporal muscle was tested.

*Results:* Immediately after the operation, sectional area of temporal muscles on the trauma side increases and X-ray density declines. All patients within up to 30 days after operation, showed that size of muscle on the fracture side was 12% lower than on the healthy side, and its density was lower by 11-13%; in 6-10 months after the operation, X-ray density reduced by 36%, and sectional area by 39-42% if compared to findings obtained before the operation. It is worth stressing that, within these periods, features of temporal muscle on the healthy side also reduced and was equal to features of the damaged side.

EMG findings showed that a month after the operation, all patients showed, at the stage of functional rest, a spontaneous activity of temporal muscles on the surgically-treated side that ranged from 0.6  $\mu$ V to 1.1  $\mu$ V. 10 patients (83%) also showed reduced quantity and duration of chewing motions in one chewing cycle. Primary EMG of patients revealed the tendency of switching to one-sided chewing, in particular with the healthy side.

*Conclusion:* Consideration and analysis of functional EMG and CT methods can give an objective assessment to the condition of the patient's muscular complex.

**P-0637****AUTOMOBILE AIRBAG INDUCED MAXILLOFACIAL INJURIES**

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**Introduction:** The wide use of automobile airbags has undoubtedly reduced the mortality and the incidence of serious injuries from motor vehicle accidents. However, automobile airbags appear to be associated with a variety of injuries including facial fractures. We present a case of a mandibular fracture caused by an airbag injury to a front seat pregnant passenger as well as a review of the literature regarding facial fractures caused by restraining devices.

**Methods:** A case report of a mandibular fracture caused by airbag deployment will be presented. A literature review was performed on Pubmed using the search terms “airbag, facial, fracture.”

**Results:** A 19 year old pregnant female who was a front seat passenger was admitted to Accident and Emergency after an airbag forced the patient into the backseat and caused a mandibular fracture. The fracture was managed with conventional operative techniques and occlusion was returned to normal. A review of the literature demonstrated that although restraining devices have reduced overall facial fractures, they themselves can still cause such fractures. The use of seatbelts and airbags together reduced risk the most followed by the use of seatbelts alone. The use of airbags alone had conflicting results. The pattern of fractures where airbag deployment is present is the same except for zygomatic complex fractures.

**Conclusion:** Airbags are restraining safety devices, but their activation may sometimes induce injuries during road accidents. Further improvements in airbag design together with education of the general public in their use should help reduce airbag-related injuries.

**P-0638****THREE DIMENSIONAL VOLUMETRIC RECONSTRUCTION AND RESTORATION IN A COMPLEX CASE OF CRANIOFACIAL TRAUMA**

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Midface fractures, especially if related to traffic accidents, represent a remarkable problem from a surgical, psychological, and social standpoint. In trauma dynamics, the pattern of the fractures can extend to all bony fragments and is often associated with soft tissue injuries and loss of bony structures.

This can lead to posttraumatic deformities that greatly influence the patient psychologically and limit his social rehabilitation, sometimes permanently.

We report an unusual complex clinical case characterized by complex cranio-orbito-maxillary trauma with zygomatic explosion and disruption.

Treatment planning of panfacial fractures requires knowledge of the three-dimensional anatomical structures

of every facial component as well as the soft tissue restoration

A 23-year-old man, a car accident victim, was admitted to the Department of Craniomaxillofacial Surgery of St. Anna Hospital & University. The patient presented with a massive left orbital fracture, maxillary explosion and zygomatic arch dislocation with a widely lacerated deep wound of the left cheek.

The facial skeleton was reconstructed and the main buttresses were rebuilt with cranial bone grafts and fixed with plates and screws.

At the end of the reconstructive and rehabilitative course, which allowed a satisfactory morphological and functional recovery, the patient was able, with psychological support, to re-establish himself in society and in his own socio-familial role.

Midfacial trauma with large bone and soft tissue loss often leads to severe deformities that may represent a limit for both morphological and functional restoration as well as difficulty in re-establishing the patient into society. Sequelae and residual deformities represent a challenge for surgeon and the patient. The reconstructive and rehabilitative “iter” is often long lasting and difficult. All the techniques, new technologies, and basic knowledge must be well known to obtain adequate results. Moreover, sociopsychological support is key to allowing the patient to accept himself as well as his new identity, which is often the sequela of such a severe traumatic impact.

## 7. CRANIO-MAXILLO-FACIAL TRAUMATOLOGY - ORBIT

**P-0701**

### RECONSTRUCTION OF A "BLOW-OUT" ORBITAL FLOOR FRACTURE WITH A PREFORMED MATRIXORBITALR TITANIUM PLATE FROM SYNTHES. REPORT OF A CASE

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A 30 year old male suffered an impact on the face following a bicycle accident.

The CT scan revealed an extensive blow-out fracture of the orbit floor.

The patient had diplopia and severe enophthalmos. Three days after the trauma, the reconstruction of the orbit floor was made using a preformed titanium plate MatrixOrbitalR from Synthes.

The patient remained with diplopia and mild enophthalmos. The CT scan showed that the plate was in the wrong position, causing an increase of the volume of the orbital cavity and a posterior positioning of the eye ball. A second surgery was performed 5 months later using a cranial bone graft to reconstruct the orbital floor. The patient improved remarkably with correction of the enophthalmos and improvement of the diplopia.

**P-0702**

### RARE CASE OF ORBITAL IMPLANT IMPLANT EXTRUSION

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**Background:** Orbital injuries account for approximately 40% of all craniofacial injuries. In the literature there are case reports of Silastic sheets migrating (Lee et al, 2011). Brown et al, 1993 had three cases of late extrusions of the implant through the facial skin, although this was with Teflon, silicone and rubber implants. To the authors knowledge there are few reports of Medpor titan orbital implant extrusion.

**Aim:** To highlight an uncommon complication of orbital reconstruction and the subsequent sequelae and management undertaken.

**Method.** A single medical case note review.

**Case report:** We report a case that, after an alleged assault, a patient was reviewed in the Maxillofacial outpatient trauma clinic and on clinical examination demonstrated diplopia on upward gaze. CT orbits scan showed a displaced left medial orbital wall fracture with expanded orbital volume. A trans-conjunctival approach was performed to repair the left medial orbital wall repair using Medpor Titan implant in October 2008. Post-operatively

there was no diplopia or immediate complications seen at review.

Three years later the patient re-presented with a medial canthus skin fistula for last 3 months with watering and increasing discharge. On examination a fistula was seen extending into the orbit, with the mini-plate and medial canthal tendon exposed. Subsequent removal of the Medpor Titan implant and refashioning of the medial canthal defect was undertaken. Following the prolapse of the lacrimal stent, the patient is currently awaiting posterior lacrimal crest fixation.

**Discussion:** This case illustrates that the rare late complication of medial orbital wall implant extrusion, along with the further management. The case also demonstrates the need for the management to be involve a multi-disciplinary team. This illustrates the need for the patient to be explained the possible sequelae during the informed consent process.

**P-0703**

### RELIABILITY OF HERTEL EXOPHTHALMOMETRY IN BLOW OUT FRACTURE; A COMPARISON STUDY WITH THE ORBITAL VOLUME ASSESSMENT IN COMPUTED TOMOGRAPHY

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Postoperative evaluation of the blow-out fracture is frequently performed by a physical and radiologic examination. The purpose of this study was to determine whether peri-operative exophthalmometry, using Hertel's tool, could provide reliable information for the postoperative evaluation of the blow-out fracture compared to the orbital volume assessment by a facial computed tomography (CT) scan. Forty-five patients with unilateral pure blowout fracture were enrolled in this study. The patients were divided into three groups: medial (Group M), medial and inferior (Group MI), inferior (Group I) orbital wall fracture.

The orbital volume ratio (OVR) and Hertel scale were measured before and 6 months after the surgery. OVR revealed significant decrease from 113.98% preoperatively to 105.02% postoperatively (p0.05). In conclusion, the Hertel's measurement cannot be a reliable value for the evaluation of the surgical results for enophthalmos, comparing to the volume measurements from a facial CT scan, in acute blow-out fracture surgery.

**P-0704**

### RADIOGRAPHIC ASSESSING ORBITAL PLATE POSITION FOLLOWING POST TRAUMATIC REPAIR OF ORBITAL FLOOR FRACTURES.

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Implant malposition can be difficult to assess (Kammer 2010) and intraoperative imaging techniques or intraoperative navigation control have been advocated to minimize error. The verification of correct plate positioning, which is often undertaken by CT scan, can be considered the "gold standard" given its superiority in the ability to image the soft and hard tissue architecture of the orbit in detail (Tanrikulu and Erol 2001). However, concerns of expos-

ing patients to excessive unnecessary radiation and the limitations in radiographic resources have led some clinicians to consider plain radiographs instead. We present our experience of assessing post operative position of preformed orbital plates (MatrixMIDFACE, Synthes) using plain film radiographs and clinical examination only.

**P-0705**

**ANATOMICAL AND TOPOMETRICAL BASED STUDY FOR RECONSTRUCTING LOWER ORBITAL WALL DURING FRACTURES OF ZYGOMATIC-ORBITAL COMPLEX.**

*Yuri Medvedev<sup>1,\*</sup>, Vladimir Nikolenko<sup>1</sup>, Anastasia Soloveva<sup>1</sup>, Varvara Volkova<sup>1</sup>*

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<sup>2</sup>*The Saratov State Medical University the named after V.I.Razumovsky*

*Relevance.* 25% of patients from the total number with injuries are people with lesions of the maxillofacial region. Fractures of the lower wall of the orbita can be isolated, but the most common injuries are combined with fractures of the zygomatic bone or maxilla.

The aim of the study is to increase the effect of treatment of fractures of the orbital lower wall.

*Materials and methods.* On the basis of the fundamental museum of the department of normal anatomy of the Saratov State Medical University named after V.I. Razumovsky 165 skulls, certified to age from 18 to 70 years, from which- 137 male and 28 female skulls, were examined. The choice of age is due to the fact that at the age from 17 to 21 years growth and development are completed, the size of the facial skeleton remains practically unchanged.

*Results.* Four quantities of all left and right orbitas were measured during the study of 165 certified skulls. Measuring the length from the junction of the maxilla and the zygomatic bone to the distal part of the lower orbital fissure range for men was from 40 mm to 56 mm, where the average value for the right orbita amounted 46.41 mm, for the left - 47.07 mm. For women the range was from 40 mm to 53 mm. The average value for the right orbita amounted 45.78 mm, for the left - 43.17 mm. As a result of measuring the length of the junction of the maxilla and zygomatic bone to the lower orbital fissure on the medial part the range was from 18 mm to 30 mm in men. The average value for the right orbita was 24.52 mm, for the left - 23.60 mm. For women, the range amounted from 19 mm to 26 mm. The average value for the right orbita was 23.53 mm, for the left - 22.51 mm.

*Conclusions.* Despite of importance of the resulting measurements average values of parameters of the lower orbital wall for reconstructive surgery, each patient requires an individual approach to planning and management of fractures of zygomatico-orbital complex.

## 8. CUSTOM-MADE IMPLANTS

### P-0801

#### IMMEDIATE ORBITOFONTAL RECONSTRUCTION WITH CUSTOMIZED POLYETHERETHERKETONE IMPLANT (PEEK).

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**Aim:** To show the results of frontoorbital reconstruction by means of a PEEK customized prosthesis. Complex orbito-frontal defects present a significant challenge and present functional, esthetic and psychologic consequences. The most commonly used materials for this purpose include autologous bone grafts, titanium mesh, methylmethacrylate, polyethylene sheets, and hydroxyapatite cements. Polyetheretherketone (PEEK) is a polymer exhibiting an excellent combination of strength, stiffness, durability, and environmental resistance.

**Material and methods:** A 49-year-old caucasian man was referred to us by progressive left hypophtalmos and proptosis. CT revealed a solid tumour in the left orbital roof and frontal bone. A biopsy confirmed an osteoid osteoma. Treatment plan included resection of the lesion comprising orbital roof, a portion of frontal bone. The left nasofrontal duct was obliterated. The intracranial cavity was isolated from the nasal cavity by means of a pericranial flap and the bone defect was immediately reconstructed using a customized PEEK implant designed by means of computer planning. The implant was fixed to the remaining bone with titanium miniplates and screws. In this single-step procedure, the determination of the exact extent and size of the resection is an important problem. An object called "tumor" was produced which marked the limits of the resection. We created a virtual defect and by mirroring of the right side we created an object "implant" that could be translated in a mill to an implant which was used for immediate reconstruction following ablation. The planned bony resection had to be accurately performed by means of a surgical guide or by navigation.

**Results:** Patient's recovery was uneventful and achieved good symmetry and brain and globe protection were achieved.

**Conclusions:** Main advantages of CAD-CAM prostheses are elimination of donor site morbidity compared to autogenous bone grafts, reduced operative time, and 0,5-mm precision. Reconstruction with PEEK prostheses customized by a prefabrication process is one of the most promising alloplastic orbito-calvarial replacements to date and it may become an ideal strategy in the reconstruction of orbitofrontal defects. In this case, a PEEK implant was used to provide immediate reconstruction using a computer planning system.

### P-0802

#### NEW Ti6Al7Nb ALLOY TREATMENT FOR CRANIOFACIAL IMPLANTS MADE BY SELECTIVE LASER MELTING

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In order to develop high quality reconstruction biomaterials in craniofacial surgery it is necessary to undertake research. The aim of the study was to obtain alloys with optimum properties for tissue reconstruction

**Material and methods:** Titanium disks of various compositions were fabricated using the SLM - Selective Laser Melting technique. The titanium disks used were of 25% porosity and of the following types: titanium alloy (Ti), titanium impregnated with hydroxyapatite (Ti-HA), titanium impregnated with titanium dioxide (TiO<sub>2</sub>) and silicium dioxide (SiO<sub>2</sub>), titanium dioxide powder and silicium dioxide powder. Upon ethical approval for the test, the disks (4 mm diameter, 1 mm thickness) were inserted in bone defects created in the calvaria of Whistar rats. The animals were divided in groups, according to the type of disk inserted. All animals were CBCT scanned postoperatively. The animals were sacrificed after 1, 2 and 3 postoperative months respectively.

**Results:** Imaging and histological analysis of the tissue specimens demonstrated the good integration of the disks. The quality of healing and the parameters of bone formation was analyzed and described.

**Conclusion:** The results of the study allow the development of new materials suitable for the manufacturing of the custom-made titanium implants by SLM technique, for bone reconstruction.

**Acknowledgement:** this research was conducted within the grant funded project "New Biocompatible Materials for Personalized Implants made by SLS and SLM – BIO-MAPIM – PN-II-PCCE-ID-101/5/2010

### P-0803

#### RECONSTRUCTION OF CRANIOFACIAL BONE DEFECTS WITH CUSTOM-MADE IMPLANTS: ANALYZING THE CASES OF 10 PATIENTS

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**Aim:** The aim of the study was to quantitatively investigate whether the symmetrical reconstruction of the calvaria had been achieved using three-dimensional (3D) custom-made implants and to investigate any complications after cranio-



plasty.

**Patients and methods:** The custom-made cranial implants were produced using the data obtained from the computerized tomography (CT) of the defect, by means of computer design and rapid prototyping techniques. Polymethylmethacrylate was used as reconstruction material. These implants were applied to 10 patients (9 men and 1 woman) who had previously had craniectomy. The symmetry gained after cranioplasty was quantified by symmetry index. Any complications after cranioplasty were also recorded.

**Results:** The aesthetic appearance of all patients was significantly improved. Preoperative symmetry index was  $0.49 \pm 0.26$  and postoperative symmetry index was  $0.94 \pm 0.07$  ( $p=0.001$ ). Average follow-up was 42.5 months (between 7 and 85 months). A case showed transient seroma collection. Another case showed wrinkle formation in forehead. No infectious episodes or signs of plate rejection had been encountered.

**Conclusions:** The custom-made implant designed for cranioplasty showed a significant improvement in the reconstructed calvarial morphology. It could be very useful in repairing large and complex-shaped cranial defects.

**Acknowledgement:** The research has been supported by grant from the project "New Biocompatible Materials for Personalized Implants made by SLS and SLM (BIO-MAPIM) PN-II-PCCE-ID-101/5/2010

## 9. DISTRACTION OSTEOGENESIS

**P-0901**

### CRANIAL BONE TRANSPORT DISTRACTION OSTEOGENESIS USING A NOVEL WORM-GEAR DEVICE

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Reconstruction of large calvarial defects is challenging. In addition to contour considerations, a hostile tissue bed is frequently encountered, due to tissue loss, fibrosis, and radiation changes. These circumstances make implantation of alloplastic material suboptimal, as the non-vascularized substrate is susceptible to exposure and infection. Local autologous vascularized bone is ideal for reconstruction, with requisite attention on soft-tissue conditioning. Bone transport distraction osteogenesis (DO) has been previously described and carries the advantage of maintaining the osseous blood-supply and promoting slow soft tissue accommodation. The purpose of this study is to implement a novel, three-footplate, worm-gear distraction device for cranial transport distraction. We also seek to investigate the relative contribution to osteogenesis in the cranial environment (dura, bone, or scalp periosteum).

This study was approved by the Yale University IACUC (# 2011-11393). This proof of concept involved two male New Zealand white rabbits, age 3 months. Following standard anaesthesia, a posteriorly based, subperiosteal scalp flap was raised exposing the cranium. A critical sized bone defect (16x16mm) was created using a piezo tool, spanning the sagittal sinus. Care was taken to preserve the underlying dura. A 10x16mm bone transport fragment was then established anteriorly, left attached to dura. The distraction device was adapted and fixated in three locations (anteriorly, on the transport bone segment, and posteriorly). The distraction protocol entailed one day of latency with subsequent activation of 1.5 mm per day. The second animal served as sham control, with creation of critical defect only without additional intervention. A 5 week consolidation/healing phase was observed in both animals. Following sacrifice, the distraction gap and defect morphology were assessed using micro-CT and histologic methods.

There were no intra- or postoperative complications. The device was well-tolerated and the scalp flap healed uneventfully. Micro-CT analysis demonstrated effective transport trajectory, spanning the craniotomy gap and conforming to the 3-dimensional skull contour, with interposed mineralized new bone between the distracted segments. The control animal failed to show significant ossification within the defect area. Histologic interrogation showed sufficient bone growth in the distraction group.

Cranial bone transport distraction can be effectively implemented using a novel 3-footplate distraction device. In addition to the incumbent benefits of DO, the middle footplate and conforming track of this device directs the

transport segment trajectory, establishing a controlled 3-dimensional autologous reconstruction. Both the defect and transport gap exhibit osseous fill, and reestablish normal cranial contours. This represents a novel, autologous method for cranial reconstruction.

**P-0902**

### EXPANSION OF THE POSTERIOR CRANIAL VAULT USING DISTRACTION OSTEOGENESIS AS FIRST STAGE OF SURGERY IN SYNDROMIC CRANIOSYNOSTOSIS.

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In patients with complex syndromic craniosynostosis there is a severe craniocerebral disproportion. The deformation of the skull accompanied with hypoplasia of anterior and posterior portions of the skull. Performing surgery in the volume of fronto-orbital advancement (FOA) cannot achieve an adequate increase in the cranial cavity volume. Performing the fronto-orbital advancement with necessary hypercorrection can produce problems in soft tissue closure intraoperatively and result in severe facial disproportions afterwards. Occipital expansion allows avoidance of these problems.

**Material and methods.** In Moscow Burdenko Neurosurgery Institute from 2009 to now ten patients have had posterior cranial vault expansion using distraction osteogenesis. The mean age was 11,5 months (9 – 22 months). Diagnoses of Kleeblattschadel anomaly (3 cases), Apert (2), Pfeiffer (2), Craniofrontonasal syndrome (1), Saethre-Chozen (1) and unspecified syndrome (1) were present. Arnaud type distractors (KLS Martin) were used in 6 patients and internal distractors (Conmet, Russia) in 4 cases. In 9 cases 4 distractors were used and in 1 case only 2 devices. The latency period was 5 days and distraction rate was 0,5 mm/day. The average advancement was 23 mm (range 17,4 – 27 mm). There was no complication during distraction. Period of consolidation was 6 months. Satisfactory callus formation was found on postoperative CT. Distractors were removed after consolidation period and no any additional fixation were needed. After 6 months FOA were performed as a second stage of treatment.

**Results.** Measures of quantitative volumetric analysis of changes in intracranial volume after posterior cranial vault expansion revealed significant increase of intracranial volume (mean 174 ml). That differs significantly from changes in intracranial volume after FOA (mean 95 ml). As a result of surgery there were changes in anterior part of skull morphology, with reduction of bulging in anterior fontanelle region, temporal protrusion. The perforated aspect of the skull, appearance of subarachnoid spaces and regression of intracranial hypertension syndrome were improved.

**Conclusion.** Expansion of the posterior cranial vault using distraction osteogenesis is efficacious method of treatment of complex syndromic deformities of the skull accompanied by hypoplasia of parietal-occipital region.

**P-0903****BIPARTITION DISTRACTION IN A CHILD WITH APERT AND STURGE-WEBER SYNDROMES**

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**Background:** Patients with syndromic complex craniosynostosis often require correction of the hypertelorism and midface hypoplasia, in order to tackle functional as well as aesthetic concerns. The bipartition distraction is a challenging operation that has the ability to correct many functional problems in one-stage procedure.

**Case Report:** We report the first case in the world's literature of a male baby born with Apert and Sturge-Weber syndrome and severe functional problems, treated with a bipartition distraction using the rigid external distractor (RED).

Sturge-Weber syndrome is a neurocutaneous syndrome characterized by facial port wine stain and ipsilateral leptomeningeal angiomas. It is commonly complicated by glaucoma and neurological disturbances including seizures, hemiparesis, transient stroke-like deficits, and behavioral problems.

Apert syndrome is a rare genetic dominant disorder manifested by premature closure of the seams between the skull bones resulting in cranial vault deformity, midface hypoplasia, ocular abnormalities and severe symmetrical syndactyly of the hands and feet.

We emphasise the importance of an intense anti-epileptic regime in the pre-, intra- and post-operative phase, in order to minimise the risk of an epileptic fit associated with both the Sturge-Weber syndrome as well as the bipartition distraction. In addition, intra- and post-operative measures were taken to minimise the risk of a life-threatening bleeding related to the facial port-wine stain and the leptomeningeal haemangioma.

**Conclusion:** Bipartition distraction using the RED frame is a challenging operation that can give a solution to functional problems such as hypertelorism, exophthalmos, raised intracranial pressure and upper airway difficulties in one-stage procedure.

We present the first case of a male baby born with Apert and Sturge-Weber syndrome who underwent a bipartition distraction and we discuss the pre- and post-operative measures that must be taken into consideration, in order to minimise the peri- and post-operative morbidity and achieve a successful outcome.

**P-0904****MODIFICATION OF MIDFACE DISTRACTORS TO AVOID TRISMUS FOLLOWING THE MONOBLOC DISTRACTION OSTEOGENESIS PROCEDURE**

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**Aims:** There is no well known cause of trismus during midface DO with internal devices which is not uncommon. This condition leads to severe mouth opening limitation and it is hard to release. The aim of this work was the

investigation of the role of temporal muscle compression in trismus formation. The modified internal midface distractors were applied for monobloc DO patients.

**Material and Methods:** Three patients with craniosynostosis (2 - Crouzon's syndrome and 1 - Pfeiffer syndrome) aged 2, 6 and 12 years were surgically treated in Burdenko Neurosurgery Institute. In all cases a monobloc osteotomy was done and 4 internal modified distractors fixed. The temporal bone fixation tabs were chosen from the set individually according to patient anatomy to avoid temporal muscle compression after fixation. Distraction started on 7th day with the rate 1 mm per day in 4 turns. The average advancement was 18,5 mm (from 17,5 to 19,5 mm).

**Results:** There were no trismus symptoms noted during activation and retention period in all cases. The post-op CT scans revealed the good callus formation. There was exophthalmos correction breath and mastication normalization after 6 months of retention when the distractors were taken out.

**Conclusion:** The temporal muscle compression by distractors can be one of possible causes of postsurgical trismus in midface DO patients. The modification of internal distractors allowed us to avoid muscle compression. There was no trismus in all 3 cases presented. The adaptation of distractors for individual patient's anatomy can be a good point in better results achievement.

**P-0905****EVALUATION OF MAXILLARY POSITION AFTER RIGID EXTERNAL DISTRACTION: ANALYSES OF 7 CASES**

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<sup>1</sup>Marmara University

**The Aim:** To evaluate maxillary position after rigid external distraction osteogenesis with cephalometric tracing follow-up.

**Patients and methods:** Seven patients (5 male, 2 female) were treated for syndromic and non/syndromic midface hypoplasia. Cleft lip/palate, claidocranial dysostosis and pyknodysostosis were main disorders. RED II halo distractor (KLS Martin, Germany) was used in all cases. All patient were operated under orotracheal intubation and complete fracture at LeFort I (n=5), LeFort II (n=1) and LeFort III (n=1) levels were performed. All patients wore intraoral splint with extraoral traction hook. Higher anchorage level (pyriform aperture and zygomatic bone) was used in 6 cases. Consolidation was 2.5 months. Patients used chin caps to prevent horizontal relapse. Preoperative and postoperative cephalometric films were obtained to monitor maxillary rotation and advancement.

**Results:** Satisfactory distraction was achieved in all cases. Movement tendency of distracted maxilla is counter clockwise rotation with anchorage at dentoalveolar level. One patient (cleft lip/Palate) had horizontal relapse and was scheduled for secondary bimaxillary correction.

**Discussion:** To secure parallel distraction to Frankfurt plane and achieve maxillary advancement at desired vec-

tor is possible with good knowledge of maxillary distraction biomechanics. Additional high level of anchorage is mandatory to get satisfactory final maxillary positioning .

#### P-0906

### FACIAL FLUSHING FOLLOWING MONOBLOC FRONTO-FACIAL DISTRACTION

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**Aims:** Patients with syndromic complex craniosynostosis frequently present with functional problems such as raised intracranial pressure, proptosis, obstructive sleep apnoeas and failure to thrive. The monobloc frontofacial advancement corrects all of these functional problems in one procedure. We describe here an unusual complication with which it may be associated.

**Methods:** A case series is presented of four children who had facial flushing after undergoing frontofacial monobloc advancement by distraction.

**Results:** Four female children aged 6 to 8 years with Crouzon or Pfeiffer syndromes responsible for severe functional problems were treated with a monobloc fronto-facial distraction using the rigid external distractor (RED) frame. Following removal of the frame, they developed intermittent but severe facial flushing. The flushing spontaneously settled in three patients after up to four years but persists in the other child seven years after her surgery.

The flushing is due to a disturbance of cutaneous vasomotor control, affecting one or both sides of the face. The cutaneous vasomotor control is regulated through a balance between sympathetic and parasympathetic inputs via the pterygopalatine ganglion and the flushing could be associated with an imbalance in the regulation of cutaneous vasomotor control, leading to an over-activity of one input or an under-activity of the other. The monobloc procedure involves an osteotomy of the lateral pterygoid plate, which is in close proximity to the pterygopalatine ganglion and/or its pre- and post-ganglionic fibres. Any injury to the ganglion or its fibres can result in an impairment of the cutaneous vasomotor control and give rise to the facial flushing observed in our series.

**Conclusions:** Monobloc frontofacial advancement using the RED frame can treat functional problems such as exophthalmos, raised intracranial pressure and upper airway difficulties in one operation. We present a series of four cases of severe, intermittent facial flushing following monobloc distraction and we discuss the anatomy and physiology of the pterygopalatine ganglion, as well as the potential mechanisms that may be responsible for this unique complication, that has never been reported in the world's literature.

This phenomenon has been observed in four children undergoing this procedure out of a total of seventy cases.

#### P-0907

### CHOOSING TYPE OF DISTRACTION DEVICES IN TREATMENT SYNDROMAL CRANIOSYNOSTOSIS

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Recently distraction osteogenesis has become the method of choice in management of children with syndromal craniosynostosis. For several years similar devices are being used all over the world. Commonly all types of them are divided on internal and external ones. Each type has advantages and disadvantages. However until now the device choosing process does not have a clear basis and usually depends on surgeon preferences or hospital opportunities. It is clear that accurate studying of advantages and exact choosing of distraction device could decrease complication rate and raise the final effect of treatment. We have analyzed our results of distraction treatment to find out if there are differences between external and internal devices when they used for Crouzon and Apert types of deformation. We made 32 surgeries for 27 children with Crouzon and Apert types of synostosis (from 18 months to 16 years). For this reason we used 16 external and 16 internal distraction sets. There are some results that we had got: 1) Internal distraction devices were more preferable in preschool children until 5 year's old; 2) Internal distraction more effective when simultaneous moving of high and middle face are needed. Especially where these parts have to be transported for different distances; 3) This type more applicable for Crouzon type deformation. Patients with Apert type synostosis had much more complications from internal devices treatment. 4) External devices were more helpful in only Le Fort III type distraction without moving forehead and supraorbital rim. Internal distraction often was more dangerous for this purpose; 5) External device is method of choice in Le Fort II type distraction. 6) So external distraction more useful for Apert type.

We believe this knowledge would be very helpful in creating common management protocol of syndromal craniosynostosis.

#### P-0908

### MAXILLO-MANDIBULAR DISTRACTION: AN OPTIMAL TREATMENT FOR FACIAL ASYMMETRY

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**Introduction:** The treatment of facial asymmetry due to unilateral mandibular ramus hypoplasia depends on the age of the patient. In young patients, the mandibular distraction with the vertical growth of the maxilla can correct changes in the occlusal plane. In adults it will produce dramatic occlusal changes that will require unacceptable orthodontic appliances. To solve this problem, Ortiz-Monasterio introduced the bimaxillary distraction with a mandibular distractor and a rigid intermaxillary fixation, creating a simultaneous distraction of the maxilla. An alternative technique is the application of two independent distractors in the mandible and the maxilla.

**Case Report:** A 28 year-old woman presented a facial asymmetry due to an ascending vertical ramus hypoplasia of the right-side mandible, with a normal temporomandibular joint. She showed a canted occlusal plane, an asymmetry of the commissures and a displacement of the chin with a Class I occlusion and a normal gonial angle. After a correct planning, we performed: 1) unidirectional internal

distraction of the right-side mandible with a horizontal ramus mandibular osteotomy 2) asymmetric internal distraction of the maxilla with a horizontal Le Fort I-type osteotomy without down-fracture and without separation of the pterygomaxillary junction in the normal side to act as fulcrum. Distraction rate was 1 mm/day for the mandible and 0.5 mm/day for the maxilla to permit the descent of the maxilla without interactions. In 4 weeks the facial balance was obtained maintaining the occlusion. The consolidation phase was followed without complications for 4 months, and then the distractors were removed. The result has been stable for the last 2 years.

*Discussion and Conclusions:* The simultaneous bimaxillary distraction eliminates the need for intermaxillary fixation in the postoperative period. The success of the result is determined by designing an optimal vector of distraction for both mandibular and maxillary distraction. It permits restoration of the facial symmetry and preservation of the pre-existing stable occlusal relationship in adults. This procedure is a good alternative to conventional orthognathic surgery in the treatment of mandibular hypoplasia. It is less aggressive and it creates new bone with an extra soft tissue to achieve an optimal facial and occlusal result.

#### P-0909

#### EVALUATION OF EARLY BONE FORMATION INDUCED BY PERIOSTEAL DISTRACTION IN A RABBIT CALVARIUM MODEL

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*Background:* A controlled, gradual distraction of the periosteum is expected to result in the formation of new bone. Purpose: This study estimates the possibility of new bone formation by periosteal distraction in a rabbit calvarium model.

*Materials and Methods:* Twelve animals were subjected to a 5-day latency period and distraction rate at 0.25 mm/24 h for 10 days. Four experimental groups with 3 rats each were killed at 7, 14, 21 and 28 days after surgery. New bone formation was analyzed by means of histology and micro computed tomography to determine the bone volume and bone mineral density.

*Results:* In the central regions underneath the mesh of the device, we observed signs of new bone apposition. Statistically significant difference in total volume of new bone was found between 7-day and 28-day group ( $p = .038$ ). No differences in bone density were found between the groups.

*Conclusion:* Periosteal distraction in the rabbit calvarium stimulates the formation of considerable amounts of new bone.

#### P-0910

#### EFFECTS OF DISTRACTION OSTEOGENESIS ON THE INFERIOR ALVEOLAR NERVE OF THE CAT MANDIBLE

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*Objective:* In recent years, the clinical applications of Distraction osteogenesis (DO) have expanded beyond conventional treatment of deformed and malformed limbs to encompass oral and maxillofacial treatment. However, few reports have described the effects of mandibular DO on the inferior alveolar nerve (IAN). The present investigation examined the long-term impact of DO on the IAN.

*Methods:* Unilateral mandibular osteotomy was performed between the second premolar and posterior molar of cats, and a distraction device was fitted (test group). Electrophysiological tests were performed prior to osteotomy, immediately after surgery, upon completion of DO (2 weeks after surgery), and 3, 4, 5, 8, 14, 26 and 50 weeks after surgery in order to measure the shortest latency of jaw-opening reflex to direct electrical stimulation of the IAN at the mental foramen using electromyography of the digastric muscles. The remaining cats only underwent osteotomy at the same site followed by consolidation, acting as controls (control group).

*Results:* Electrophysiological testing revealed marked increases in the latency of both the test and control groups immediately after surgery. While latency in the test group on completion of DO was virtually identical to that immediately after surgery, postoperative latency in the test group resembled latency prior to surgery. Latency in the test group tended to improve from 3 week after surgery, and had recovered by 14 weeks after surgery. Meanwhile, latency in the control group had recovered by 2 weeks after surgery.

*Conclusion:* Distraction osteogenesis damages the IAN, but this damage heals over time.

## 10. EMBRYOLOGY AND PRE-NATAL DIAGNOSIS OF CRANIO-FACIAL MALFORMATION

### P-1001

#### HEPARANASE LOCALIZATION DURING PALATOGENESIS IN MICE

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**Aim:** Palatogenesis is directed by epithelial-mesenchymal interactions and results from remodeling of the extracellular matrix (ECM) of the palatal shelves. Hyaluronan and fibronectin in the palatal mesenchyme may contribute to the elevation of the palatal shelves. After adhesion of the bilateral palatal shelves in the midline, formation and subsequent disappearance of the medial epithelial seam (MES) is essential for complete palatal fusion. Changes in the distribution of the ECM components within the basement membrane of MES (e.g., type IV collagen, laminin, and perlecan) have been examined. However, mechanisms leading to their disappearance are controversial. Heparanase cleaves the heparan sulfate (HS) chains in perlecan and released HS complexes promote cell growth and migration. Here, we assessed heparanase distribution in developing mouse palate to determine whether heparanase might function in palate formation.

**Materials and Methods:** Embryos recovered from timed pregnant C57/BL10 mice were used. We evaluated immunoreactivity for heparanase in the palatal shelves. We also examined the localization of perlecan, laminin, type IV collagen, and HS in order to identify the palatal basement membrane. Moreover, we assessed the distribution of matrix metalloproteinases (MMPs) in fusing palatal shelves.

**Results:** No heparanase was observed in the vertically oriented palatal shelves in early stages of palate formation. As palate formation progressed, the palatal shelves were reorganized and arranged horizontally above the tongue, and heparanase localized to the epithelial cells of these shelves. When the palatal bilateral shelves first made contact, the heparanase localized to epithelial cells at the nasal side of shelves, and later in fusing palatal shelves, the cells of MES were labeled with intense heparanase signal. MMPs were also observed in MES. In contrast, the BM was scarcely observed in the palatal shelves, perlecan labeling was sparse in the BM of MES, on which laminin and type IV collagen were observed.

**Summary:** Our findings indicated that heparanase was important for palate formation because it mediated degradation of the ECM of palatal shelves. Heparanase may, in

concert with other proteases such as MMPs, participate in the regression of MES.

### P-1002

#### IDENTIFICATION OF NOVEL GENES DOWNSTREAM OF FGFR2 CONTRIBUTING TO SYNOSTOSIS OF THE CORONAL SUTURE IN A MOUSE MODEL FOR CROUZON SYNDROME

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Mutations in FGFR2 are the main cause of Crouzon syndrome. Patients are affected by synostosis of the coronal sutures and midfacial hypoplasia and require complex surgery. In a mouse model for Crouzon syndrome carrying the Fgfr2C342Y allele, we have determined that the craniosynostosis phenotype develops perinatally, between E17.5 and P14. To assess which downstream targets of FGFR2 are contributing to the pathogenesis of the phenotype, we employed transcriptome profiling of the coronal suture. Analysis of expression data identified five novel candidate targets of FGFR2 signalling associated with osteogenic differentiation (Dpt, Osr1, Nov, Dlk1, Kera) that are downregulated up to 3.5-fold in mutant coronal sutures. These genes have been reported as regulatory factors during osteoblast and chondrocyte differentiation and could contribute to the formation and homeostasis of suture patency. We present data on the validation of the differential expression of these genes at different stages of development using qPCR and ISH.

## 11. FACIAL RECONSTRUCTIVE SURGERY

### P-1101

#### ELIMINATION OF FACE DEFORMITIES USING BONE GRAFTS AND IMPLANTS.

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**Introduction:** Post-traumatic and postoperative deformities of the face not only lead to functional disturbances, but also to significant disfigurement of the patient's face and severe mental disorders. We have analyzed the results of surgery aimed to eliminate facial deformities.

**Objective:** The aim of the study was a comparative evaluation of methods using bone grafts and implants to correct maxillofacial deformities.

**Material and methods:** We analyzed medical records of 41 patients aged 16 to 57 years with deformities of the face, who were treated at the Maxillofacial Surgery Department of Belorussian State Medical University from 2004 to 2011.

**Results:** Bone grafting was carried out as a primary procedure in 22% of cases and as a secondary procedure in 78% of cases. Deformities of the upper jaw accounted for 8% of cases, with 51% involving the mandible. The remaining cases involved frontal bone - 10%, parietal - 4.5%, superciliary arches - 4.5%, orbital walls - 11.4%, zygomatic bone - 2.3%, temporal bone - 3.4%, occipital - 1.1%, nasal bones - 2.3% and TMJ - 1.1%. Traumatic defects of the body of the maxilla occurred in 42.9%, of the alveolar process in 28.6%, of the zygo-alveolar ridge in 14.3% and of the anterior wall of the maxillary sinus in 14.3%. Traumatic defects of the body of the mandible accounted for 42.2%, angle - 26.7%, ramus - 24.4% and alveolar process - 6.7%. Bone autografts were used in 33.3% of cases, allograft in 18.8% and implants in 47.9%. Heterotopic autologous grafts from the iliac crest were used in 81.3% of cases, orthotopic grafts of the mandible in 12.5% and heterotopic zygo-alveolar ridge grafts in 6.3%. Where alloplastic heterotopic grafts were used the donor site was iliac crest - 11.1%, rib graft - 22.2%, orthotopic grafts of the mandible 66.7%. Mesh titanium implants were used in 56.5% of cases, titanium/silver in 13%, tantalum 13%, collagen 13% and complex (bioplatant # 000319, the Stimul-OSS, Kafam) in 4.3% of cases.

**Conclusion:** The study showed that the use of bone autograft to correct maxillofacial deformities produces good aesthetic results. However in some clinical situations, it is justified to use allogenic grafts and implants.

### P-1102

#### AN ALTERNATIVE TECHNIQUE FOR RECONSTRUCTION OF THE ORAL COMMISSURE AFTER RESECTION OF BASAL CELL CARCINOMA RECURRENCE: CASE REPORT

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**Introduction:** The reconstruction after excision of cutaneous malignancies of the lip can present a challenge for the maxillofacial surgeon who seeks excellence in the restoration of facial aesthetics and functional movements of this unique structure. These can range from small deformities amenable to primary closure, to larger deformities ideally suited to reconstruction with tissue transfer. Lips are included in the lower third of the face and play an important role in facial appearance and function. Oral commissure defects present difficulties in common with all cross-lip flaps used for oncological reconstruction involving several aesthetic units such as upper and lower lip, and may have a blunted or asymmetric appearance after reconstruction.

**Patients and Methods:** We present the case of a 91 years old patient with a diagnosis of ulcerated Basal Cell Carcinoma of the nasolabial fold. The lesion had a maximal diameter of 4,8 cm, extending to and involving the oral commissure. The initial intervention was performed in October 2008 and included an immediate reconstruction using an inferior double Limberg flap. The procedure was carried out under local anaesthesia and sedation. 18 months later the patient developed a recurrence of the primary lesion, presenting with a nodular lesion, measuring 25 x 14 mm, which was located again in the commissural region. The recurrence was treated pharmacologically with Aldara (Imiquimod 5%) over a period of six weeks. Due to insufficient therapeutical response we proceeded to surgical excision of the cancerous tissue and performed a reconstruction of the resulting 1,5 x 1,5 mm defect through a rotational flap.

**Results:** The most rewarding lip reconstruction for both patient and surgeon are those that preserve or fully restore the anatomical functional structures. In this case the oral commissure and its neighbouring structures suffered distortion following the initial surgery and the objective of the secondary procedure was to eliminate the tumour with clear margins and try to reproduce the anatomical features of this complex area. At 9 months follow-up, the patient had noticeable improvement in the aesthetic and functional results and showed lip competence similar to that prior to surgery.

### P-1103

#### PRINCIPLES OF LOWER LIP RECONSTRUCTION AFTER TUMOUR SURGERY

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**Introduction:** Lower lip cancer is one of the most frequent tumours of the oral-maxillary region seen in patients in their 70's and 80's in Germany. The incidence has decreased over the past decades, although the reason for this is unknown. More than 100 different reconstructive strategies after lower lip resection have been published. The aim of this study was to analyse treatment results after tumour surgery and reconstruction of the lower lip.

**Materials and methods:** A prospective study was undertaken to evaluate treatment results after lower lip reconstruction following ablative tumour surgery between 2009 and 2012. The following clinical and pathological parameters were collected using a databank [SPSS 17.0]: age, sex, tumour size, reconstruction and outcome.

**Results:** We analyzed a total of 22 patients. There were more men than woman (ratio 2:1). The youngest patient was 53, the oldest 85 years of age. 15 patients had pT1 tumours and 7 pT2 tumours. All cases were R0-resections. The reconstruction strategy was as follows: wedge-shaped or w-shaped resections were performed in 7 cases, another 8 patients were reconstructed by unilateral or bilateral FRIES-plasties. In seven cases a subtotal resection of the lower lip was necessary, the reconstruction performed in accordance with GRIMM-JOHANSON. All cases showed good aesthetic results, and good function was achieved even in case of subtotal lower lip reconstruction. There were no recurrences.

**Conclusion:** Based on our experience we recommend the use of only some specific reconstructive strategies. Defects up to one third of the lower lip should be directly closed (wedge-shaped or w-shaped resections). In cases of resections more than one third, unilateral or bilateral FRIES-plasty should be the preferred option. Box-shaped resections are necessary to treat T2 tumours and the reconstruction strategy of choice for these cases should be the method described by GRIMM and JOHANSON. The main advantage of all the procedures is their ability to be performed under local anaesthesia along with excellent aesthetic and functional results. The edentulous mandible is more problematic due to inversion of the lip in these cases.

**P-1104**  
**TISSUE EXPANSION IN PAEDIATRIC CRANIOFACIAL RECONSTRUCTION.**

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**Introduction:** Craniofacial reconstruction presents a complex challenge due to the confluence of highly visible aesthetic units. The development of tissue expansion has added another technique for management of defects which cannot be eliminated primarily without undue tension. Our study was performed to evaluate the possibility of tissue expansion application in optimizing the outcome of paediatric plastic surgery.

**Materials And Methods:** Since 1995 to 2011 46 patients have undergone reconstructive surgery using tissue expansion: 13 patients with pigmented nevi, 8 with burn injuries, 8 with scar defects after haemangioma and lymphangioma treatment, 7 with other injuries (animal bites, gunshot wounds, car crash injuries), 6 who have undergone auricular reconstruction and 4 with congenital pathology. The age range was from 2 to 18 years. A total of 86 expanders were placed, among them 56 latex and 30 silicon balloons. Since 2007 only silicon expanders have been used. Average time for full balloons was 12 to 46 days.

**Results:**

1. Serial expansion of the expanded flap was performed a second time for 9 patients and a fourth time for 2 patients.

2. There were two main complications: necrosis over the expander and a port failure.  
3. Defects were successfully managed in all patients.  
4. Reconstruction was accomplished with excellent cosmetic results.

**Conclusions:** Repeated tissue expansion is a safe and effective procedure for use in paediatric plastic surgery. Use of silicon expanders is preferable to latex ones. Tissue expansion is advantageous in facial reconstruction, because the donor site is well preserved, while large defects are reconstructed with contiguous skin of similar texture, colour, thickness and sensation. Such surgery creates minimal scar formation. With carefully planned use of tissue expansion in paediatric cranio-facial reconstruction, all defects can be reconstructed reliably and in accordance with aesthetically accepted principles.

**P-1105**  
**SLIDING ISLAND FLAP FOR RECONSTRUCTION OF NASOLABIAL AREA AFTER TUMOUR ABLATION**

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**Introduction:** Skin cancer is the most common malignancy occurring in humans. In most cases it requires surgical ablation and three dimensional reconstructions. The main goal is to excise the tumour with safe margins and depth, causing often wide defects. Reconstruction of such defects is difficult because of the many functional and aesthetic units involved. Reconstructive goals are: complete cover of the defect with skin, re-establishment of the vermilion border, good stomal diameter, and function of the oral sphincter.

**Material and methods:** Our patient is a female of 82 years with histopathological diagnosis of squamous cell carcinoma in the lateral upper lip region, of 2 x 2 cm of diameter and exophytic. No intra-oral lesions or nodes were found on examination. No bone infiltration or pathological nodes were shown on CT.

Under general anesthesia, excision of the lesion with safe margins and reconstruction with a sliding island flap was performed. Laxity of subcutaneous tissue was increased in our patient because of her age, which allowed sliding of the flap.

**Discussion:** Monitoring of the future defect is a critical part of any reconstructive procedure. The best option for monitoring depends on the relationship between the defect and the surrounding tissue, presence of facial hair, laxity of the surrounding tissue, previous scars and the need to re-establish function in the area concerned. For wide defects, not amenable to direct closure, local flaps are usually preferable if the tension on the flap is not excessive.

**Conclusions:** Nasolabial region tumour ablation should respect oncological margins, and ultimately reconstruction of the defect should re-establish function of the region and be aesthetically acceptable.

A local flap is a suitable technique; it provides similar colour and texture of the skin of the defect, its results are



usually acceptable in elderly patients with additional skin laxity, respecting the function of the structures involved.

#### P-1106

### RECONSTRUCTION OF FRONTOTEMPORAL SKIN TUMOURS

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**Introduction:** Frontotemporal reconstruction after skin tumour resection is a challenge for the surgeon due to anatomic limits and structures, and the difficulty in achieving a good aesthetic result.

**Case reports:** Reconstruction of the defect has to be individualized depending on the size, histology and depth of the tumour, anatomical structures, age and patient's comorbidities. Different types of flaps have been used to reconstruct this particular region: local (rotational, advancement), regional (myofascial from temporal muscle), split skin grafts or a combination of the three. The primary tumour was basal cell or squamous cell carcinoma and in some cases the frontal branch of the facial nerve had to be sacrificed due to tumour invasion. In one patient a full thickness resection including periosteum and bone milling had to be performed in order to obtain clear margins.

Some patients had multiple primary tumours that dictated the kind of reconstruction carried out, and in others the best option would have been a microvascularized flap but it could not be done because of their age or co-morbidities.

**Conclusions:** Local flaps are a reliable and predictable option when reconstructing a defect in the head and neck area but care must be taken when choosing the design in order to avoid complications such as flap necrosis, haematoma, alteration of anatomic structures (in this area specially the eyelids, eyebrows, hair implantation) or aesthetically unacceptable scars.

#### P-1107

### ACUTE EPIDURAL HAEMATOMA AFTER CALVARIAL BONE GRAFT

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**Introduction:** We report a case of acute epidural haematoma after calvarial bone graft harvesting, along with a literature review.

**Case Report:** A 60-year-old male with past medical history of intracerebral haematoma, presented with a nasal septal tumour. For reconstruction of the nasal septum after the resection, calvarial bone graft was harvested. Although a full thickness defect of cranial bone had occurred during the harvest, the donor wound was closed after effective haemostasis and penrose drain placement. The cerebral CT 1 hour after the operation did not show any sign of intracerebral haematoma and consciousness and vital signs were unremarkable. 7 hours after the operation, his conscious level had decreased and left hemiplegia had appeared. The cerebral CT revealed an acute epidural haematoma and emergency haematoma evacuation was performed. Although the patient was disoriented and had left complete hemiplegia after the operation, he regained the ability to

walk after four months of rehabilitation therapy.

**Discussion:** Nasal reconstruction using autograft tissue allows us to define the contour of the nasal bridge and is effective for cases with severe deformity. Among the major donor sites such as iliac bone, cranial bone and ribs, calvarial bone is commonly chosen due to less bone absorption of the graft and less noticeable scar. Jackson et al reported that the rate of severe complication such as dura trauma or subarachnoid haemorrhage following cranial bone harvest is about 1%. The lucid interval and distinctive clinical characteristics of acute epidural haematoma, makes diagnosis more difficult, yet prompt diagnosis and immediate haematoma removal is important as the level of cerebral damage directly affects the prognosis. To diagnose the haematoma immediately, post operative neurological observations and cerebral CT are necessary. In addition, the complication needs to be considered especially for patients with previous intracerebral haematoma.

#### P-1108

### VALUE AND MODIFICATION OF LIMBERG'S TRANSPOSITION FLAP FOR MALIGNANT FACIAL TUMOURS

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The surgical treatment of malignant facial tumours requires an oncologically safe, and aesthetically satisfying outcome. For this purpose, the range of possibilities must be known and it is a need for some modifications. Transposition flaps represent one possibility for reconstruction. LIMBERG has planned and calculated a reconstruction method not only geometrically exact in two dimensions, but he also considered their influence on the third dimension. He has made the method of defect coverage predictable by rhomboid-shaped transposition flap. The simple planning principle is based on the construction of equal-sided triangles. The key issue here is closure of the donor site. This method is also used for reconstruction of facial skin defects.

From September 1993 to April 2012, we performed 1153 outpatient operations for excision of facial skin tumours. The defects were closed by 343 regional flaps (30%), 265 full thickness skin grafts (23%) and 545 end-to-end closures (47%). Of the 343 regional flaps, 183 were LIMBERG's transposition flaps (16%).

Over the course of time the number of LIMBERG's flaps decreased. We found that when a postoperative proven R1 status occurs, an exact 3-dimensionally orientated reoperation is much more difficult after LIMBERG's flaps have been used in comparison to full thickness skin grafts or end-to-end closure of the wound edges. The LIMBERG flap for reconstruction of the ala nasi and lateral eyelid areas remains essential.

Over time, we modified the exact calculations of the original LIMBERG's transposition flap to achieve a better adaptation to aesthetic subunits of the face. The modification is a rounding off of the top of the transposition flap by original geometric planning.

**P-1109****RECONSTRUCTION OF THE TEMPORAL FOSSA WITH TITANIUM MESH AFTER TEMPORALIS MYOFASCIAL FLAP TRANSPOSITION**

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The temporalis muscle flap (TMF) is a versatile technique for different purposes (reanimation of facial paralysis, mass defect fill at the orbit and midface, and reconstructions of the oral cavity, palate and skull base). One of its limitations is the resulting facial deformity due to secondary depression at the donor site. For correcting this subsequent deformity alloplastic materials (acrylic materials, porous polyethylene implants, surgical cement) are often used, their main potential problems being infection, mobilization and/or extrusion of the implant.

We report 2 of the 26 cases treated in our department from 2010 to 2012 whose surgical defects were reconstructed with the use of a TMF, and immediate primary reconstruction of the temporal fossa contour with a titanium mesh anchored at the calvarium, outer wall of orbit and zygomatic arch.

**Cases**

CASE 1: 61 years old man with a polymorphous low-grade adenocarcinoma (T2 N0 M0) of the left side of the soft palate (Fig. A).

CASE 2: 82 year old woman with a well-differentiated squamous cell carcinoma (T3 N0 M0) of the left maxillary alveolar ridge and hard palate (Fig. D).

**1. SURGERY:**

- a) Ablative surgery (Fig. B, E).
- b) TMF raising and sectioning of the zygomatic arch (Fig. B, E).
- c) Titanium mesh placement and fixation (Figure C, E).

**2. POSTOPERATIVE:** Uncomplicated, with good aesthetics of the temporal region and no evidence of locoregional recurrence of the disease (Fig. C, F).

**Discussion and conclusions.**

The temporalis muscle flap is widely established for reconstruction of cranio-maxillofacial defects due to the ease of harvesting, size, versatility and low complication rates. However, the aesthetic defect at the donor site leads to an apparent collapse in the absence of reconstruction. Various alloplastic materials have been usually used whose main complications include secondary infection, mobilization and/or extrusion of the material.

In our series, none of the 26 cases had immediate or delayed complications after the placement of the mesh, with good aesthetics of the temporal fossa contour. Only in one case was there collapse of the mesh because of an intense direct trauma in the area as the result of a traffic accident. The immediate reconstruction of the temporal defect after TMF transposition with the use of a titanium mesh is an easy and safe method (probably also useful for secondary correction), presenting excellent long-term functional and aesthetic results.

**P-1110****THE SELECTION OF RECONSTRUCTIVE METHODS AFTER WIDE EXCISION OF MALIGNANCY OF THE LOWER LIP**

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**Background and purposes:** The process of lower lip reconstruction after excision of malignancy should be efficient in minimizing recurrence of the malignancy and producing good functional and cosmetic outcomes. When choosing the operative method for lower lip reconstruction, we obtained acceptable outcomes based on our treatment policy where we chose either a barrel-shaped excision or the Webster modification of the Bernard operation.

**Methods:** We operated on 26 patients during the period September 1996 to September 2010. For these patients, we reconstructed the lower lip malignancy using either a barrel-shaped excision (figure.1) or the Webster modification (figure.2), because we were concerned about the amount of residual tissue on the lateral side of the vermilion following excision, due to the location and size of the defect. Our clinical series were followed up for at least one year postoperatively to evaluate whether they were satisfied with cosmetic outcomes and if there were any recurrences, metastases or complications.

**Results:** In our series, three patients underwent a single barrel-shaped excision, nine had a double one, six had a unilateral Webster modification and eight had a bilateral Webster modification. Among 26 patients, all but one were satisfied with the postoperative shape of the lip. Of the three patients who experienced recurrences after the operation, one had both recurrence and wound dehiscence. This patient needed to have additional surgery, but experienced recurrence again. Of the patients who underwent the Webster modifications, one underwent a commissuroplasty, because this patient had difficulty wearing a denture. In addition, two patients complained of drooling and four reported altered sensation.

**Conclusions:** We speculated that we could obtain sufficient reconstruction if we applied only one of the two surgical methods, which are a barrel-shaped excision and the Webster modification of the Bernard procedure. We have successfully reconstructed the lower lip in all patients. In addition, the treatment outcomes were also satisfactory from both functional and cosmetic perspectives.

**P-1111****PURE RETICULATE TITANIUM IN PLASTIC SURGERY FOR DEFECTS AND DEFORMITIES OF THE BRAIN AND FACIAL SKELETON**

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**Relevance.** Treatment of maxillofacial deformity after trauma or its consequences is a significant problem for maxillofacial surgeons. Maxillofacial trauma occurs frequently and the incidence is increasing.

These injuries belong to combined and multiple injuries of the maxillofacial region should be used as the basis for the scientific development of multi-therapeutic-tactical approach.

*Aim.* To study pure reticulate titanium as an implant in aesthetic and reconstructive surgery.

*Objects and methods.* Highly pure titanium has important characteristics: biologically inert, corrosion resistant, nontoxic, maintains high mechanical strength over the long term in vivo, flexible, low specific gravity, etc.

We developed an anatomotopographic map of defects and deformities of the brain and facial skeleton of the patients. To repair the cranial bone defects, we used the following method: 2 cm from the front edge of the scalp, a skin incision of subcutaneous tissue was performed with transcranial access, galeoaponeurotic galea raised from the bone with further skeletonization of the defect or deformity in the region. Then we made a thorough sequential separation of scar tissue. Thermocoagulation devices, compression, hot isotonic sodium chloride solution were used for haemostasis. We examined the defect visually and anthropometrically. We used reticulate titanium for modelling the appropriate implant to the contour of the cranial bones, to a size of 1.5 cm more than the size of the defect using "Strum" instruments to fix the implant with titanium screws. We covered the implants with a layer of spongy collagen, returned the galeoaponeurotic galea to the site and repaired the surgical wound with polyamide catgut leaving the rubber drains in situ.

*Results.* We performed 52 operations in 36 patients: 22 male, 14 female under general anaesthesia. Postoperatively, patients underwent a complex anti-inflammatory therapy. Sutures were removed 9-10 days after surgery. For repair of facial defects we used the same methods for selecting access to the face skeleton.

*Conclusion.* Reticulate titanium implants allows restoration of facial aesthetics and function as the result of post traumatic deformity, and as a result prevents the development of psychological issues due to facial disfigurement.

#### P-1112

### REDUCING THE RISKS OF ECTROPION AFTER RESECTION AND RECONSTRUCTION OF EXTENSIVE FACIAL CANCER

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*Introduction:* Lower eyelid ectropion is a well recognized complication after local or regional flap reconstruction of infraorbital defects. We present a case of extensive facial infiltrative basal cell carcinoma (BCC) with bony invasion and several surgical methods to reduce the risks of eyelid ectropion.

*Case Report:* A 65 year-old man presented with a longstanding extensive morphoeic and infiltrative BCC of the left cheek and bridge of nose. CT scan confirmed infraorbital rim invasion. Resection of the tumour included infraorbital rim and floor. Reconstruction was made with a titanium miniplate and PDS sheet insertion with a cervicofacial and glabellar flap. For the superior end of the

cervico-facial flap, the following techniques were performed: anti-gravitational suspension sutures between the base of and periosteum of maxilla, tension sutures with plastic tubing over both ends of the superior skin edges, double-sided biological resorbable tissue patch sealant (Tissuemed), anti-gravitational suturing technique and multiple layer wound closure. The patient showed minimal ectropion with no epiphoria 9 months after surgery.

*Discussion:* Scar tissue contracture after local or regional flap reconstruction for defect closures in the infraorbital and periorbital region often results in ectropion of the lower eyelid. Various surgical procedures have been reported to reduce the gravitational pull and inferior tractional forces from the midfacial and cervical regions on the lower eyelid.

*Conclusion:* Although significant ectropion of the lower eyelid was expected in our case of resection and reconstruction to treat an extensive facial and infraorbital tumour, a combination of surgical procedures was used to minimize this unfavourable outcome.

#### P-1113

### THE USE OF TWO TYPES OF HYDROXYAPATITE CEMENT AFTER TEMPORALIS MYOFASCIAL FLAP TRANSPOSITION IN 29 PATIENTS

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The temporalis muscle flap (TMF) is a reliable myofascial flap that has been widely used for intra- and extraoral reconstruction.

Temporalis muscle transposition always leads to a significant and permanent cranial deformity. The remaining defect strongly outlines the lateral orbital rim, the temporoparietal insertion of the muscle and the zygomatic arch, thus creating an undesired aesthetic result which somehow should be avoided.

In partial or total rotation of TMF the use of biomaterials may represent a valid alternative for recontouring the donor-site.

Hydroxyapatite cement is becoming the preferred alloplastic material for craniofacial reconstruction because of its ease of application, biocompatibility, and ability to be replaced by the host's living bone.

*Materials and methods:* In order to evaluate results for clinical application of Hydroxyapatite cement the authors studied a series of 29 patients in whom 2 kinds of Hydroxyapatite cements (BoneSource -Stryker Leibinger and Norian CRS-Synthes-Stratec,) were placed after partial or total TMF transposition.

*Conclusion:* The use of hydroxyapatite bone cement after TMF rotation or transposition was found to be simple and effective method to correct the soft tissue volume deficit in the temporal area. This alloplastic material is easily carved in a 3-dimensional shape, is biocompatible and osteoconductive, and it permanently maintains its volumen and position after its placement. It also proves to be resistant after radiation therapy.

## 12. FACIAL REJUVENATION, AESTHETIC SURGERY AND SCULPTURING

### P-1201

#### FACIAL SKIN BLEACHING AND ITS POTENTIAL IMPLICATIONS FOR THE OMF SURGEON

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The risks associated with increased levels of unprotected ultraviolet light exposure, particularly for those with fair skin, are well known.

Despite high-profile campaigns warning of the risks of skin cancer, individuals continue to seek a 'sun-tan' through sun or sunbed exposure. The reasons for this are complex, but are due, in part, to perceptions of increased attractiveness, health, wealth and social status associated with a tanned complexion.

In many parts of the world, however, the converse is true. In parts of the world where complexions are generally darker, individuals may seek to lighten their skin for exactly the reasons highlighted above and for other social reasons. Lighter facial skin is advertised as leading to increased job and marriage prospects.

The only way this can be achieved is through the usage of skin bleaching creams, increasingly available across the world and used predominantly on the face and hands. The active ingredients may include hydroquinone, mercurial compounds and corticosteroids. Despite their effectiveness, these products are associated with significant dermatological and systemic adverse effects which has led to attempts to curtail their manufacture and sale.

Adverse effects range from impaired wound healing, cellulitis, rosacea, atrophy and perioral dermatitis to squamous cell carcinoma, tubular necrosis/nephropathy and psychiatric disturbance.

With an increase in usage, the possible impact to our practice is clear. Ethnic populations in Europe and elsewhere in the West are increasingly using the products. If usage is not identified and discussed prior to facial procedures, there may be both clinical and medico-legal implications. Additionally, patients may need to be counselled about the long-term risks of using these products which may be systemic.

Using relevant clinical examples and the latest published literature, this paper explores the reasons why these products are used, common adverse effects and, importantly, the implications to all those involved in surgical procedures involving the skin of the head and neck.

### P-1202

#### LIPOSTRUCTURE IN CHILDREN FACIAL MALFORMATIONS: A PROSPECTIVE 3-DIMENSIONAL EVALUATION

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**Introduction :** Autologous fat grafting for volume augmentation in soft tissues has grown in popularity in the paediatric plastic surgery community, despite a lack of quantifiable evidence of graft survival and predictable results for child patients. The objective is to quantify by objective method the amount of fat graft survival in paediatric reconstructive surgery.

**Methods :** Clinical evaluation of all children was performed under standardized conditions through a prospective analysis within a period of one year. All patients, under 18 years of age, were photographed using a three-dimensional imaging system. Data was analysed using three-dimensional analyzing software to quantify volume improvements postoperatively and during the follow-up.

**Results :** Eleven children were included and followed up for 12 months. Mean age was 7.4 years. The mean amount of fat grafted was 13 cm<sup>3</sup>. At the end of this follow-up, the mean amount of surviving fat graft was 40%. Complimentary fat grafts were needed in 27% of cases. No significant complications occurred.

**Conclusion :** Until now, the literature has failed to provide objective evidence of fat graft survival in children. This study, using three-dimensional data, showed 40% of fat graft survival. The use of three-dimensional photograph and analysis might be helpful for surgical planning and follow-up.

### P-1203

#### PREOPERATIVE ECHOTOMOGRAPHIC ASSESSMENT OF TRACHEOSTOMY DEFECTS MANAGED BY FAT GRAFTING

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**Purpose:** The first autologous adipose tissue grafting was performed by Neuber in 1893. In the early 1980s Illouz and Fournier introduced closed liposuction. In the 1990s Coleman published a new method of atraumatic fat grafting. The aesthetic and functional sequelae of tracheostomy are frequently troublesome. Conventional procedures comprise local flaps to close any soft tissue defects and surgical transposition of soft tissue to fill the depression. The purpose of this study is to describe the role of the echotomography in the preoperative diagnostic assessment of post-tracheostomy defects.

**Materials and methods:** Between January 2008 and December 2010 we have used fat grafting to manage 5 patients affected by post-tracheostomy depression and hyper-

trophic scars. The study population was composed of 2 patients who underwent fat grafting after cancer-related ablative surgery and 3 patients for the sequelae of Maxillofacial trauma. Preoperatively we evaluated the post-tracheostomy defects with the aid of echotomography. Fat grafting is performed by means of multiple infiltrations between the skin and the subcutaneous tissue above the trachea. The fibrotic bands between the skin and the underlying tissue are interrupted by inserting a V-shaped dissector cannula subcutaneously. This procedure is performed several times until the tissue depression is corrected and the eutrophic skin is restored. Finally any residual scars are excised to obtain a better aesthetic result.

*Results:* Our innovative approach is to evaluate the post-tracheostomy defects with the aid of an echotomography. This technique has not been reported in the scientific literature. This method permits us to quantify the thickness of the subcutaneous tissue between the skin and the trachea and to plan the surgical procedure. The positions of the vital structures of the neck (trachea, thyroid and great vessels) are identified preoperatively. The day after the surgical procedure an echotomographic control is easily performed to assess the morphological change of the transplanted site.

*Conclusion:* We are convinced that this approach can be a valid tool to preoperatively evaluate the tracheostomy defects; moreover prospective studies enriched by long term echotomographic controls can be performed. It can objectify the long term stability of the graft and the absorption of the fat. Moreover it may be helpful to develop a mathematical model of absorption. Finally it can be a defensive tool for any medico-legal disputes.

## 13. HEAD & NECK INFECTION

### P-1301

#### ANTIBACTERIAL EFFICACY OF OZONE GAS ON PERIAPICAL LESIONS

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The aim of this study was to investigate the effect of Prozone, which produces ozone gas, on microorganisms isolated in periapical lesions. This pilot study was carried out in vivo and included 10 patients with chronic periapical infections in 10 maxillary teeth. In all cases endodontic treatment had failed and surgical endodontics (apicectomy) was indicated. During surgery samples were taken from the lesion to identify the microorganisms and a second sample was taken after ozone gas application for 12 sec. Samples were taken, transported and prepared based on standard microbiological protocols.

In seven cases the sample was sterile while in three cases staphylococcus aureus was isolated. In all cases staphylococcus aureus colonies were not found after ozone gas application proving the efficacy of ozone gas against bacteria.

**Key words:** ozone, periapical lesions, staphylococcus aureus.

### P-1302

#### NOMA: AN ILLNESS DEVOURING BOTH BEAUTY AND LIFE

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Noma or cancrum oris is an infectious disease of unknown aetiology that affects children and is characterised by oral mucosal ulcers and severe destruction of muscle, bone and skin.

The authors describe the case of a 14 year old girl from Angola, with noma sequelae (severe limitation of mouth opening, miositis ossificans with formation of an ankylotic block of bone and destruction of the jugal region). The patient's treatment was managed using a multidisciplinary approach that included stomatology and paediatric surgery, and she underwent reconstructive surgery on six occasions.

Noma remains a rare disease. It is poorly recognised and is difficult to treat.

### P-1303

#### A LOCAL REVIEW OF ANTIBIOTIC PRESCRIBING IN ODONTOGENIC ABSCESSSES

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Hospital admissions in England for dental abscesses have

doubled in recent times. Odontogenic abscesses account for a significant proportion of emergency inpatient admissions to Northwick Park Hospital Maxillofacial department. Once admitted, these patients are all treated with IV antibiotics and the majority require surgical intervention.

A wide range of bacterial species are implicated in dental abscesses including streptococcus mutans, viridans, prevotella, porphyromonas and bacteroides. These bacteria are mostly a mix of facultative and strict anaerobes. Although the gold standard of treatment for any abscess is incision and drainage, antibiotics are an important adjunct for patients presenting with systemic symptoms.

The most commonly used antibiotics are Co-amoxiclav (Augmentin), Amoxicillin, Benzylpenicillin, Clindamycin and Metronidazole. Local guidelines recommend the use of IV benzylpenicillin and Metronidazole (in non-allergic patients) based on the current literature suggesting optimal coverage with these antibiotics for the causative organisms. In penicillin allergic patients 500mg Metronidazole IV tds and 500mg Clarithromycin IV bd is recommended.

**Aim:** To investigate which IV antibiotics are prescribed for inpatient admissions of odontogenic abscesses at Northwick Park Hospital, and whether this was in line with the local protocol.

**Method:** A retrospective study of inpatients with odontogenic abscesses using a proforma filled in based on the patient's hospital notes. A list of patients admitted was obtained from the OMFS handover sheets and information gathered on patient demographics, treatment, antibiotics prescribed and microbiological sensitivity of any pus collected.

**Results:** The data for 35 patients with an odontogenic abscess admitted over a 6 month period were collected. 8 patients were allergic to penicillin. Of the remaining 27 patients, only 3 were given the recommended protocol of 1.2g Benzylpenicillin four times a day with 500mg Metronidazole IV. 87.5% of penicillin allergic patients received the recommended protocol.

**Conclusion:** Local protocol regarding prescribing in odontogenic abscesses was not being routinely followed. Prescribing of antimicrobials needs to be directed at causative organisms and based on clinical evidence to ensure efficacy of treatment and resolution of symptoms. The protocol needs to be implemented and audited in the future to ensure compliance.

### P-1304

#### ORAL TUBERCULOSIS. REPORT OF TWO CASES AND LITERATURE REVIEW.

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Tuberculosis is the most classic example of granulomatous disease. Is caused by Mycobacterium tuberculosis and other species. It remains an important disease and to be taken into account when establishing a differential diagno-

sis. Currently, oral tuberculosis is rare, manifesting in 0.05% -3.5% of patients who are diagnosed with tuberculosis. Lesions that appear are often blamed on other conditions, this fact being of great importance since it is a treatable and potentially curable. We present 2 cases of oral tuberculosis diagnosed in the last year in the Department of Oral and Maxillofacial Surgery, University Hospital Marqués de Valdecilla.

#### P-1305

### MANAGEMENT AND SURGICAL INTERVENTION OF UNUSUAL NECK SWELLINGS

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**Introduction:** swellings of the oral cavity and neck can be a common A&E presentation, often caused by an odontogenic source. There is much written in the literature about management. Surgical intervention coupled with the modern antibiotics and their widespread use has reduced the morbidity and mortality from these infections.

We present two unusual cases presenting as acute emergencies and discuss interesting clinical, radiological and microbiological findings.

**Cases:** 1) Female aged 49 with a discharging left neck swelling extending to the scapula and clavicle had a working diagnosis of actinomycoses and was treated with surgical drainage and microbiology supported antibiotic therapy. 4 hourly debridement in the post-operative phase with hydrogen peroxide and saline through 2 indwelling neck catheters improved her signs and symptoms leading to recovery and granulation healing of residual neck wounds.

2) Female aged 37 presented to A&E with Ludwig's Angina 2 days post XLA of a lower 2nd molar. The swelling extended into the neck as far as the clavicle and empirical antibiotic therapy coupled with surgical drainage and a tracheostomy surgical airway prevented deterioration. A working diagnosis of a phoenix abscess on a background of confirmed H1N1 flu status treated in the post-operative phase with similar methods to case 1.

#### **Conclusion:**

In an era of improved public health, large odontogenic infections have declined. There are still a cohort of patients that present with swellings of interesting aetiology. Their care should involve airway protection, and the management strategies above suggest an appropriate regimen for effectively treating such cases.

#### P-1306

### THE CLINICAL RELEVANCE OF MICROBIOLOGY SPECIMENS IN OROFACIAL ABSCESES OF DENTAL ORIGIN

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It is common practice to take a specimen for microbiological culture and susceptibility (MC&S) following drainage of orofacial abscesses. Patients are often discharged promptly following surgical intervention, often without follow-up. The aim of this study was to determine if rou-

tinued MC&S had any therapeutic value in the care of patients with orofacial abscesses of dental origin.

Retrospective study was undertaken of clinical records for those patients admitted for surgical management of orofacial abscesses at Royal Shrewsbury Hospital between January 2010 and December 2011. Data included bacteriology specimen and result, admission details, antimicrobial treatment and outcome.

Seventy-nine patients were included in the study (males = 41, 51.8%), mean age 34.2 years (median = 31 years). Of those patients between the ages of 18 and 65 (n=64, 81.0%), 24 (37.5%) were unemployed. Forty-three (54.4%) of the cohort were smokers.

Specimens were sent from 62 (78.4%) patients. Samples were positive in 85.4% of cases, of which streptococcus viridans was the most commonly isolated organism (54.7%). Interim reports were published on average 3.25 days postoperatively (median 3 days). 89.9% of patients were discharged within 2 postoperative days.

Only 32.9% of patients were routinely followed up in the outpatient department. According to clinical records, no patients in the cohort required further intervention or alteration of prescribed antimicrobial treatments post discharge.

In conclusion, bacteriology swabs were frequently taken during incision and drainage of orofacial abscesses. Almost 90% of patients were discharged before bacteriology results were available, thus culture results had no therapeutic value. Omission of this practice in the case of uncomplicated, orofacial abscesses could save considerable expenditure within healthcare systems without affecting patient care.

#### P-1307

### PSEUDOANEURYSM OF A FACIAL ARTERY BRANCH (OF ODONTOGENIC INFECTION ORIGIN)

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**Introduction:** Aneurysms of the facial artery are rare and not widely acknowledged. In terms of vessel wall continuity, they can be classified as either true or false (pseudoaneurysm). Pseudoaneurysms are the most frequent in the facial artery, where vessel rupture usually caused by trauma leads to blood extravasation into the perivascular tissues, which form a false aneurysmal sac. In this case, we describe a pseudoaneurysm of non-traumatic origin.

**Case report:** A 42-year-old caucasian man with poor dentition, without cardiovascular risk factors or other systemic illnesses and denying any facial traumatic event, was admitted with an 8 day history of a progressively enlarging left submandibular swelling, despite antibiotic therapy. Examination on admission found it to be 70x60mm in size, tender, non-pulsatile, with fluctuant areas. The clinical diagnosis was odontogenic cellulitis. Computed tomography scan (CT) suggested recent blood extravasation close to the facial artery, confined to the submandibular inflamed tissues, along with pus collections. AngioCT scan further delineated a 13,5x8,3x10 mm pseudoaneurysm from a left facial artery branch.

Catheterization allowed successful embolisation with cyanoacrylate. To avoid uncontrolled bleeding, there were no attempts at surgical pus drainage, relying solely on antibiotic therapy and dental extraction. The patient was discharged 8 days later. At 4-month follow up, there were no clinical nor imaging signs of infection or vessel disruption.

**Conclusion:** Infection can be a rare cause of vessel wall rupture and pseudoaneurysm, of which diagnosis can be challenging due to its unusual position, along with the lack of a supporting history and clinical findings. Pseudoaneurysms may account for unforeseen bleeding in attempted surgical drainage of facial and neck infections.

#### P-1308

### DIAGNOSIS AND TREATMENT OF AGGRESSIVE DESTRUCTIVE MIDFACIAL LESION FROM NASAL COCAINE ABUSE: CASE REPORT.

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Although a central midface destructive process can be caused by multiple conditions, it is less known that cocaine abuse can produce severe destruction with perforation of the palate and extensive osteocartilaginous necrosis of nasal septum mimicking other aggressive pathologic conditions (i.e. nasal-type natural killer/T-cell lymphoma, Wegener's granulomatosis and infectious diseases).

We report the case of a 31-year-old Italian woman who presented with a progressively destructive midfacial process associated with chronic nasal abuse of cocaine. The initial presentation was a small, localized palatal defect mimicking an infectious diseases or granulomatosis and the patient had been treated with antibiotics, without improvement. Consequently, an open biopsy specimen was taken; it suggested the presence of necrosis and chronic inflammation. Four months later the patient appeared, for follow up examination, with a large oronasal communication, loss of vomer and nasal cartilage and nasal deformity. Computed tomography and magnetic resonance imaging revealed, in comparison with initial radiological findings, significant enlargement of the defect. Serologic test results were positive for cocaine. The patient was very self-conscious and concerned about her problem. She abandoned her cocaine addiction and was subsequently treated with radial forearm flap for palatal and nasal septum reconstruction. In the second stage a costal cartilage graft, for support of the septal/columella element and to restore the nasal tip, was performed.

At one year postoperatively, the patient exhibited satisfactory palatal and nasal structure with functional nasal airways.

#### P-1309

### WHAT CAN WE FIND AFTER A TONGUE ABSCESS?

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This is a rare disease, but is adequately discussed in the literature. Needless to say, if the patient has difficulty eating, speaking or breathing, and has pain and fever, these issues should be dealt with initially only later considering the origin of the pathology.

A 64 year old female patient with a history of seropositive rheumatoid arthritis, allergic to penicillin, gastric problems, right knee replacement, non-smoker, no alcohol consumption, hypertension, hyposialia, anxiety and depression, osteoporosis, and polymedicated came to our clinic. She had notice a lump in the middle of her tongue the previous day. Under sedation and regional anaesthesia and with the patient in the sitting position, the abscess was surgically treated.

Microbiological analysis revealed *Streptococcus viridans* (SGV) and *Candida albicans*. Specific treatment with fluconazol 100mg /24h/ 7 days along with bicarbonate rinses several times a day were prescribed. The outcome was favourable.

Three months later, she came back to the clinic, with a recurrence of the abscess. Repeat surgical exploration, using the same anaesthetic and surgical method, obtained more abundant content with a similar characteristic.

It is not difficult to understand what may have occurred: an abscess of the tongue due both to systemic disease (erosive seropositive rheumatoid arthritis), and to the side effects of the anti-inflammatory and immunosuppressive drugs (steroids + leflunomide), which perhaps also caused her other diseases: hypertension, depression, anxiety, osteoporosis, hyposialia and gastric problems.

The physician should be cautious in the treatment and control of chronic diseases of undetermined aetiology in order to avoid causing new symptoms and/or true diseases, which may be referred to as iatrogenic.

#### P-1310

### PARANASAL SINUS MYCOSIS - REPORT OF FIVE CASES AND AN UPDATED LITERATURE REVIEW

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Mycotic chronic rhinosinusitis is a clinical entity produced by several kinds of fungi. It can be classified as an invasive or non-invasive disease. The invasive type can be divided into acute and chronic forms depending of the disease progress and granulomatous and non-granulomatous depending on histological features. The non invasive type is divided into: mycetoma form (fungus ball), saprophytic colonization and allergic fungal rhinosinusitis.

Fungal infections of the paranasal sinuses may occur in patients with chronic sinusitis who usually have a predisposing cause such as neutropenia, prolonged use of corti-



costeroids, uncontrolled diabetes mellitus, HIV infection. Occasionally it may also be seen in immunocompetent patients. It is of utmost importance that physicians suspect the possibility of fungal sinusitis in these patients, especially if they do not respond to medical treatment or when they present with the complications of sinusitis.

Five cases of sinusitis due to fungi are presented in this paper. Two of them occurred in immunocompromised patients and the other three in immunocompetent patients. Two of the latter cases were directly related with the patients professional jobs and therefore may be categorized as occupational diseases.

#### P-1311

### SEVERE ODONTOGENIC INFECTIONS: CAUSES OF SPREAD AND THEIR MANAGEMENT

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Maxillofacial infections have a significant financial cost and can result in severe, even life-threatening complications. Necrotizing fasciitis, airway obstruction, thrombosis of the cavernous sinus, orbital abscess and loss of vision, descending mediastinitis, cardiac tamponade and septicemia have been reported in the literature.

The majority of head and neck infections are of odontogenic origin. The earliest stage of an odontogenic infection is the inoculation of bacteria in the periapical tissues. Portal of entrance may be a carious and/or non-vital tooth, a defective root canal treatment or a deep periodontal pocket. The periapical tissues are the initial point of bacterial growth resulting in a focus of infection, which induces an immune response in the patient. Occasionally the immune system alone or assisted by a therapeutic intervention (dental treatment, antibiotics) suffices in confronting the infection. Otherwise, the infection spreads following the path of least resistance and affects the deep maxillofacial spaces.

The aim of the present study was to investigate various factors, regarding the patient and his pre-hospital treatment, which could lead to the spread of infection. Our experience of the inpatient treatment and the outcome of the infections are also reported.

The study comprised 212 cases, which were reviewed retrospectively. The main origin of infection was odontogenic. 59.9% of the subjects reported the use of antibiotics orally, not infrequently (37%) without prescription. 78.3% had moderate or poor oral hygiene. The percentage of inappropriate use of antibiotics was 8.0%. 63.2% required incision and drainage, while 46.2% underwent extraction of the responsible tooth. No major complications were encountered.

As a conclusion, odontogenic infections remain a common cause of morbidity. Poor oral hygiene, self-medication, inadequate utilization of antibiotics, no treatment of the causative tooth, delayed presentation at hospital and bacteria resistant to empirically administered antibiotics contribute to the spread of infections. We advocate admission, iv antibiotics, modification of the antibiotics according to sensitivity tests and early treatment of the causative tooth as a successful management protocol.

#### P-1312

### CHANGES OF INTEGRATIVE LEUKOCYTIC INDEXES IN PATIENTS WITH FURUNCLES AND CARBUNCLES IN MAXILLOFACIAL AREA

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**Relevance:** Development of inflammatory processes of nonodontogenic genesis is increasing permanently and is parallel to the odontogenic pyoinflammatory processes. The number of furuncles and carbuncles of the total quantity of inflammatory diseases of soft tissues of the maxillofacial region is 19,4%. People of working age make 57,6% of them. Changes of the clinical course, there quick development leads to hard complications which threat to the patient's life: face venous thrombosis, cavernous sinus thrombosis, sepsis. However, the data about changes of integral leukocytic indexes of intoxication during the furuncles and carbuncles development in maxillofacial area is missing the special literature up till now.

**Aim** was to determine changes of integral leukocytic indexes for patients with furuncles, carbuncles in maxillofacial area.

**Objects and methods.** We analyzed 120 outpatient's cards with furuncles and carbuncles in maxillofacial area. Statistical processing was performed using a personal computer and packages of statistical application programs. The data obtained was processed with descriptive statistic method and standard error of the mean (m) was calculated, the median (Me), 25th and 75th percentile (leukocytic index of intoxication (LII), leukocytic index of intoxication by V.K. Ostrovsky (LIIO), lymphocyte -granulocyte index (LGI) were found.

**Results.** When analyzing the obtained data, we revealed authentic deviations of the integral leukocytic indexes of intoxication comparing with standard data. So, the data of LII was 2,2 (1,2;3,7) when the standard indices were 0,3+1,5; LIIO was 2,8 (2,1;3,5); LGI was 2,95 (2,13;4,0) when the standard indices were 4,56+0,37.

**Conclusion.** Changing the integral leukocytic index of intoxication characterizes them as informative tests for evaluation of the patients with furuncles and carbuncles in maxillofacial area treatment effectiveness what proves the need for wider application in medical practice taking into consideration the high socio-economic significance of the problem.

#### P-1313

### THE DRUG "MEKSIBEL" IN THE COMPLEX TREATMENT OF ODONTOGENIC INFECTIONS IN THE MAXILLOFACIAL AREA

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**Relevance:** Last decade the problem of antioxidant therapy was studied by many scientists and described in several articles. Antioxidants became more significant in physicians' daily practice as single drugs or in combination with other drugs. The drug «Meksibel» based on siccine

acid has a strong antioxidant, antihypoxic, lipid regulatory membranoprotective action.

*Aim* was to examine the effectiveness of the drug «Meksibel» in the treatment of odontogenic infections of the maxillofacial region.

*Objects and methods.* We examined 39 patients with odontogenic osteomyelitis of the mandible complicated by infection of two or more cellular spaces treated in Maxillofacial Department of Vitebsk Region Clinic (2007 – 2011). Patients were divided into two groups: the control group (26 people) received standard treatment; the main group (13 people) had complex therapy combined with the antioxidant drug «Meksibel». Patients of the main group had 7 days of intramuscular injections of 200 mg «Meksibel» twice daily; no side effects were observed. We measured the length of hospital stay in days, duration of hyperthermia and maximum body temperature. *Results* were processed with the computer program Statistica 6.0 and «Excel». Differences were recognised statistically significant at  $p < 0,05$ .

*Results.* Duration of hospitalisation of the main group was 9 (8, 9) days, which was significantly lower than in the control group of 10,5 (8; 14) days,  $p = 0,04$ . Maximum body temperature of the main group of patients was recorded 3 (3; 4) days after hospitalisation, which occurred earlier than in control group at 4 (4; 5) days,  $p = 0,004$ . The maximum temperature rise was 38 (38, 38) C, which was significantly lower compared to the control group 38,2 (37,8; 38,8) C,  $p = 0,04$ .

Patients with odontogenic infections of two and more cellular spaces receiving "Meksibel" relative to the control group had shorter length of stay in hospital - 9 (8;9) days compared to 10,5 (8;14) days; shorter duration of hyperthermia - 3 (3;4) days compared to 4 (4;5) days.

*Conclusion.* The drug «Meksibel» reduces the length of patient stay with odontogenic infection of one cellular space and can be recommended in complex treatment of this disease.

#### P-1314

### MOLECULAR-GENETIC PECULIARITIES OF S.AUREUS SINGLED OUT IN PATIENTS SUFFERING FROM THE FURUNCLE OF THE MAXILLO-FACIAL REGION

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The current status of research testifies to the fact that the pathogenesis of a number of diseases is the ability of S.aureus to express a great number of pathogenicity potential factors.

In view of the above the aim of our investigation was the detection of proteins which secrete S.aureus in case of the furuncle in the maxillo-facial region (FMFR) and the explanation of their ethiopathogenetic origin. S.aureus strains being singled out from the wound discharge of the fauces mucous membrane, anterior parts of the nose and

facial skin of 45 FMFR patients and 26 healthy patients were selected for the molecular-genetic investigation and they were tested for the presence of the pathogenicity gene factors with the aid of the polymerase-chain reaction. To validate the hypothesis of the significant role of S.aureus biological properties in pathogenesis of the purulent-inflammatory diseases there were selected primers.

The molecular-genetic investigation of the purulent discharge in the main group of FMFR patients allowed to reveal the priority representation of methicillin-resistant S.aureus strains (in 58,54% of cases) expressing cytolytic toxin-S (19,51%) and -F (58,54%). Besides S.aureus is a toxin producer of the toxic shock syndrome (2,44%) and of staphylococcal enterotoxin-C (41%). It is established that the presence of S.aureus bacteria carrying on the fauces mucous membrane in 36 cases (80%), nasal meatus in 33 cases (73,3%), off the facial skin in 32 cases (71,1%) of FMFR patients and these parameters substantially exceed the level of the given condition in the group of clinically healthy persons (16% of 4 cases). The correlation of pathogenicity genes S.aureus, wound discharge and strains vegetating on the mucous membrane of the nasal meatus, fauces and skin allowed to ascertain their coincidence.

Thus the obtained data testify to the ethiological important role of S.aureus persisting on the mucous membrane of the nasal meatus, fauces and skin in the arising purulent lesions of the facial soft tissues and these data also ascertain a priority representation of methicillin-resistant S.aureus strains expressing the cytolytic toxin and staphylococcal enterotoxin-C being a pathogenic reason of the development and recurrence of the maxillo-facial region furuncle.

#### P-1315

### CASE REPORT: LEMIERRE SYNDROME ACCOMPANING A DENTAL INFECTION

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First case of Lemierre Syndrome has been reported in 1936 from Lemierre. It is caused by a bacterial oropharyngeal infection and it is characterized with internal jugular vein thrombophlebitis. In 81% of cases it is caused by fusobacterium necrophorum.

The main clinic sign is the temperature which varies also by the primary infection. According to other case reports and also the theory, death is very rare, but this infection can cause other complications, so the soon we diagnose the better it is. This syndrome is diagnosed by clinical examination, MRI, echography, CT etc. The most important treatment of this syndrome is the use of antibiotics with broad specter, combining them with antibiotics which fight anaerobic flora. Also of a great importance is using trombolitics and also vital support. Here we are reporting a case with Lemierre syndrome caused by an infection of tooth 38, diagnosed 4 months ago.

*Key words:* Lemierre syndrome, odontogenic infection, jugular venous thrombosis.

## 14. HISTORY OF CRANIO-MAXILLO-FACIAL SURGERY

P-1401

### PAUL TESSIER'S LEGACY

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Dr. Paul L. Tessier was a giant in the field of reconstructive surgery, creating a new surgical speciality and helping many whose severe facial deformities had previously been untreatable. For him it was not enough that patients should "look better than they did before we started". He believed that "if it is not normal, it is not enough". Furthermore, the revolutionary techniques he devised for the treatment of craniofacial birth defects have been successfully extended across geographical and generational boundaries into the seemingly disparate arenas of craniofacial cancer surgery, trauma and facial aesthetic surgery. He had developed an interest in facial plastic surgery after seeing cleft lips treated while a resident, and he was finally able to join the paediatric service at the Foch in 1946. At about this time he started visiting Britain regularly to watch the "fathers of plastic surgery", Sir Harold Gillies, and Sir Archibald McIndoe, where he learnt many new techniques. Tessier organised a symposium in 1967 to present his revolutionary techniques to distinguished international peers, inviting their critical appraisal before continuing. Paris became a haven where Tessier inspired and trained the first generation of craniofacial surgeons worldwide. In 1973 he carried out the first such procedure in Britain at Great Ormond Street Hospital for Children, which he continued to visit for 25 years. Dr. Tessier's capacity for work was remarkable but he was not without other interests. Sculpture was incorporated into his study of facial forms. He was born in 1917 and operated well into his 80s and was still making contributions to the field up to his death in Paris on June 5th at the age of 90. His habitual answer to a challenge -- "Pourquoi pas?," French word for "Why not?" -- became an International motto. In 2000 was given the Jacobson Innovation Award by the American College of Surgeons and was awarded the French Legion of Honor, in 2005. Paul Tessier was a great innovator in the medical profession, the creator of a new surgical speciality which brought hope to many with severe facial deformities that had previously been untreatable. He is acknowledged as the father of craniofacial surgery and his contribution is recognised internationally, crossing the boundaries of the related specialities of plastic, maxillofacial, ophthalmic and neurosurgery.

P-1402

### HISTORICAL BACKGROUND FOR MAXILLOFACIAL SURGEON IMAGE IN PAINTING

Oleg Chudakov<sup>1,2,\*</sup>, Tatyana Mazurkevitch<sup>1</sup>, Anastasiya Lobkova<sup>1</sup>

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*Relevance:* The historical origins of maxillofacial surgery

go into the past. Anthropological researches confirm it. Special instruments for dental surgery were used in ancient Egypt, Roman Empire.

Hippocrates, Aesculapius, Avicenna made a significant contribution in assisting in surgical diseases of the teeth and jaws. Surgical instruments used by the celebrity of ancient medicine amazes by their originality and functionality.

The first paintings by famous artists of XVI century depict a street story showing the master of dental surgery. Most of the pictures demonstrate the folk humour, sharp characterization of characters (Jean Fouquet., Giovanni Domenico Tiepolo, Giovanni Battista Tiepolo). Great artists of XVI-XVIII centuries used amazing transparency of soft colours, the ease and freedom of the psychological situation (Jan Steen, 1668). In the public art gallery in Amsterdam a painting of I.Lingeyabah, (1651) is exhibited in which a dentist is pained as the main character. Using the scenes from the animal's life Charles Verlad (1879) pained accurately the patient's anxiety, fear and tension before teeth surgery in habits, poses and gestures.

The representative of school masters of Dutch painting Johann Goylib Hanchsh (1837-1839) painted the human skull as a necessary attribute of a surgeon in the picture "The dentist" confirming the historical community of dental and maxillofacial surgery.

The same is found in Pieter Bruegel the Elder's (1556), Lupi Leopard Bualier's (1809), Yon Horeman Younger's (1772), Gieodor Rombouns's (1626), Leonard Defrans's (1781) paintings.

In 1791, Martin Johann Schmidt reflected confidence and composure of dental surgeon during the operation in picture «Der Zahnbrecher». In the gallery Sterling and Francine Clark (USA) there is a picture by Henri de Toulouse-Lautrec (1891-1892) who painted Jules Emile Paean (1830-1898) a famous French surgeon performing maxillofacial surgery.

In 1622 Italian artist Gerard van Honthorst made an excellent picture «The Tooth Puller». Later, a prototype of this picture was made by sculptor Egbert van Heemskerc - a small porcelain sculpture.

*Conclusion.* Analyzing the different periods of painting, we could conclude that one of the first operations in humanity was the tooth removal which is a prototype for further development of maxillofacial surgery.

P-1403

### GUINEA PIGS 65 YEARS ON

Jerome Philip<sup>1,\*</sup>, Nicola Kurtz<sup>1</sup>

<sup>1</sup>Norwich University Hospital

This is a presentation based on the portraits of Nicola Kurtz at the 65th reunion of McIndoe's Guinea pigs. The presentation is centred around the work of Archibald McIndoe and his cousin Harold Gilles. It gives insight into their lives, their work and their legacy in the development of Jaw and Facial plastics as well as general plastic surgery and medicine.

**P-1404**

## **ORAL AND MAXILLOFACIAL HEALTH OF LOUIS XIV (1638-1715) – A SYSTEMATIC REVIEW**

*Poramate Pitak-Arnnop<sup>1,\*</sup>, Alexander Hemprich<sup>1</sup>, Kittipong Dhanuthai<sup>1,2</sup>, Dirk Halama<sup>1</sup>, Niels Pausch<sup>1</sup>*

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**Aim:** To conduct a systematic review, including published data, regarding oral and maxillofacial health of France's Louis XIV.

**Methods:** Relevant published articles until April 2012 were identified through literature searches using 13 electronic databases, coupled with hand searches and analyses of reference lists. We included only the articles discussing oral and maxillofacial health, oral habits or jaw diseases of Louis XIV and any related data.

**Results and conclusions:** 25 articles met inclusion criteria; all but 4 were in French. All references suggested that Louis XIV neglected his oral health care. He had multiple dental caries, requiring aggressive tooth removal, which led to oroantral fistula (OAF). Various treatments, including direct heat cautery to the fistula, were carried out, but unsuccessful. No surgical intervention, such as local flap for OAF closure, was performed. OAF remained asymptomatic and persisted until the end of his life.

**Keywords:** Louis XIV; oral and maxillofacial health; oroantral fistula

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## 15. IMAGING AND SIMULATION

### P-1501

#### STEREOLITHOGRAPHIC CUTTING GUIDE FOR FIBULA OSTEOTOMY IN MANDIBULAR RECONSTRUCTION

Pedro Infante-Cossio<sup>1,\*</sup>, Eusebio Torres-Carranza<sup>1</sup>, David Gonzalez-Padilla<sup>1</sup>, Purificacion Gacto-Sanchez<sup>1</sup>, Gorka Gomez-Ciriza<sup>1</sup>, Tomas Gomez-Cia<sup>1</sup>

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**Introduction.** Oral and maxillofacial surgery is well suited for image-guided techniques, particularly in the domain of fibular osteocutaneous flap, because preoperative awareness of the defect dimensions permits improved flap design and reliability, operative safety, reduction in operative time, and planning of the osteotomies. We have lately developed the AYRA software that can be used in conjunction with CTA to provide a detailed three-dimensional image reconstruction. This software has been applied to mandibular reconstructive procedures to convert the surgical simulation to the real surgery accurately. We have developed templates by means of the application of image-guided technique defining the fibula osteotomy, and then transferring for accurately implementing surgical simulation with a stereolithographic cutting guide.

**Objectives.** To assess the surgical reconstructive simulation after a mandibulectomy with the help of a reconstructed mandible stereomodel, prebent titanium reconstruction plate, and a positioning template by means of a stereolithographic cutting guide for fibula osteotomy.

**Methods.** We present a clinical case of a patient diagnosed with a recurrent multicystic ameloblastoma, including 8-cm segmentary mandibulectomy and primary reconstruction with 3-segment single-barrel osteocutaneous flap fixed with reconstruction plate. The osteotomy of the fibula bone was virtually recreated before mandibulectomy, and also a customized template was printed to precisely determine where to perform fibula osteotomies with the use of a rapid prototype modelling technology. The plastic template was sterilized for intraoperative use and temporarily fixed to the vascularized fibula with the use of monocortical screws. Afterward, a reciprocating saw blade was inserted into the cutting guide slots to perform osteotomies before clamping peroneal vessels.

**Results.** The template was extremely helpful when performing osteotomies, for both lengths and angles. Surgery time was reduced by an average of 1 hour owing to this template, which allowed us to perform osteotomies in a fast and reliable way.

**Conclusion.** In addition to preoperative virtual surgical simulation on the computer and manufacturing stereolithographic models, we can also convert the simulation to the real surgery accurately through stereolithographic cutting guides; thus may be an alternative aid for osteotomy performance and fibula shaping, allowing for faster and more reliable surgical procedures.

### P-1502

#### THE TWO DIMENSIONAL MODEL OF BONE REMODELLING AS SCREENING METHOD OF BONE LOSS AFTER TOOTH EXTRACTION IN MANDIBLE

Michał Szałwiński<sup>1,2,\*</sup>, Tomasz Lekszycki<sup>3</sup>, Marcin Socha<sup>1</sup>, Paweł Michalski<sup>1</sup>

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The aim was evaluation of screening method for prediction of bone loss followed by tooth extraction. Loss of one to few teeth does not change global stress transmission within whole bone, but causes local changes at areas after extraction mainly bone loss. Authors present a mathematical model of bone remodelling after tooth extraction. Two dimensional model of functional bone adaptation based on hypothesis of optimal bone reaction was applied

Material consisted of retrospective analysis of 30 Orthopantomogram (OPG) images. As control we compared OPG of the same patient performed at least 6 months after molar tooth extraction in mandible.

**Method:** Pattern of mandible from OPG before extraction was transferred to file possible for Finite Element Method analysis. Forces of muscles on the model were on location of their anatomical attachments as well as direction of natural function as well as teeth.

**Results:** Although it is very difficult to predict bone remodelling of 3D structure as mandible is on 2D image as well as anatomy which is deformed by image of curved mandible projected on plane surface of OPG. Screening method should be easy for interpretation in general practice. Our study revealed 2D model as possible qualitative method of alveolar bone loss prediction followed by tooth extraction. Basic analysis of two dimensional model is suitable in general practice in prediction of bone loss in region of interest as well as comparison of two dimensional model with OPG.

### P-1503

#### INERTIAL NAVIGATION SYSTEM - POSSIBLE NEW TECHNOLOGY FOR SURGICAL NAVIGATION

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The complex three-dimensional anatomy and geometry of the human skull and face, combined with the need for precise symmetry, poses a challenge to reconstruction in that region. Therefore, and because of technical improvements accurate pre-operative 3D-planning of corrective surgical jaw interventions becomes more and more important in modern orthognathic surgery.

Considering importance of 3d planning we will try to design less expensive method which will enable 3d orientation of bone segments, according to treatment plan. Due to previous technical limitations we are currently at the initial stage, but we would like to present our idea which we think could be cheaper alternative.

Inertial navigation system (INS) has the merits of high accuracy in short time, complete independence, and can successively supply position, velocity, and attitude information. Consequently, it is widely used for the positioning

and navigation of airplanes, spaces, ships, vehicles, and robots, etc.

Invensense® MPU 6050 (Figure 1) is a motion tracking device whose small size (4mm x 4mm x 0.9mm) and priced (15\$) meet the requirements in this initial stage. The devices combine a 3-axis gyroscope and a 3-axis accelerometer on the same silicon die together with an onboard Digital Motion Processor™ (DMP™) capable of processing complex 9-axis MotionFusion algorithms. If preliminary tests on the models show expected results, this method could be very useful in orthognathic surgery. It would be cheap but reliable, and as such great help in exact 3d orientation in everyday surgical work. We hope that this paper will encourage others to engage in research of this technology in the surgical field.

#### P-1504

### THE PIG AS AN EXPERIMENTAL MODEL FOR THE CRANIOMAXILLOFACIAL RESEARCH

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The pig has been used as an animal biomodel for experiments for a long time. There are limited information about orofacial region in pigs despite the comparative resemblance of certain anatomic structures of humans and pigs. The diagnostic screening of this area has widespread use in human medicine owing to computed tomography (CT) and nuclear magnetic resonance (MRI). However, the use of these methods in porcine medicine is very limited or anecdotal. The purpose of this project was therefore description of porcine orbit.

Ten porcine heads (6-24 months-old) were examined by CT and MRI. Subsequently, the necropsy of the orbit was carried out. The results were correlated with CT, MRI images and were compared to human orbit with emphasis on important anatomic structures.

The pig orbit is cavity delineated by four walls which are all bony except one. The medial wall is almost rectangle shaped. It is comprised of the lacrimal bone, the zygomatic bone and the orbital part of the upper jaw. The roof comprises of the frontal bone and the wing of the sphenoid bone. The floor of the orbit is very short extending only 1cm behind the infraorbital edge and descending sharply into fossa pterygopalatina. The caudolateral wall is comprised of soft tissues represented by ligament that extends between the zygomatic process of the frontal bone and the frontal process of the zygomatic bone. Orbicular muscles anchored with short ligaments to the medial and lateral aspect of the orbital opening form the basis of the eyelid.

The size of the porcine orbit, the composition/stratigraphy of the eyelids and arrangement of orbicular muscles is similar to that in humans. However, the shape of the orbit in pigs is different. Moreover, the porcine orbit is bordered by a ligament in the caudolateral part. The nerve localization inside and around the orbit is significantly

different from that in human orbit.

In conclusion, the porcine orbit is suitable for experimental medicine. However, if used in experiments, one has to take into consideration its anatomical differences.

#### P-1505

### CONCURRENT BILATERAL TOTAL TEMPOROMANDIBULAR JOINT REPLACEMENT SURGERY AND CONVENTIONAL MAXILLARY OSTEOTOMY UTILISING VIRTUAL PLANNING WEB-BASED TECHNOLOGY

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We describe the case of a 31 year-old lady who presented with significant temporomandibular joint (TMJ) dysfunction following a previous vertical sub-sigmoid osteotomy in 1999.

The previous surgery had resulted in both condyles being displaced out of their glenoid fossae and a persistent dysocclusion. Initially she was managed conservatively, with her symptoms being alleviated in the short term. However, both condyles remained out of their fossae and the patient presented 10 years after her initial surgery with increasing pain.

On presentation, she had significant progressive right TMJ dysfunction with severe pain. A Class III malocclusion was apparent with a 5mm anterior open bite and jaw deviation to the right on mouth opening. Her maximal inter-incisal opening was 32mm.

The case was prepared using conventional orthodontic treatment and the surgery virtually and remotely planned by a design facility using web-based technology. All surgical splints were made based on this virtual planning and design process. Following optimisation with orthodontic treatment, her definitive surgery consisted of bilateral condylectomy and coronoidectomy and the placement of bespoke bilateral TMJ replacement prostheses. A simultaneous Le Fort I osteotomy was performed with a 4mm maxillary advancement.

**Results:** A Class I occlusion was achieved with a full range of movement, good functional and aesthetic outcomes.

**Conclusion:** This case documents one of the first reported cases of bilateral total TMJ replacement surgery performed with a concurrent conventional maxillary osteotomy. It demonstrates the future potential of virtual planning and the viability of simultaneous procedures in appropriately selected patients.

#### P-1506

### PREOPERATIVE STEREOLITOGRAPHIC PLANNING IN CRANIOMAXILLOFACIAL SURGERY IN CHILDREN

Maria Antonia Contreras Morillo<sup>1,\*</sup>, Manuel Angel Martinez Navarro<sup>1</sup>, Francisco Ruiz Delgado<sup>1</sup>, Antonio Valiente Alvarez<sup>1</sup>, Lucas Bermudo Añino<sup>1</sup>

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**Introduction.** Both stereolithographic biomodels and design assisted by computer (CAD-CAM) use CT-scan 3D

for certain surgical procedures to craniofacial level planning. These techniques allow the manufacture of solid replicas of anatomical structures in order to facilitate the planning of treatment as well as pre-surgical simulation.

**Material and methods.** It is presented a case of Craniofacial defect in a girl of 10 years of age with the antecedent of immature teratoma in right temporo-parotid region treated at two years of age through surgery (tumour excision including temporary muscle, resection of the zygomatic arch and superficial right parotid) and radiotherapy. In exploration, drew attention to default to zygomatic-temporal level, paralysis of the frontal branch of the facial nerve and malocclusion in class III with mandibular deviation to the left for 3 mm. The reconstruction was raised using a stereolithographic model; so requested a CT scan with 3D reconstruction. Under general anesthesia and taking advantage of the previous temporary boarding, more two small incisions, preauricular and eyebrow tail, was exhibited the defect. Taking reference the stereolithographic skull carved graft of temporary calota (both tables) for the reconstruction of the zygomatic arch that was later set with absorbable material to the body of the zygoma and the stump of the temporary steel lighting poles of the zygomatic arch. For the temporary defect was used an acrylic bone cement (Cranioplastic™).

**Results.** She currently presents good functional and aesthetic result of the operated area. She is waiting of the future treatment of her dentofacial anomaly.

**Conclusions.** . The use of these techniques for the surgical planning has a number of advantages. On the one hand, facilitates the diagnosis of abnormality, it allows the movement of bony structures, design and real simulation analysis of surgery that it leads to greater ease of the procedure, minor surgery time as well as allow the explanation to the patient that will consist of the surgery and its limitations. On the other hand, does not require a specialized learning and models can be sterilized and use intraoperatively. Despite its advantages, are techniques of high cost in the context of the current economic situation, what makes necessary settle indications of those cases that would truly benefit more of the pre-surgical planning.

#### P-1507

##### IDENTIFICATION OF JAWBONE CYSTS VIA ORTHOPANTOMOGRAM PROCESSING

Vojtěch Peřina<sup>1,\*</sup>, Jan Mikulka<sup>2</sup>, Miroslav Kabrda<sup>2</sup>, Eva Gescheidtová<sup>2</sup>, Ondřej Liberda<sup>1</sup>

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The subject of the presentation is a method proposed for automated evaluation of the parameters of orthopantomograms of cystic disorders in human jawbones. The main problem in medical diagnostic is the low repeatability due to the subjective evaluation of images/pictures without using a tool for image processing. An available database of images of cysts is described in the presentation. **Results** of a fast automated segmentation by the live-wire method are also given. Selected segments were processed in the ImageJ Java environment. In the cystic regions their basic statistical and shape properties were evaluated. **Results** of the evaluation are given in the presentation conclusion. In

the next stage of the research, the values obtained will be compared with the subjective evaluation by radiologists and the possibility will be discussed of exploiting selected parameters or their combinations for an automatic assessment of the level of cystic disorders. The other aim is to develop a fast automated detection of periapical lesions. This could be useful when focal infection examination is performed by radiologist without specific training in dental radiology.

#### P-1508

##### ANALYSIS OF TENDONS AND APONEUROSIS IN HUMAN MASSETER MUSCLE WITH CT IMAGES

Michiko Goto<sup>1,\*</sup>, Yoritaka Yotsui<sup>2</sup>, Masahiro Nakajima<sup>1</sup>, Kimishige Shimizutani<sup>2</sup>, Kenji Kakudo<sup>1</sup>

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**Objectiv:** The distribution of tendon and aponeurosis in masseter muscle with Computed tomography images was observed to diagnose masticatory muscles tendon - aponeurosis Hyperplasia (HyTAMs) directly. We created the classification of tendon and aponeurosis in masseter muscle and compared with HyTAMs and other patients.

**Materials & Methods:** 20 cases (40sides) of HyTAM patients' CT images, that came to Second Department of Oral Surgery, Osaka Dental University (ODU) hospital, were used for materials.

160 cases (320 sides) of CT images were selected randomly from the data base of ODU Hospital and used as control. They were taken with 16 Row Multi-detector CT (Bright speed, GE, Milwaukee, USA). The exposure condition was 120kVp/100mA/0.5mmthk/0.5mmImageInt. with Bone, STD and Soft kernel. The extracted conditions of cases were follow; 1 Without occlusal and TMJ problem, 2 Without heavy infection and 3 Without markedly jaw deformity.

The CT images were sent to Image workstation (Advantage workstation Ver.4.3, GE, USA, Milwaukee), and made up 3-dimensional imaging analysis for extracted tendon and aponeurosis. Masseter muscle structure was separated into inner and outer layer during 3-D observation.

Masseter tendons and aponeurosis were classified into the following 4 types; TypeI: no or a single thin tendon was in the anterior margin of outer layer in the masseter muscle, TypeII: a single tendon continuous from Zygoma to Mandibular masseteric tuberosity was in the anterior margin of outer layer in the masseter muscle, TypeIII: two or more tendons and aponeurosis continuous from the zygomatic arch to the mandible were in the outer and inner layer of the masseter muscle, and TypeIV: others.

**Results:** The distributions of Controls were; TypeI was 84%, TypeII was 6%, TypeIII was 9% and TypeIV was 1%. Those of HyTAMs were; TypeI was 0%, TypeII was 3%, TypeIII was 93% and TypeIV was 4%.

**Conclusion:** The distribution of human masseter tendons and aponeurosis was clearly different between the HyTAMs and Controls. The patients, who suffered trismus and have hardness of masseter muscle or square mandible, should be examined the tendon and aponeurosis with CT images for suspected that applies to TypeIII or IV in this classification.

**P-1509****OSTEOPOROSIS AND MANDIBLES***Marko Božič<sup>1</sup>\*, Nataša Ihan Hren<sup>1</sup>**<sup>1</sup>University Medical Center Ljubljana, Clinical Department of Maxillofacial and Oral Surgery*

*Objectives.* The purpose of the study was to test the significance of the differences between the mandibles of women with osteoporosis and osteopenia respectively and women with normal bone mineral density (BMD) on a common dental panoramic tomogram (DPT).

*Study design:* A case-control study included 119 white Caucasian women: 62 women with osteoporosis and 24 women with osteopenia were compared to a group of 33 women with normal BMD. DPTs were digitized and analyzed resulting in relative bone density (RBD) and anatomical indexes. Student T-test was performed for statistical analysis.

*Results.* Four RBD indexes were statistically significantly different between the test group and the subgroup with normal BMD. Three RBD indexes were statistically significantly different between the group with osteopenia and normal BMD. The subtractions of average values of anatomic indexes with and without a tooth were 1.1 to 4 times higher in the group with osteoporosis than in the group with normal BMD.

*Conclusions.* The differences of the mandibular bones on a DPT are statistically significant between women with osteoporosis and osteopenia respectively and those with normal BMD. This readily available method of DPT analysis could represent a screening tool for osteoporosis.



## 16. MEDICAL ONCOLOGY

### P-1601

#### EXPRESSION OF CYTOKERATIN IN DEVELOPMENT, INVASION AND METASTASIS OF ORAL SQUAMOUS CELL CARCINOMA

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**Introduction:** Cytokeratins (CKs) are protein expressed in epithelial and epithelium-derived cells. CKs have been widely applied to the differential diagnosis of epithelial tumors. Mode of invasion, presence of perineural invasion, and control of cervical lymph node metastasis are important factors that influence the prognosis of oral squamous cell carcinoma (OSCC) patients. In the present study, we investigated a relationship between clinicopathological findings and CKs expression in patients with OSCC. We also examined an alteration of CKs expression in invasion and metastasis of OSCC.

**Materials and Methods:** Immunohistochemical staining was conducted for CK10/13, CK17, and CK19 expressions using an indirect enzyme antibody method in 91 patients with primary OSCC, 32 patients with oral epithelial dysplasia, and 11 patients with normal oral mucosal epithelium to examine a relationship between the CKs expression and clinicopathological factors. Additionally, immunohistochemical staining was conducted for CK AE1/AE3 in the primary tumor tissues of perineural invasion and invasive cases of Grade 4 according to the Jakobsson classification, and the FDG-PET/CT-positive lymph nodes of metastatic cases after dissection.

**Results:** OSCC showed decreased CK10/13 expressions and increased CK17 expression as compared with normal oral mucosal epithelium and oral epithelial dysplasia. CK19 expression was not significantly correlated with carcinogenesis. The relationship between the CKs expression and clinicopathological factors in 91 OSCC patients demonstrated that CK17 expression was increased in tumors of stages III and IV as compared with those of stages I and II (p

**Conclusion:** CK13 and 17 expressions allowed the differential diagnosis of carcinogenesis in oral mucosa. Moreover, CKs staining was useful in the cases which invasion or metastasis was difficult to diagnose by HE staining alone.

### P-1602

#### ORAL MANIFESTATIONS IN HAEMOTOLOGIC DISEASES. ORAL LESION IN CHRONIC LYMPHOCYTIC LEUKEMIA. CASE REPORT AND REVIEW OF LITERATURE

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**Background:** Presence of oral lesions in haematologic diseases is common, and in an increase percentage (>65%, even series). Occasionally, these signs or symptoms are the first diagnosis value of the disease, may be insubstitutable for the further specific treatment.

**Material and methods:** Case report: woman, 79 years old, with a syndrome of astenia, weight loss and mucocutaneous, with an intraoral lesion, painful, and with progressive growing. Biopsy revealed the presence of atypical clon cells, lymphocytic clon. Study was completed with exhaustive blood test, bone marrow biopsy and immunohistochemical study of the biopsy material.

**Results:** The results confirm the diagnosis of lymphocytic leukaemia, type IB Binet classification. Chemotherapy treatment was started with bendamustine, with remission of disease and oral lesion. Actually, patient is free of illness and follow haematological and maxillofacial revisions in our hospital.

**Conclusions:** Oral lesions in systemic diseases are common, specially in haematologic diseases. Even, they are more frequent in acute leukemias, but not uncommon in chronic, like the case. Its accurate diagnosis in beginning times of the process could be specially valid for the successful further treatment. Therefore, dentist and oral and maxillofacial surgeons must know the clinical presentations of this type of lesions.

### P-1603

#### BIOFILMS AT INTRAORAL TUMOR SURFACES

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**Introduction.** Biofilms are intelligent systems for bacterial survival. The influence of medical biofilms at intraoral tumor surfaces is not completely understood. Therefore, the aim of this prospective clinical study was to identify different bacteria organized in biofilms of oral squamous cell carcinomas (OSCC) and to compare the bacterial spectra with a risk group and healthy controls.

**Material and Methods:** A total of 90 patients, divided into three groups (OSCC-patients, risk group and a healthy control group) was analyzed. In general, swabs from the biofilms were taken, collected into a transport medium (Stuart, Copan, Italy) and transported to the microbial laboratory within one hour. All specimens were cultured on media for aerobes and anaerobes and tested with agar-diffusion and Etest.

**Results:** Altogether, 1006 isolates were cultured from 90 patients, 352 different species with 164 aerobes, 176

anaerobes and 12 candida species. The most frequent aerobes were 47 viridans streptococci, 30 Staphylococci species, 14 Enterococci faecalis, 36 Neisseria species, 14 Escherichia coli. The anaerobes were dominated by Peptostreptococcus (66x), Fusobacterium (39) and Prevotella (34).

The ratio between aerobes : anaerobes was 2:1 in healthy controls, riskpatients showed a balance and on the surface of OSCC we found an inverted ratio of 1:2.

The resistance rates in the OSCC-group was as follows: Penicillin G 40 %, ampicillin 57%, doxycyclin 23%, clindamycin 47%, amoxicillin/clavulanic acid 20%. 100% of pathogens were susceptible to azithromycin, telithromycin, gatifloxacin, levofloxacin and moxifloxacin.

**Conclusion:** Anaerobes, notably gramnegative anaerobes play a crucial role in the etiology of postoperative infections in patients with OSCC. We found a new, tumor-special type of colonization which doesn't agree with the normal flora of the oral cavity. Biofilms on OSCC surfaces provide an important reservoir for anaerobic bacteria. The experience from odontogenic infections can't transferred to eradicate the biofilm-related bacterial spectrum. As a consequence, a new antibiotic prophylaxis and treatment regime is necessary and should include broad spectrum antibiotics like amoxicillin/clavulanic acid and moxifloxacin.

#### P-1604

### PROGNOSTIC RELEVANCE OF OSTEOPONTIN IN ORAL SQUAMOUS CELL CARCINOMAS

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**Introduction:** Osteopontin (OPN) is an extracellular matrix protein with influenced cell growth, migration, invasion and metastasis. It is known as a tumor-associated protein. Only a few papers analyzed the correlation between OPN expression and prognosis in oral squamous cell carcinoma [OSCC]. Therefore, it was the aim of this investigation to correlate the OPN-expression with clinical outcome in these tumors.

**Materials and methods:** Immunohistochemical investigations of OPN were performed for 25 paraffin-embedded OSCC-specimen. The staining intensity and percentage of positive cells were analyzed, summarized to an immunoreactive score [Remmele] and correlated with clinicopathological parameters. All correlations between immunoreactive score and clinical data were examined using Kaplan-Meier-Analysis, spearman's rank and multivariate Cox's regression analysis. P-values < 0.05 were considered as statistically significant.

**Results:** Interestingly, we found an inverse correlation between OPN-expression and clinical outcome of the patients. A low OPN-expression was associated with poor overall survival in OSCC-patients. The multivariate Cox's regression analysis (adjusted to tumor size and tumor-grade) revealed that patients, whose tumors weakly expressed OPN showed a 4-fold increased risk of tumor-related death. There was a trend towards an association between low OPN-expression and poor survival (RR =4.0,

p=0.09). Additionally, a low OPN expression correlated with a lower recurrence rate (p=0.013).

**Conclusion:** Based on these pilot investigations we can conclude that OPN can be considered as an independent prognostic marker in OSCC-patients. In contrast to other investigations the present study demonstrated that low expression level of OPN in the tumor tissues of the patients with OSCC was associated with tumor progression. Further investigations should explain the precise role of OPN in progression of an OSCC.

#### P-1605

### ROLE OF MICRORNA EXPRESSION IN ORAL SQUAMOUS CELL CARCINOMAS

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**Introduction:** Oral squamous cell carcinoma [OSCC] is among the ten most frequent human malignancies. The five year survival stagnated up to 40 – 50% during the last 40 years. Therefore, additional prognostic parameters for therapeutical stratification are needed. The aim of the investigation was to analyze the prognostic impact of some microRNA in OSCC.

**Materials and methods:** Three different miRNAs (miRNA 22, miRNA 199a and miRNA 210) was determined in 4 head and neck cancer cell lines ( FaDu, SAS, Cal 33and XF 354) . In addition, biopsies from 92 patients with oral squamous cell carcinomas were obtained during surgery and snap frozen in liquid nitrogen and stored at -80°C. Cell lines and tumor specimen were cultured under normoxic and hypoxic conditions. MiRNA then was extracted from the remaining tissue by using Trizol. Quality and quantity of the RNA were confirmed using a Nano Drop spectrophotometer. After that expression of the miRNAs were measured by RT-PCR according to the Taq Man microRNA Assay Protocol. Fold changes in miRNA were determined by the  $\Delta\Delta C_t$  method.

**Results:** Notable was the downregulation of miRNA 22 and 199a in all cell lines under hypoxia. Whereas the miRNAs 210 had been upregulated nearly everywhere, except the FADU cell line. In the tissue samples we could detect an upregulation of the hypoxia-associated miR-210 in OSCC samples compared to normal tissue. Furthermore, a downregulation of miRNA 22 and 199a in the tumor tissue was observed.

**Conclusions:** A new class of regulatory molecules known as microRNAs has grown more and more into the focus of understanding the molecular pathways associated with tumorigenesis in different kind of cancers including OSCC. However, there are only a few published studies in head and neck cancer.

These small, noncoding RNAs represent key regulators of diverse cellular processes including proliferation, differentiation and apoptosis.

It has been suggested that miRNAs can act as tumor-suppressor genes and oncogenes, and therefore play an important role in human carcinogenesis.

**P-1606****18F-FDG PET-SCAN NECK STAGING IN HEAD AND NECK TUMORS: PATHOLOGY RESULTS, CORRELATION AND MANAGEMENT**

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**Objective:** To evaluate the utility of 18F-FDG PET-TAC preoperative studies and their correlation with pathology results in head and neck patients presenting neck involvement.

**Material:** We performed a retrospective analysis from november 2008 to february 2012 in 15 head and neck oncological patients suspicious for positive neck disease. Primary tumor site was known in 11 cases and 4 were considered patients presenting metastatic disease of unknown origin. 13 were male and 2 female.

**Results:** PET-TAC results in cervical node staging prior to treatment were positive in 12 patients and negative in 3. We performed uni or bilateral neck dissection according to primary tumor site and PET-TAC result, being radical or modified depending on metabolic parameters. Pathology results matched previous studies in 14 out of 15 cases. 2 false positive results were obtained. In patients presenting suspicious metastatic disease of unknown origin, blind biopsies were also negative in all cases.

**Conclusions:** There is good correlation between 18F-FDG PET-TAC studies performed prior to treatment and pathology results. In areas presenting high metabolic rates, parameters should be well defined to improve positive predictive value. Nevertheless, patients presenting 18F-FDG PET-TAC positive for metastatic disease in unknown primary tumors, protocol biopsies must be done, although these studies tend to match.

**P-1607****DERMATOPONTIN REGULATES ADHESION AND INVASION IN ORAL CANCER THROUGH EPIGENETIC SILENCING OF CHROMATIN/HISTONE DEACETYLATION.**

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**Objectives:** Dermatotontin (DPT), a noncollagenous extracellular matrix (ECM) protein, is involved in promotion of cellular adhesion and ECM assembly activities. However, the role of DPT in the pathogenesis of carcinoma has not been clarified. The aim of this study was to evaluate DPT expression in human oral cancer and its possible roles including cellular adhesion and invasiveness.

**Materials and Methods:** DPT mRNA and protein expression status in human oral squamous cell carcinoma (OSCC)-derived cells were analyzed by quantitative re-

verse transcriptase-polymerase chain reaction (qRT-PCR) and immunoblotting. To assess the epigenetic regulation of DPT, OSCC-derived cells were treated with a histone deacetylase inhibitor, sodium butyrate (NaB). DPT-overexpressed OSCC cells were examined whether DPT could contribute to cellular adhesion and invasiveness. In addition, the expression status of DPT in primary OSCCs (n = 97) was analyzed and compared to clinicopathological behaviors.

**Results:** qRT-PCR and immunoblotting analyses detected frequent downregulation of DPT in OSCC-derived cells compared with human normal oral keratinocytes. DPT-overexpressed cells were found increased adhesion and decreased invasiveness compared with mock-transfected cells, and its adhesion was inhibited by  $\alpha 3\beta 1$  integrin functional blocking antibody. OSCC-derived cells treated with NaB also restored DPT expression and decreased invasiveness. Consistent with our hypothesis that DPT is involved in adhesion and invasiveness in OSCC, DPT expression in primary OSCCs was significantly lower ( $p < 0.05$ ) than that in the normal counterparts, and was correlated significantly ( $p < 0.05$ ) with regional lymph node metastasis.

**Summary:** Present data provided strong evidence that downregulation of DPT is a characteristic event in OSCCs, and that DPT was correlated with cellular adhesion and invasiveness. Therefore, DPT might play an important role in regulating tumor invasion and metastasis.

**P-1608****DIAGNOSTIC EFFICACY OF SENTINEL NODE BIOPSY IN ORAL SQUAMOUS CELL CARCINOMA (FIS P1020482): 96 CASES**

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**Aims:** To evaluate the feasibility and predictive ability of the sentinel node (SN) localization-biopsy technique for patients with squamous cell carcinoma of the oral cavity and clinically negative necks.

**Methods:** We performed a prospective study of 96 consecutive patients with oral squamous cell carcinoma and clinically negative necks. These patients had not received treatment for their tumours when they were assessed by Maxillofacial Surgery Service of HUVM in Seville. All patients received a cervical Tc99m-lymphoscintigraphy to localize the sentinel node and a new dose before surgery. Intraoperatively, the sentinel node was localized with a gamma probe and it was removed before tumour resection and functional neck dissection. The different anatomic specimens were sent for independent histological examination by two doctors of Histology Department (they were the same). The specimens were examined with hematoxylin and eosin staining and cytokeratin immunohistochemical staining (AE1/AE3).

**Results:** lympholocalization 96%, radiolocalization 100%, cervical metastases 37%, 12% were negative with the hematoxylin-eosin technique and positive with immunohistochemical technique, false negative 4 cases, sensitivity 85% and NPV 91%, positive likelihood ratios > 10 and

likely negative ratios = 0.09. There was inter-observer diagnostic concordance in the localization of the SN in the lymphoscintigraphy in all case except in 3 patients (IB-IIA). There was inter-observer diagnostic concordance in the PA study of the SN in all cases. 68% of our patients presented lymphatic drainage with stage jumps.

**Conclusions:** The technique allows identification of SN-metastases and shows promise in guiding functional neck dissection. Other ways to reduce these false-negative rates must be investigated.

#### P-1609

### THE CHARACTERISATION OF POSSIBLE SALIVARY OSCC BIOMARKER EXPRESSION IN TYPE -2 DIABETES

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In the last decade the detection of potential oral squamous cell carcinoma biomarkers became centre of interest in the prevention but also in the treatment strategies. Our goal was to develop a non-invasive and good reproducible method, which is able to screen the risk for possible oral malignancies in diabetic patients.

**Methods:** Under standardized circumstances saliva samples were collected of diabetic patients (n = 17). As a control group we used saliva from healthy subjects (n = 15). The samples were analyzed using SDS PAGE and MALDI-TOF/TOF mass spectrometry after tryptic digestion. The resulted peptides were identified by peptide mass finger printing. The peptide masses were searched by utilizing the MASCOT Server 2.2 search engine.

**Results:** The analysis showed a different pattern of protein biomarker expression between diabetic and control subjects. A significant difference was measured in the expression of Annexin A-11, Peroxiredoxin-2, Tyrosine-Protein-phosphatase levels. These biomarkers were previously identified in OSCC patients.

**Conclusions:** Our study requires further analysis and validation with larger population, but the detected overexpressed peptides and proteins are possible predisponating biomarkers for an early-stage cancer.

#### P-1610

### EXTRAMEDULLARY PLASMACYTOMA AND SPONTANEOUS REGRESSION WITHOUT TREATMENT

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The extramedullary plasmacytoma is an unusual way of presentation in plasma cells tumours. As characteristics it is located in soft tissues and there is no evidence of another systematic disease that works with. Its presentation is less usual than the solitary bone plasmacytoma, but in the same way its prognosis is less unfavourable and the prob-

abilities of transformation in multiple myeloma are few. The MRI is very reliable in the diagnosis, but it is also necessary a certain histological diagnosis. Normally the treatment consists in radiotherapy and/or surgery. The spontaneous decline of this kind of tumours seems unusual, the mechanisms involved in these cases are unknown and we only have found two cases and a review of the literature. We present the clinical case of a man of 58 with a cervical extramedullary plasmacytoma, he has presented a spontaneous regression and no signs of relapse after 4 years of monitoring.

We consider it would be interesting to do a more detailed research about the mechanisms involved in these cases, if it had a considerable number of patients.

#### P-1611

### ORAL CANCER SCREENING SYSTEM APPLYING ELECTROCHEMICAL TELOMERASE ASSAY

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**Objectives:** An effective medical examination system for oral cancers has not yet been established whereas screening systems for colon or uterus cancer has already been established and is being utilized in general hospitals. Telomerase activity has drawn attention as a cancer marker since a long time back. However, Telomeric repeat amplification protocol assay (TRAP) which was the only method to detect telomerase activity consists of time-consuming steps. Hence, we have applied a new method of electrochemical telomerase assay for screening of oral cancers which has easy steps and is less time-consuming.

**Material and method:** First, we drew a comparison of telomerase activity between TRAP assay and electrochemical assay by cultured cell (human oral squamous cell carcinoma lines). Next, Telomerase activity of clinical samples from oral cancer patients and healthy volunteers were detected by TRAP assay and electrochemical assay. Three types of clinical samples were collected from one individual. Oral exfoliated cells (OE): Cells collected from whole oral cavity with Sponge-type brush. Local exfoliated cells (LE): Cells collected by scratching lesions (in healthy volunteer, cells collected from lateral margin of tongue). Tissue (T): from incisional biopsy.

**Results:** In cultured cells, electrochemical assay has higher sensitivity than TRAP assay. In OE, LE, T samples, the higher current shift was observed in the samples from cancer patients with the electrochemical assay than healthy volunteers. Consequently, this electrochemical assay will enable oral cancer screening system.

**P-1612****NEAMINE INHIBITS PROGRESSION OF ORAL CANCER BY SUPPRESSING ANGIOGENIN-STIMULATED ANGIOGENESIS AND CANCER CELL PROLIFERATION**

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**Background:** Anti-angiogenesis therapy in oral cancer is promising approach of preserving organs and minimizing functional disturbance in addition to chemoradiotherapy. Among a number of angiogenic factors, angiogenin (ANG) is of particular interest. ANG, originally identified and characterized as an angiogenic ribonuclease, has a dual effect of inducing angiogenesis and cancer cell proliferation by undergoing nuclear translocation and stimulating ribosomal RNA transcription in both endothelial and cancer cells. In oral cancer, ANG elicited in the hypoxic environment is related to the cancer progression. Thus, ANG may become an effective molecular target for the treatment of certain cancers.

**Aim:** The aim of this study was to investigate the anti-tumor activity of neamine, a nontoxic degradation product of neomycin, an aminoglycoside antibiotic, that blocks nuclear translocation of ANG in oral squamous cell carcinoma (OSCC).

**Methods:** The anti-oral cancer activity of neamine was evaluated in a xenograft animal model. Ribosome biogenesis was measured by silver staining of nucleolar organizer regions, and apoptosis was quantitated by TUNEL staining.

**Results:** Neamine effectively blocked nuclear translocation of ANG in HSC-2 human OSCC cells and inhibited xenograft growth of HSC-2 cells in athymic mice. Immunohistochemical stainings showed that neamine inhibited both angiogenesis and cancer cell proliferation. It also inhibited ribosome biogenesis and induced apoptosis of HSC-2 cells in athymic mice.

**Conclusion:** These results suggest that blocking nuclear translocation of ANG is an effective means to inhibit oral cancer progression and that neamine is a lead compound for further preclinical evaluation against oral cancer.

**P-1613****MALIGNANT TRANSFORMATION OF PRECANCEROUS LESIONS IN CLINICAL STUDY**

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**Keywords:** Malignant process, leucoplakia

**Introduction:** The causality of malignant transformation of precancerous lesion is connected with many agents. Precancerous lesion in the oral region are often irregular and depend on time factor (1,2)

**Materials and methods:** In this study authors observed 1170 patients with leucoplakia during 8 years. The selection of the patients was random from the east part of Slovak Republic. All patients were examined 2 times per year, due the local changes and screened histopathological.

**Results :** During the period of years 1980-1989 we noted 1.45% of malignant transformation of precancerous lesions in monitored group of patients with leucoplakia. There was noted malignant transformation of leucoplakia verrucosa in 90 % irritated by nicotine, spicy food, alcohol and mechanical irritations. In 10 % malignant process was noted without any principal facts.(1)

**Conclusion and discussion:** The malignant process of transformation has own patterns . in many times latent to the macroscopic examination. The important role is imputed to the dispensarisation and depistages, which can help in monitoring of these malignant transformations in time.

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**P-1614****IDENTIFICATION OF GKAP1 AS A NOVEL CANCER ANTIGEN AND ITS IMMUNOGENICITY IN ORAL SQUAMOUS CELL CARCINOMA**

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Cancer/testis (CT) antigens are considered promising target molecules for immunotherapy for patients with various cancers. In order to identify novel CT antigens, we performed serological identification of antigens by recombinant expression cloning (SEREX) analysis that screen a testicular cDNA library with serum obtained from a gastric adenocarcinoma patient. We isolated a testis specific gene, G kinase anchoring protein 1 (GKAP1). GKAP1 is a male germ cell-specific protein and functions as an anchoring protein for cGK-1 $\alpha$ . RT-PCR analysis showed that the mRNA expression levels of GKAP1 were restricted to the testis in normal adult tissues. By northern blot analysis, a strong hybridization signal was observed in testis. In malignant tissues, GKAP1 was aberrantly expressed in a variety of cancers, particularly oral squamous cell carcinoma (OSCC). We also analyzed mRNA expression of other known CT antigens in OSCC. It revealed that MAGE-A4 was expressed in 32%, MAGE-A3 in 24%, MAGE-A1 in 13%, CCDC62-2 in 12%, SSX-2 in 11%, XAGE-1b in 7%, and NY-ESO-1 in 3% of OSCC. 52.5% of OSCC expressed at least one of these antigens. In order to analyze humoral immune response of GKAP1 in cancer patients, we examined serum reactivity of patients by ELISA using recombinant GKAP1 protein. Of 19 sera from cancer patients with OSCC, 2 sera were reactive with GKAP1 protein. None of the healthy donor serum was reactive. Western blot analysis confirmed the reaction of the ELISA positive patient's sera against GKAP1. These findings indicated that GKAP1 is immunogenic in OSCC,

and suggested its potential use as a diagnostic marker for patients with OSCC in combination with other CT antigens such as MAGE-A4, MAGE-A3, and CCDC62-2.

**P-1615**

**SYNDROME OF INAPPROPRIATE ANTIDIURETIC HORMONE (SIADH) SECRETION ASSOCIATED WITH SQUAMOUS CELL CARCINOMA OF THE ORAL CAVITY.**

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**Objectives:** The syndrome of inappropriate secretion of antidiuretic hormone (SIADH) is euvoletic hyponatremia due to excessive release of antidiuretic hormone. SIADH is associated with various conditions such as malignant diseases, pulmonary disorders, central nervous system (CNS) disorders. Also, a large number of pharmaceutical agents including many of cytotoxic drugs such as cisplatin have been shown to cause SIADH. SIADH as a paraneoplastic syndrome is frequently seen in small cell lung carcinomas (SCLCs), but not common in oral squamous cell carcinomas and only a few cases have been reported. We report the case of oral squamous cell carcinoma which developed the SIADH after the chemo-radiotherapy.

**Material and Method:** A 86-year-old woman with squamous cell carcinoma of the buccal mucosa received the super selective intra-arterial cisplatin (CDDP) infusion using Seldinger's technique and the concurrent radiotherapy (total 56Gy). After the chemo-radiotherapy, the patient developed weakness of lower extremities and daily drowsiness with no localizing neurologic signs, no hemodynamic abnormality and normal cerebral CT results. A metabolic assessment revealed a serum sodium level of 124 mmol/L and normal serum potassium, creatinine, and urea levels. The serum hypo-osmolality with the urine hyperosmolality and urinary sodium excretion presented with normal thyroid function, plasma cortisol and ADH level. There were no clinical or laboratory signs of dehydration.

**Results:** The diagnosis of SIADH was proposed and the patient received the treatment with fluid restriction and sodium supplements. The serum sodium level was corrected appropriately. We should consider SIADH during the treatment of oral malignancies in spite of its rarity and the frequent assessment of serum sodium level is recommended.

**Summary:** SIADH is characterized by hyponatremia induced by various conditions including malignant diseases, but rarely associated with head and neck cancer. We report a case with squamous cell carcinoma of the buccal mucosa which developed SIADH during the treatment. After the diagnosis of SIADH, hyponatremia was corrected properly. Oral malignant tumor-associated SIADH is rare, but serum sodium level must be carefully monitored.

**P-1616**

**MALIGNANT TRANSFORMATION OF PRECANCEROUS LESIONS IN CLINICAL STUDY**

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**Keywords :** Malignant process, leucoplakia

**Introduction :** The causality of malignant transformation of precancerous lesion is connected with many agents. Precancerous lesion in the oral region are often irregular and depend on time factor

**Materials and Methods :** In this study authors observed 1170 patients with leucoplakia during 8 years. The selection of the patients was random from the east part of Slovak Republic. All patients were examined 2 times per year, due the local changes and screened histopathological.

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**Conclusion and Discussion :** The malignant process of transformation has own patterns. In many times latent to the macroscopic examination. The important role is imputed to the dispensarisation and depistages, which can help in monitoring of these malignant transformations in time.

**P-1617**

**CELL DIVISION CYCLE ASSOCIATED 2 IS ESSENTIAL FOR G1 PROGRESSION IN HUMAN ORAL CANCER**

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**Objectives:** Cell division cycle associated 2 (CDCA2) recruits protein phosphatase 1  $\gamma$  (PP1 $\gamma$ ) to chromatin to antagonize activation of Ataxia telangiectasia mutated (ATM)-dependent signal transduction. The ATM kinase plays a critical role in the DNA damage response (DDR) and its phosphorylation cascade to inhibit the p53-MDM2 interaction, which releases p53 to induce p21 and G1 cell cycle arrest. Little is known about the effect of a high level of CDCA2 in regulating oral cancer cell behavior. The purpose of the present study was to investigate the potential oncogenic activities of CDCA2 and its expression profile in OSCCs. We here show the functional and clinical results of a comprehensive analysis for aberrant expression of CDCA2 in OSCCs.

**Material and Method:** We analyzed CDCA2 expression in OSCC-derived cell lines and primary OSCCs compared with matched normal tissue (n = 85) by quantitative reverse transcriptase-polymerase chain reaction, Western blot, and immunohistochemistry. We then evaluated the

correlation between the CDCA2 expression status in primary OSCCs and the clinicopathological features. In addition, we performed functional analyses of CDCA2 in OSCC-derived cells using the shRNA system. To investigate the mechanism by which down-regulated CDCA2 is related to cell-cycle progression, we performed fluorescence-activated cell sorting (FACS) analysis and assessed protein expression level of cell-cycle regulatory proteins, such as CDKIs (p21Cip1, p27Kip1, p57Kip2) and the INK4 families (p15INK4B, p16INK4A, p18INK4C, and p19INK4D).

**Results:** CDCA2 expression was significantly up-regulated in OSCCs in vitro and in vivo ( $p < 0.05$ ). Functional studies with shRNA system revealed that knockdown of CDCA2 significantly ( $p < 0.05$ ) inhibited cellular proliferation compared with the control cells by arresting cell-cycle progression at the G1 phase and up-regulating of cyclin-dependent kinase inhibitors (CDKIs; p21Cip1, p27Kip1, p15INK4B, and p16INK4A).

**Summary:** Our results provide evidences for the first time that overexpression of CDCA2 is a frequent event in oral tumorigenesis and might be closely associated with the OSCC progression by preventing the cell cycle arrest and apoptosis.

#### P-1618

### COMPLICATIONS ASSOCIATED WITH DAILY CONCURRENT CHEMORADIOTHERAPY USING SUPERSELECTIVE INTRA-ARTERIAL INFUSION VIA A SUPERFICIAL TEMPORAL ARTERY FOR HEAD AND NECK CANCER

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Superselective intra-arterial chemotherapy via a superficial temporal artery has been used with concomitant radiation therapy to treat advanced head and neck cancers in order to preserve organs and improve quality of life; however, prolonged treatment periods are plagued with complications. The purpose of this retrospective study was to evaluate the toxicity of this procedure and the countermeasures taken in response.

Between April 2010 and February 2012, 8 patients (5 men, 3 women, aged 51-84 years) with head and neck squamous cell carcinoma (lower gingival, 2; buccal mucosa, 2; upper gingival, 1; tongue, 1; maxillary sinus, 1; and cervical lymph node metastasis, 1) were treated for 5-7 weeks with superselective intra-arterial infusions of docetaxel (10mg/m<sup>2</sup>/week; 50-70mg/m<sup>2</sup> in total) and cisplatin (5mg/m<sup>2</sup>/day, 5 days/week; 125-175mg/m<sup>2</sup> in total), and concurrent radiotherapy (50-70Gy in total).

Grade 3 or higher toxicities that developed included: lymphopenia, 8 (100%); mucositis 8 (100%); leucopenia, 7 (87.5%); and neutropenia 3 (37.5%). Intra-arterial chemotherapy was discontinued in 2 patients (25.0%) because of occlusion of the external carotid artery and a catheter infection, respectively.

Since bone marrow suppression and direct damage to the arterial intima will occur during arterial infusion chemo-

therapy, particular attention should be paid to the degree of complications that develop. It also should be remembered that mental anguish may be caused by placement of a catheter in the temporal region and by the long-term hospitalization required to undergo this treatment regimen.

#### P-1619

### NONMALIGNANT MICROENVIRONMENT DOES NOT SUPPORT ORAL CARCINOMA INVASION

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Invasion is the first step towards metastasis in cancer and thus the invasion efficiency is an important prognostic factor. Invasion efficiency has previously been studied in vitro with rat collagen or mouse tumor derivatives, such as Matrigel. These assays combine material from different species and do not properly mimic human tissue. We have developed a fully human uterine leiomyoma based model for cancer invasion studies (Nurmenniemi et al. Am J Pathol 2009). However, there is still a need for more tissue specific in vitro models.

The aim was to find out if porcine tongue can be used as a material for tissue specific invasion assay for oral tongue squamous cell carcinoma (OTSCC) and to test the capability of cancer cells to invade in human tissues. Another aim was to test if the myoma invasion model maintains its invasion favoring properties after tissue lyophilization and rehydration.

Porcine tongue, human heart, human healthy and fibrotic liver and human myoma were processed into discs. Some myoma discs were lyophilized and rehydrated. Human OTSCC cells (HSC-3) were cultured on the top of tongue in the absence or presence of normal and cancer-associated fibroblasts. HSC-3 cells, breast carcinoma (MDA-MB-231) and melanoma cells (G361) were cultured on top of the native myoma and heart discs as well as HSC-3 cells on liver discs and on lyophilized and rehydrated myoma. Invasion depth was measured from histological sections and radioimmuno assay was used to measure type III collagen degradation products in culture media indicating protease activity during invasion.

Cancer cells did not invade in porcine tongue, heart or liver suggesting that nonmalignant tissue does not support invasion of studied cancer cells and as such is not suitable for organotypic in vitro assays. Instead, myoma tissue enabled the invasion of OTSCC cells even after lyophilization and rehydration. These results confirm the crucial role of microenvironment in OTSCC invasion and the suitability of myoma as a microenvironment mimicker.

**P-1620****MEDICAL TREATMENT FOR A MANDIBULAR TUMOR: A CASE REPORT OF A PRIMARY HODGKIN LYMPHOMA OF THE MANDIBLE**

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**Introduction:** Primary extranodal Hodgkin Lymphoma is a rare disease in head and neck and its mandible location is even less frequent. About ten cases have been published so far, with only four of them describing the mandibular affection as primary site.

The treatment and prognosis of these patients depends on the stage of the disease. Extranodal affection classifies patients with mandibular lymphoma in a stage IV (COTSWOLD), defined as advanced disease.

**Clinical Case:** A 35-years-old male presented with a 3-months history of a tumour in the right mandible and pain, especially in the retromolar triangle. Lower right wisdom tooth was extracted 12 months before. The patient was HIV positive with no treatment. The physical examination showed severe trismus, numbness of inferior right dental nerve and also a right paramandibular mass protruding through the buccal cortex. No cervical lymph nodes were palpable. Orthopantomography and craniofacial CT-scan featured an expansive, lytic and multilocular lesion in right mandibular ramus and angle, involving soft tissues. Oral mucosa and underlying soft tissues were biopsied with pathological report of classical Hodgkin lymphoma, grade II nodular sclerosis subtype and oral mucosa infiltration.

Study of extension did not show other location for active disease. The patient was set on standard chemotherapy treatment for the particular type of lymphoma and he is currently in follow up.

**Conclusion:** Lymphomas located in oral cavity are more common in HIV positive patients. However, mandibular bone affection is a very rare localization and it is usually not suspected. Therefore, it is important to obtain promptly a biopsy, as the appropriate treatment for this advance stage lymphoma is medical.

**P-1621****INCREASED BIOLOGICAL ACTIVITY OF ENDOTHELIAL PROGENITOR CELLS (EPCS) FROM PATIENTS WITH SQUAMOUS CELL CARCINOMA COMPARED TO NORMAL POPULATION**

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**Introduction:** Essential for an undisturbed tumor growth is an adequate blood supply. In addition to angiogenesis, neovascularization, the mobilization of endothelial progenitor cells from bone marrow to blood vessel formation, is an important pathophysiological mechanism of tumor progression. Therefore we measured in 23 cancer patients

and a normal population, the migratory capacity and colony forming ability (CFU) of EPCs.

**Materials and Methods:** Mononuclear cells (MNC) were isolated by density gradient centrifugation from peripheral venous blood and differentiated on fibronectin-coated culture plates. After 3 days the migration ability of EPC was determined. For determination of the CFU the cells were cultured on methylcellulose for 2 weeks.

**Results:** EPCs in tumor patients showed a significantly increased migration behavior. Also, the number of CFU significantly increased compared to the normal group.

**Discussion:** In this study, we demonstrated that the biological activity of EPCs is significantly increased in tumor patients. This is reflected in an increase in migratory capacity and colony-forming ability. It reflects the ability of the tumor to recruit EPCs for tumor angiogenesis.

**P-1622****THE VALUE OF ORAL BRUSH BIOPSY AND LIQUID CYTOLOGY IN EARLY DETECTION OF ORAL CANCER CELLS**

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**Introduction:** Oral cancer is the sixth in terms of occurrence malignant neoplasm. 90-93% of cases have the form of squamous cell carcinoma. The most frequent localization is the tongue corpus, then the oral cavity floor, finally the oral mucosa.

Difficulties in the diagnosis result from its diverse morphological and histological structure, and the fact that the clinical picture is frequently obscured by infectious base and the diversity of bacterial flora. In order to lower the mortality rate due to cancer of the oral cavity it is essential to detect the pathologic change early and to apply a proper method of treatment.

**The aim of the paper:** The paper aims at evaluating the efficiency of oral brush biopsy and liquid cytology in detection of dysplastic and neoplastic cells in the material taken from ulceration within the oral mucosa.

Cytological examination in the above described form is technically simple, does not require complex, highly specialised procedures, and can help in prompt detection of malignant and premalignant changes by a dental practitioner.

**Material and method:** Patients over 18 years of age in whom during clinical examination ulceration of unknown etiology was discovered were qualified for the procedure.

After subjective and objective examination, in a patient under local anesthesia, oral brush biopsy was performed using special brush. Through rotational movements the material was taken from the ulceration, which was then placed on properly protected microscopical slide. The working part of the brush had to be rinsed in Cytospin liquid, the procedure which guarantees fixation of the cells and retains their natural shape. The final stage consisted of taking a sample segment the result of which was compared



with the results of previous cytological examination.

**Conclusion:** Cytological diagnosis (oral brush biopsy and liquid cytology) enable a doctor in any dentist's surgery to diagnose oral cancer at an early stage as the examination is technically simple, non-invasive and does not require any specialized procedures or highly qualified staff.

High mortality rate due to cancer of the oral cavity creates a need to find a diagnostic method which would make it possible to diagnose the disease in its early phase. Such diagnosis allows immediate treatment and improves the patient's chances of recovery.

#### P-1623

### INHIBITORY EFFECT OF GREEN TEA CATECHIN (-)-EPIGALLOCATECHIN-3-GALLATE IN RAT TONGUE CARCINOGENESIS INDUCED BY 4-NITROQUINOLINE 1-OXIDE

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**Purpose:** Reports of beneficial properties of green tea and its components are increasingly. Green tea and its components inhibit carcinogenesis, tumor proliferation, invasion, metastasis and angiogenesis. Although (-)-epigallocatechin-3-gallate (EGCG) is major component of green tea flavanol, its effect on cellular signal transduction is not well understood. We investigated the modifying effect of the (-)-epigallocatechin-3-gallate (EGCG) on 4-nitroquinoline 1-oxide (4NQO) induced tongue carcinogenesis.

**Methods:** A total of 240 SD rats aged 6 weeks were divided into 4 groups A,B,C,D: group A(n=60) were fed with 0.005% 4NQO dissolved in drinking water to induce tongue carcinogenesis. 180 rats were given 0.005% 4NQO for 12 weeks. Group B (n=60) were fed with 0.05% EGCG in drink from 2weeks before the dosage of 4NQO during the study. Group C (n=60) started EGCG in drink 12 weeks before 4NQO. Group D served as an untreated control. The rats were sacrificed at 4, 8, 12, 16, 20 and 24 weeks respectively from the beginning of drinking 4NQO the experiment. After killing, the tongues were excised and macroscopic observations were performed. These were divided to white or red patches, ulcers, papillary and massive lesions. The samples were collected for histopathological assessment and immunohistochemical investigation of Ki-67. The sections stained with H-E were classified as normal, hyperplasia, dysplasia and squamous cell carcinoma (SCC).

**Results:** The dorsal surface of the tongue became white with a rough appearance during the early inductive stage. As time progressed, papillomas or ulcers were found in the same region, and in the majority of animals, lesions subsequently developed into ulcers with indurative prominence. At macroscopic observations, the group B,C decreased papillary and mass formation than group A. Historically, all of group A at 24 weeks were SCC. Group B at 24 weeks, contain hyperplasia (2/10), dysplasia (4/10), SCC (4/10). Group C at 24 weeks, hyperplasia (3/10), dysplasia (5/10), SCC (2/10). We found that the expression of SCC was inhibited in the EGCG treated group.

**Conclusions:** This study suggested that EGCG have an inhibitory effect on carcinogenesis.

#### P-1624

### ADHESION MOLECULE L1 IS DOWN-REGULATED IN MALIGNANT PERIPHERAL NERVE SHEATH TUMORS VERSUS BENIGN NEUROFIBROMATOSIS TYPE-1-ASSOCIATED TUMORS

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**Abstract:** Type 1 neurofibromatosis (NF-1), also known as von Recklinghausen disease, is caused by a disorder of a single gene on chromosome 17 that usually restrains cell division. A sequence that is frequently associated with NF-1 is tumor progression from neurofibromas to malignant peripheral nerve sheath tumors (MPNSTs). The aim of this study was to determine the expression of the neural L1 cell adhesion molecule (CD171) in dermal-diffuse neurofibromas, plexiform neurofibromas and MPNSTs of NF-1. We retrospectively analyzed surgically-resected primary tumors, including 20 dermal neurofibromas, 23 plexiform neurofibromas and 17 MPNSTs by immunohistochemistry in paraffin sections of NF-1 tumors using the L1-specific monoclonal antibody UJ127.11, which does not crossreact with other members of the L1-family. Immunostains for CD34 and S100 were included to distinguish and allocate L1 expressing Schwann cell and perineural (specialized) fibroblasts. Our data showed that L1 is highly expressed in all benign NF-1 tumors and in some but not all MPNSTs.

Furthermore, we demonstrated correlation between L1 expression and differentiation grade of MPNSTs. There was a significant trend towards lower or non-detectable expression in the poorly differentiated MPNSTs, in contrast to all other tumor entities so far investigated, in which L1 expression correlated positive with malignancy, except for juvenile but not adult-derived neuroblastomas. Future studies are thus desirable to focus on the molecular basis of the varying effects of the degree of L1 expression, receptor and signal transduction mechanisms in different tumors.

#### P-1625

### SILENT PULMONARY EMBOLISM IN A PATIENT WITH HIT (HEPARIN INDUCED THROMBOCYTOPENIA) - AN INTERESTING CASE REPORT

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Heparin induced thrombocytopenia (HIT), is a potentially serious complication of heparin therapy and is being encountered more frequently in patients with cardiovascular disease as a use of anticoagulant therapy becomes more widespread. Is an idiosyncratic, autoimmune disorder

that occurs in 1% to 3% of patients receiving heparin. It is a prothrombotic drug reaction caused by platelet-activating IgG antibodies (Ab), which recognize platelet factor 4 (PF4)/ polyanion complexes. HIT occasionally causes severe thrombosis; in this case heparin induced thrombocytopenia and thrombosis is called HIT. We present an interesting case of HIT with pulmonary embolism, in a patient with a malignancy of the mandible, which was presented during the immediate postoperative period.

**P-1626****EPIGENETIC REGULATION OF FOUR AND A HALF LIM DOMAINS 1 IN HUMAN ORAL CANCER**

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**Objectives:** Four and a half LIM domains 1 (FHL1) has been related to carcinogenesis. However, the expression status of FHL1 in human oral squamous cell carcinoma (OSCC) remains unclear and the detailed mechanism of expression regulation is poorly understood. The aim of this study was to examine FHL1 expression in OSCC patients and to determine its regulation of expression.

**Material and Method:** FHL1 mRNA and protein expression in primary OSCCs (n=63), eight OSCC-derived cell lines (HSC-2, HSC-3, Ca9-22 HSC-4, HO-1-u-1, HO-1-N-1, KON, and Sa3) were analyzed by real-time quantitative reverse transcriptase-polymerase chain reaction (qRT-PCR), western blot and immunohistochemistry (IHC). In addition, to assess the epigenetic regulation of FHL1, three OSCC-derived cell lines (HSC-2, HSC-3, and Ca9-22) were treated with a histone deacetylase inhibitor, sodium butyrate (NaB), and DNA methyltransferase inhibitor, 5-aza-2'-deoxycytidine (5-aza-dC). Using methylation specific PCR (MSP), we examined the status of promoter methylation. We conducted chromatin immunoprecipitation (ChIP) of acetylated histone 3 at lysine 9 (H3K9ac) and monomethylated histone 3 at lysine 9 (H3K9me) in three OSCC-derived cell lines (HSC-2, HSC-3, and Ca9-22).

**Results:** qRT-PCR and western blot analysis detected frequent downregulation of FHL1 in OSCC-derived cells compared to human normal oral keratinocytes (HNOKs). The expression status of FHL1 in primary OSCCs (n = 63) was analyzed and compared to clinicopathological behavior. FHL1 expression in primary OSCCs was significantly lower ( $p < 0.05$ ) than in the normal counterparts. NaB and 5-aza-dC restored the FHL1 expression in OSCC-derived cells. MSP analysis showed that FHL1 DNA methylation was detected in OSCC-derived cell lines. ChIP revealed that in FHL1 promoter region was enriched with H3K9ac, however, in OSCC-derived cell lines, H3K9 was acetylated.

**Summary:** Our data provided evidence that downregulation of FHL1 is a characteristic event in OSCCs and that FHL1 expression was regulated by DNA methylation. FHL1 may play an important role in the development and progression of oral cancer and that FHL1 may be a useful target for oral cancer gene therapy.

**P-1627****E-CADHERIN AND B-CATENIN EXPRESSION IN ORAL SQUAMOUS CELL CARCINOMA AND RELATIONSHIP WITH CLINICAL PARAMETERS.**

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**Purpose:** Cell adhesion molecules are mainly placed on the cell surface and play a key role both in cell-cell and cell-extracellular matrix unions. The aim of this study was to determine the expression and localization of E-cadherin and  $\beta$ -catenin in normal epithelium of the oral cavity as well as in oral squamous cell carcinomas (OSCC) in order to correlate these findings with prognostically relevant clinicopathological variables.

**Methods:** E-cadherin and  $\beta$ -catenin expression in normal oral mucosa and in 69 oral squamous cell carcinomas was examined by immunohistochemistry. The association between these two molecules and the clinicopathological factors and prognosis was subsequently analysed.

**Results:** E-cadherin expression in OSCCs was observed in all 69 cases (100%): 11 (15.9%) cases showed weak expression; 21 (30.4%) moderate, and 37 (53.7%) high.  $\beta$ -catenin expression was observed in 64 cases (92.8%): 18 (26.2%) cases showed weak cell membrane expression; 26 (37.7%) moderate cell membrane, 19 (27.5%) high cell membrane, and one case (1.4%) showed cytoplasmic staining. No nuclear staining was detected. E-cadherin showed significant association with histological grade ( $\chi^2$ ,  $P=0.003$ ) and alcohol consumption ( $\chi^2$ ,  $P=0.05$ ).  $\beta$ -catenin showed significant association with nodal stage ( $\chi^2$ ,  $P=0.029$ ), TNM stage ( $\chi^2$ ,  $P=0.009$ ) and E-cadherin expression ( $\chi^2$ ,  $P=0.018$ ). However, no of them were independent prognostic factors in the disease-specific survival analysis.

**Conclusions:** E-cadherin is closely linked to  $\beta$ -catenin expression in OSCC and tumor differentiation. Alcohol consumption could increase the aggressiveness of cancer leading to a reduced expression of E-cadherin.  $\beta$ -catenin could be an early marker to identify the presence of occult metastases in patients with OSCC.

**P-1628****EXPRESSION OF FOCAL ADHESION KINASES IN ORAL SQUAMOUS CELL CARCINOMA AND ITS RELATIONSHIP WITH NODAL STAGE AND SURVIVAL**

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**Background:** Focal adhesion kinase is protein tyrosine kinase that has been identified as a key mediator in the signalling mediated by Integrins. The objective of this study was to determine the expression and localization of FAK in normal epithelium of the oral cavity as well as in oral squamous cell carcinomas in order to correlate these findings with prognostically relevant clinicopathological variables.

**Methods:** FAK expression in normal oral mucosa and in 69 oral squamous cell carcinomas was examined by immunohistochemistry. The association between FAK and the clinicopathological factors and prognosis was subsequently analysed.

**Results:** FAK expression was detected weakly in basal and suprabasal cell layers of normal epithelium, with a lack of staining in the most external and differentiated layers. FAK staining was preferentially cytoplasmatic. FAK expression in OSCCs was heterogeneous: 23 (33.3%) cases showed weak expression; 16 (23,2%) moderate expression, and 23 (33.3%) cases showed high expression. FAK expression significantly correlated with tumor size ( $P=0.010$ ), neck node metastases (Fisher exact test,  $P=0.012$ ), and local tumor recurrence (Fisher exact test,  $P=0.019$ ). FAK expression was an independent prognostic factor in the disease-specific survival analysis (log-rank  $P=0.017$ ).

**Conclusion:** Increased expression of FAK may play a role in invasiveness and metastases of OSCC, that carries a poor prognosis and low survival.

#### P-1629

##### COMPARISON OF E-CADHERIN EXPRESSION IN ORAL SQUAMOUS CELL CARCINOMA PRIMARY LESION AND ITS RELATED METASTASIS

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**Purpose:** E-cadherin plays a key role in cell-cell unions and is involved in oral squamous cell carcinoma (OSCC) development and metastasis. The aim of the present study is to compare the expression of E-cadherin in primary lesion and their associated metastasis in OSCC, by means of immunohistochemistry and its relationship with clinicopathological parameters and survival.

**Methods:** E-cadherin expression in primary tumors and their paired metastases, from 50 surgical patients with OSCC were examined by immunohistochemistry. The association between this molecule and the clinicopathological factors and prognosis was subsequently analysed.

**Results:** When E-cadherin staining was compared between primary lesion and their associated metastasis, 32 cases showed maintained expression (64%), 10 cases reduced expression (20%) and 8 cases (16%) increased expression. There was no statistically significant relationship between E-cadherin immunostaining and clinical variables, such as age, sex, T stage, tobacco, alcohol and survival.

**Conclusions:** OSCC show heterogeneity in their potential to express E-cadherin, which is dynamically regulated during tumour progression.

#### P-1630

##### TELOMERASE-SPECIFIC REPLICATION-SELECTIVE ONCOLYTIC VIRUSES FOR ADENOID CYSTIC CARCINOMA CELL LINES

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There is no effective treatment of adenoid cystic carcinoma (ACC) in oral region, which low sensitivity of chemotherapy and radiation therapy.

We previously showed that telomerase-specific replication-competent adenovirus (Telomelysin, OBP-301), in which the human telomerase reverse transcriptase (hTERT) promoter controls the adenoviral E1 gene expression, induces a selective antitumor effect in oral squamous cell carcinoma (OSCC) cells in vitro and in vivo orthotopic graft model.

In this study, we conducted to evaluate the effectiveness of OBP-301 for ACC. We could confirm that the expression of coxsackie and adenovirus receptor (CAR) and hTERT in two types of ACC cell lines (ACC2, ACCM) by Western blotting. Then, we examined the antitumor effect of OBP-301 on human ACC cells in vitro. OBP-301 infection induced oncolytic cell death in human ACC cells in a dose-dependent manner. Relative E1A mRNA expression in ACC was analyzed by real-time RT-PCR, which showed high expression. Moreover, OBP-301 in use has limited potency when administered alone; however, combination therapy using these agents and radiation exhibits encouraging levels of efficacy. Here, we describe the mechanistic basis for synergy of irradiation and OBP-301. This combination therapy was more effective compared with OBP-301 alone in ACC cells.

TelomeScanOBP-401 is a genetically engineered adenovirus that expresses GFP by inserting the GFP gene under the control of the cytomegalovirus promoter at the deleted E3 region of OBP-301. Human ACC cells expressed bright GFP fluorescence as early as 12 h after OBP-401 infection. The fluorescence intensity gradually increased in a dose-dependent manner, followed by rapid cell death due to the cytopathic effect of OBP-401, as evidenced by floating, highly light-refractile cells under phase-contrast photomicrographs. In conclusion, our data clearly indicate that telomerase-specific oncolytic adenoviruses have a significant therapeutic potential against human ACC in vitro. These results suggested that treatment of OBP-301 and OBP-401 are possible to improvement of QOL of oral cancer patients.

#### P-1631

##### MAST CELL SARCOMA; AN EXTREMELY RARE ENTITY

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**Introduction.** Mast cell sarcomas are exceedingly rare in humans; to date there have been only four other cases reported in the literature, worldwide. Mast cell sarcomas display an extremely aggressive growth pattern, histologi-

cally consisting of neoplastic mast cells within connective tissue.

Diagnosis is made from biopsy of the lesion and bone marrow trephine; with all current cases showing positivity for cd 17+ve, CD 25+ve cell and mast cell tryptase. There is currently no established treatment protocol for mast cell sarcoma, owing to the rarity of the condition. Reported cases have been treated with local resection and radiotherapy with additional chemotherapy if the disease is refractory or recurrent.

The prognosis of this tumour is dismal and commonly develops into mast cell leukaemia.

**Methods:** A 61 year-old Mediterranean lady was referred by her GMP to the one stop head and neck lump clinic regarding lymphadenopathy of four weeks duration. Clinical examination revealed multiple bilateral cervical lymph nodes. (firm rubber??). There was no evidence of infection or regional potential malignancy noted. Nasoendoscopy was normal. Haematological tests revealed a normocytic and normochromic anaemia. Ultrasound and FNAB was inconclusive. PET revealed no obvious regional primary. An open lymph node biopsy was subsequently performed. Histopathology was positive for cd 17+ve, CD 25+ve cell and mast cell tryptase. A diagnosis of mast cell sarcoma was made.

The case has KIT mutation; therefore a tyrosine kinase inhibitor will be of no use. Patient has been entered into a 'newer generation' TKI clinical trial.

The authors will illustrate this extremely rare case with clinical pictures, histology and imaging.

#### P-1632

### VALUE OF EICOSAPENTAENOIC ACID-ENRICHED NUTRITIONAL SUPPLEMENTS FOR PATIENTS WITH HEAD AND NECK CANCER TREATED BY CHEMOTHERAPY AND RADIOTHERAPY

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**Background:** Inflammatory cytokines produced by cancer cells or immunocytes induce malnutrition in patients with advanced cancer. We investigated the value of oral nutritional supplements containing eicosapentaenoic acid (EPA) for such patients as the concept of immunonutrition with dietary supplements that exert anti-inflammatory effects has recently been introduced to overcome such malnutrition.

**Methods:** This study included 12 patients who underwent chemotherapy and radiotherapy to treat advanced head and neck cancer at our department between September 2009 and March 2012. Four patients received daily supplementation with Prosure® (Abbott Laboratories), an oral nutritional supplement containing 2 g/pack (240 mL, 300 kcal) of EPA. Nutritional status was evaluated using the modified Glasgow prognostic score (mGPS) that measures CRP (> 0.5 mg/dL) and serum albumin (< 3.5 g/dL). All of the patients were assigned to groups A (normal CRP and normal albumin), B (normal CRP and hypoalbuminemia), C (elevated CRP and normal albumin) and D (elevated CRP and hypoalbuminemia). We evaluated GPS and

weight in each patient at the start and one month after treatment.

**Results:** Among the four patients who consumed 1 or 2 packs of Prosure®, two improved from D to A, one improved from D to B, and one remained in A. The average weight loss of these four patients was -0.68 kg. Among the eight patients who did not consume Prosure®, three and two respectively worsened from A and B to D and one shifted from C to B. One each of the remaining two patients stayed in groups A and D. The average weight loss of these eight patients was -3.39 kg.

**Conclusion:** Supplementation with EPA might improve poor nutritional status among patients undergoing treatment for malignancies.

#### P-1633

### HEDGEHOG SIGNALING PATHWAY IN ORAL AND OROPHARYNGEAL SQUAMOUS CELL CARCINOMAS

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**Background:** Hedgehog (Hh) signalling pathway is of paramount importance in morphogenesis of the most body tissues and organs and in homeostasis of the adult tissues. Recently, several lines of evidence indicate its importance in growth of many malignant tumors. The aim of this study was to examine the role of Hh-Gli signaling in oral and oropharyngeal squamous cell carcinoma (SCC).

**Methods:** Sixty-four tissue samples; both from the tumour and adjacent mucosa, were collected from 60 patients with oral and oropharyngeal SCC, all tobacco and alcohol users. Expressions of the genes of interest; *Shh*, *Ptch*, *Smo*, *Gli1* were detected by RT-PCR (54 samples), while the levels of Shh, Ptch, Smo and Gli1 proteins were detected by immunohistochemistry (32 samples).

**Results:** The presence of signalling pathway was confirmed in a subset of control mucosal tissues, as well as in tumours. Higher expression of *Ptch* (p=0.04, Mann-Whitney test) and Ptch protein (p=0.01, Mann-Whitney test) in tumours than in control mucosal samples indicates the contribution of Hh signalling pathway in tumour growth. Correlation of the Shh ligand expression with other genes/proteins of signalling pathway in tumours samples indicates ligand dependent signal activation. Furthermore, high *Ptch* mRNA expression (p= 0.05, Fisher exact test) and high Shh protein expression (p= 0.04, Fisher exact test) are in relation to pathohistologically positive neck lymph nodes status and pathohistologically poor differentiated tumours (*Ptch*; p= 0.04,  $\chi^2$  test, p= 0.02, Kruskal- Wallis test). Surprisingly, high *Gli1* mRNA (p= 0.04,  $\chi^2$  test, p= 0.006, Fisher exact test), as well as, protein expression (p= 0.02,  $\chi^2$  test) correlates with negative neck lymph node status and pathohistologically well differentiated tumours.

## 17. MICROSURGICAL RECONSTRUCTION IN HEAD AND NECK

### P-1701

#### THE EFFECTIVENESS OF PREOPERATIVE 3D PLANNED FREE FIBULA RECONSTRUCTIONS OF THE MANDIBLE COMPARED TO CONVENTIONAL RECONSTRUCTIONS

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**Background:** Complex mandibular reconstruction requires multi-planar attention to detail to recreate its requisite contours and symmetry. The vascularized fibula graft is versatile and can be three-dimensionally fashioned to reconstruct a variety of mandibular defects. Traditionally, a freehand approach has been employed to re-establish mandibular form. The advent of computer generated aids, including prebent plates, osteotomy cutting guides, and stereolithographic models, may simplify the intraoperative manipulation and optimize results. The purpose of this study is to compare the outcome of fibular transfer for mandibular reconstruction using conventional "eyeballing" techniques to those involving sophisticated planning. We hypothesize that interfragmentary gap size will be less and symmetry enhanced using computer aided planning.

**Methods:** This was a preliminary, retrospective analysis of CT scans, including patients from Mainz medical centre and Yale medical school. Individuals who underwent mandibular reconstruction using fibular transfer were included. Demographic information was tabulated, as were pertinent operative details, and information relating to diagnosis, mandibular site, number of osteotomies, and presence or absence of CAD/CAM design. Interfragmentary bone gap size and volume were measured between osteotomized segments using a 3D planning module (Osirix). Symmetry with contralateral normal control side was calculated by comparing angles of the mandibular symphysis, respectively the angulus mandibulae and as well as the length of the corpus mandibulae. Statistical differences were tabulated using a t-test.

**Results:** 30 CT scans were identified (15 preoperative, 15 postoperative). Diagnoses included squamous cell cancer, osteoblastoma, craniofacial microsomia and posttraumatic mandibular defect. In total eight osteotomy sites had been analyzed. 4 patients underwent free fibular reconstruction using conventional means, without computer-aided planning. The remaining patients were planned preoperatively using a combination of computer simulation, guide fabrication, prebent plates, and model construction. Differences in interfragmentary gap size showed the double distance in conventional reconstructions compared to 3D planned reconstructions (p=0,07). The symmetry differed not

significantly, although 3D reconstruction showed a tendency of better symmetry due to symphysis angles.

**Conclusions:** These preliminary findings indicate that CAD/CAM planning can enhance the osseous morphology for mandibular reconstruction using free fibular grafts. The interfragmentary gaps are more closely approximated and the angles from the adapted edges better represent normal mandibular morphology. Future efforts will focus on quantifying the efficiency and time-savings when using preoperative planning with an increasing sample size.

### P-1702

#### MICROSURGERY IN SEGMENTAL RESECTION OF MANDIBLE

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The segmental resection of mandible raises particular problems, especially in cases of oncologic surgery when patients are exposed not only to surgical treatment but also to radiotherapy and chemotherapy. We intend to present our experience in the plasty of mandibular defects by use of microsurgical techniques.

**Methods:** Between 2006 and 2012 a number of 35 patients have been treated by performing segmental resection of mandible. In 30 of them the resection was performed for malignant tumors, the rest of them for benign tumours. A number of 24 musculo-cutaneous latissimus dorsi flaps were used, as well as 10 fibular flaps, 2 iliac flaps and 2 fascio-cutaneous radial flaps. In 2 of the cases there were 2 free flaps used for the reconstruction, and in 2 of the patients the mandibular reconstruction was performed one year after the initial surgery. In most cases we preferred using the latissimus dorsi free flap combined with a titanium reconstruction plate (20 cases), or a bone flap (1 case fibular, 1 case iliac flap) or without the reconstruction of the bone defect (in 2 old patients with lateral defects). Also, in 2 of the patients, the prosthetic dental restoration was achieved by use of titanium implants in the fibular flap.

**Results:** Two of the flaps were fully lost: one latissimus dorsi and one fibular. 2 reconstruction plates were removed: one in the patient with necrosis of the musculo-cutaneous flap and the other one after the skin exposure of the splint, one year after surgery.

The functional and aesthetic results were good or very good and allowed patients to follow radiotherapy and/or chemotherapy when recommended, and also to return to social life in most cases.

**Conclusions:** The appropriate individualized use of microsurgical techniques allows the achievement of good functional and aesthetic results in patients with segmental resection of mandible.

**P-1703****RHABDOMYOLYSIS – A RARE COMPLICATION OF FIBULAR-FREE FLAP SURGERY**

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Rhabdomyolysis is the degradation of muscle fibres resulting in release of toxic cellular byproducts into the systemic circulation. Potential complications include acute renal failure and cardiac arrhythmias. Unless recognized and appropriately managed it may be lethal. In our case it also led to late-stage flap failure.

There are reports within the literature of rhabdomyolysis secondary to the use of pneumatic tourniquet during lower limb orthopaedic surgery, positional trauma secondary to prolonged urological and spinal procedures and reperfusion injury following vascular procedures. To the best of our knowledge no such cases have been reported in the literature in relation to free-flap harvest.

To raise awareness of this potentially lethal condition amongst our head and neck surgical colleagues, we present the rare occurrence of post-operative rhabdomyolysis in a man who underwent fibular free-flap reconstruction for a maxillary cancer resection defect.

Risk factors, causes, diagnosis, complications and management of this rare but potentially life threatening condition are highlighted and preventative strategies are proposed. In addition, we attempt to quantify the normal rise in creatine phosphate kinase following free-flap surgery.

**P-1704****THE ANATOMICAL BASIS OF THE DEEP CIRCUMFLEX ILIAC ARTERY FLAP: AN ANATOMICAL STUDY IN SOUTH KOREAN CADAVERS**

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**Aim:** This study focused on the anatomy of deep circumflex iliac artery (DCIA) with iliac crest suitable for the reconstruction of maxillofacial defect.

**Materials and Methods:** Ten cadaveric dissections (a total of 20 cases bilaterally) have been performed. We surveyed a pattern of DCIA that was branched from external iliac or femoral artery. And we also measured length, diameter, and location of vascular pedicle.

**Results:** In dissection of 20 cases, mean diameter of deep circumflex iliac vessel was as follows; artery: 2.75 mm, vein: 2.28 mm. Mean length of artery from origin to anterior superior iliac spine (ASIS) was 59.35 mm. In 18 cases, the ascending branch originates from DCIA. But in two cases, it originates independently with DCIA.

**Conclusion:** DCIA as a pedicle of the iliac crest showed sufficient diameter and length enough for microanastomosis in the maxillofacial reconstruction. Although anatomical variation presents, flap harvesting can be performed

successfully based on the knowledge of anatomy.

**P-1705****FREE VASCULARIZED ANTERIOR RIB FLAP: AN ANATOMIC DISSECTION STUDY IN SOUTH KOREAN WITH CLINICAL CORRELATION**

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The purpose of this study was to clarify topography of the anterior rib region for reconstruction of various defects of the jaw, especially condyle defect. We also verified usefulness of the internal thoracic vessel as a vascular pedicle for vascularized anterior rib flap. Ten embalmed Korean cadavers (5 males, 5 females; mean age 68 years, age range 46-79 years) were used in this study. The branching pattern of the anterior intercostal vessel from the internal thoracic vessel was measured on the 5th rib region. In addition, we took the measurement of the vascular pedicle length and the diameter and location of the internal thoracic vessel. The function of the transversus thoracis muscle as a dissection landmark of harvest elucidated in this study. As a result of measurement, the branching patterns showed uniform types and there was difference between the right and the left side. The patterns that branched out from the one and two anterior intercostal branches of the internal thoracic vessel in the right and the left side were dominant, respectively. The mean diameters of the internal thoracic vessel were 2.5±0.4 mm (the artery on the left side), 2.0±0.5 mm (the vein on the left side), 2.6±0.4 mm (the artery on the right side) and 3.0±0.5 mm (the vein on the right side). There was also difference between the both sides, we estimated the results were adequate for micro-anastomosis. The transversus thoracis muscle could be an invaluable landmark which prevent the lung exposure when clinicians operating the flap dissection.

**P-1706****RETROSPECTIVE ANALYSIS OF 200 CONSECUTIVE FREE FLAPS.**

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**Introduction:** Radial and fibular free flaps are often used in reconstruction of maxillofacial defects. A retrospective analysis was performed to score our flap survival rate and to determine the relevance of different parameters.

**Materials and methods:** 200 fibular and radial free flaps with a minimal follow-up of 1 year were included. The data were retrieved from the files were related to patient characteristics, disease, surgical procedure and hospital stay. Statistical analysis was performed by means of the Pearson's chi squared test.

**Results:** A total of 130 radial free flaps and 70 fibular flaps were included in a total of 192 patients. The sex ratio was 2.09/1 and the mean age was 55.2 years old. The overall flap survival rate was 85.5%. Salvage surgery rate was 4.5%. There was no statistical significant difference in flap survival regarding sex, smoking habit, ASA score, median age and pre-operative radiotherapy. Statistical significant difference was seen comparing 0 or 1 fibular osteotomies

to 2 osteotomies ( $p < 0.001$ ).

**Discussion:** The flap survival rate in this series is lower than reported in literature. Possible explanations can be the lack of experience in performing the microanastomoses (although we did not find any effect of a learning-curve), the lack of extensive follow-up and the high threshold for salvage flap surgery. Strictly comparison between our technique and the classical one described in the literature allowed for outpointing some technical surgical points whom advantages and perhaps inconveniences are discussed. Inconsistencies in literature regarding the influence of age, sex, pre-operative radiotherapy, were seen, but could be explained by the small sample size.

**Conclusion:** Although the success rate of our last 200 consecutive free flaps in Head and Neck reconstruction is lower than this reported in the literature, we think that this report may induce some modifications in our surgical flap harvesting technique, in our microsutures and in the post-operative flap management, including another philosophy for redo-surgery.

#### P-1707

### FREE FLAPS RECONSTRUCTION AFTER SURGERY IN ONCOLOGIC HEAD AND NECK – OWN EXPERIENCES

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<sup>1</sup>*Military Institute of Medicine*

**Target:** The target of our work is to show our first experience in applying free flaps in the reconstruction of head and neck after oncologic surgery interventions.

#### Material and Method

During the period of one year we treated seven patients in our clinic. We carried out reconstructive operations and applied free flaps on the microvascular anastomosis. In five cases the reconstruction concerned soft tissues (cheek, tongue, floor of the mouth) This cases have been carried out with the application of forearm free flaps (RFFF). In the two remaining cases for reconstructive mandible end soft tissues of the mouth we have used fibula free flaps (FFF). Among the patients were 4 male and 3 female patients in the age of 25-71 years (average age 50, 8 years). In six cases the reason for the surgical intervention was malignant cancers (carcinoma planoepitheliale) and in one case benign cancer (myxoma odontogenes). Between the patients who were treated because of malignant cancers, were two patients who were treated because of recurrent cancers after full dose of radiotherapy (RTH)

#### Result

In five cases (4 forearm free flaps and 1 composite fibula free Flap with a skin island) we accomplished full good result. One forearm free flap entire necrosis. In one of the composite fibula free Flap necrosis got partly skin island while the part of the bone which reconstruct the mandible, heal without complication. Donor sites healed without complications. Three patients received supplemental radiotherapy. All patients stay permanently under our further observation. We can notice very positive functional and cosmetically effects without recurrent of cancers

Although we lost one flap completely and one flap partly we can conclude, that the six applied free flaps enabled us to solve many problems usually connected with the reconstruction tissues following oncological operations and the

achieved functional and cosmetically effects are very satisfying.

#### P-1708

### CONCEPT OF PLANNING MAXILLA AND MANDIBLE RECONSTRUCTION INTERVENTIONS.

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The main objective of our study was to improve functional and aesthetical treatment results of patients with defects and bone atrophies of maxilla and mandible with the aid of 3D computer planning and modelling reconstructive intervention.

**Material and method.** During 2007-2012 surgical interventions were performed at 122 patients with bone defects and atrophies of maxilla and mandible. 72 men and 50 women. 26 patients had bone atrophy of different aetiology, 96 had posttraumatic defects, defects resulted from gunshot injuries and defects after radical tumor resections. 89 microsurgical autotransplantations were performed with revascularised flaps: 72 osteocutaneous fibula flap, 6 iliac crest flap, 7 osteocutaneous forearm flap, 4 cortico-periosteal medial femoral flap.

Intervention planning performed at three main stages:

1. Computer tomography of the interest region and of the donor site.
2. Volume facial skeleton virtual model building suitable for further CAD\CAM applications.
3. Autotransplant volume modelling and designing surgical templates for transplant harvest and shape configuration.

All the calculations were performed using "backward planning" concept - the bony part of the microsurgical transplant was calculated according to the demanded osseointegrated implant supported prosthetic construction.

**Results:** Osteocutaneous fibula flap was used in most cases for combined defects reconstruction because of the skin paddle which is an option for oral and nose cavity isolation and oral vestibule reconstruction. Fibula configuration is proper for osseointegrated implants modelling because of the structure and vascular characteristics.

In 2 cases we had fibula flap failure due to venous thrombosis in early postoperative period.

We consider a vascular graft of the iliac crest the best option for maxilla reconstruction in cases of bone atrophy, in mandible atrophy reconstruction we consider a vascular retromolar graft optimal.

**Summary:** The described approach in planning reconstruction interventions in solving severe atrophy and defects of mandible and maxilla, allows us to perform complex rehabilitation of the patients and get superior functional and aesthetical results.

**P-1709****“RECOVERY OF A LOST IDENTITY . VERSATILITY OF ANTEROLATERAL FREE THIGH FLAP FOR RECONSTRUCTION OF LARGE CRANIOFACIAL DEFECTS”**

David Gonzalez Ballester<sup>1,\*</sup>, Luis Ruiz Laza<sup>1</sup>, Damian Manzano Sólo de Zaldivar<sup>1</sup>, Raúl Gonzalez García<sup>1</sup>, Laura Villanueva Alcojol<sup>1</sup>, Isidoro Rubio Correa<sup>1</sup>, Cristina Hernandez Vila<sup>1</sup>, Manuel Moreno Sanchez<sup>1</sup>, Jesús Mateos Arias<sup>1</sup>, Florencio Monje Gil<sup>1</sup>

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Reconstruction of large defects in the skull and scalp is a challenge for reconstructive surgeon. Origin of these can be multiple and varied: trauma, burns, benign or malignant tumour resection, osteomyelitis, osteoradionecrosis, etc. presenting in occasions determined characteristics that limit the use of certain reconstructive options. Several factors can influence in the selection of a specific surgical method: anatomy of the defect (such as size, depth, adjacent vascular supply, previous radiation and surgery, presence of infection, etc...), patient-dependent factors (such as general condition, quality of life, comorbidities, prognosis, cosmetic requirements, etc...), surgeon-dependent factors (experience, preferences, ), etc... In unfavourable conditions, such as large defects, presence of infection, previous surgery, etc ... free transfer tissue are superior to other reconstructive techniques in the recovery of craniofacial integrity.

We present a male of 57 years with a major cosmetic defect on the forehead and active chronic infection over 20 years of evolution after complicated craniotomy. Multiple failed attempts of reconstruction with grafts and local flaps were performed. After a complete analysis of the case and review of different available options, the defect was reconstructed with an antero-lateral free thigh flap of 10 x 15 cm of size in a dual mode:

- using epithelialised area to solve the infectious process with the use of healthy vascularized tissue, and
- using a partial de-epithelialised area of 7 x 5 cm to add volume and to solve the aesthetic defect.

In conclusion, the use of anterolateral free thigh flap in a dual form (epithelialised and de-epithelialised) constitutes an good option for solving complicated craniofacial defects with a excellent final outcome.

**P-1710****COMPLICATIONS IN THE DONOR AREA OF THE FASCIOCUTANEUS FOREARM FLAP.**

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There is controversy about the morbidity and complications that the radial flap donor site has, and some authors suggest the use of other flaps.

We have studied the frequency of complications at the donor site in 20 cases.

*Material and methods:* The study sample includes all patients who underwent surgery with radial flap reconstruction between January 2006 and December 2010 (n 20) in the Department of Oral and Maxillofacial Surgery

Hospital Gregorio Marañón. We analyze the immediate and long-term complications. Of these 7 died and 3 patients had not been followed developmentally. Ten patients were interviewed with a follow-up between 6 months and five years evaluating the sensitivity epicritic, flexion and extension of the wrist and thumb opposition.

The flap design was always based on a negative Allen test, and was used as far as possible the non dominant forearm. The resulting skin defect was covered with a dermo-epidermal graft. The forearm was splinted for a period of 10 days.

*Results.* We observed 1 case of Mucor infection in the donor site, the patient died in the intensive care unit due to respiratory complications.

The remaining complications were minor, such as tendon exposure in two cases with a favourable outcome with conservative treatment.

The motor disturbances and sensitivity epicritic do not limit the quality of daily life.

*Conclusions:* The radial fasciocutaneous flap is a secure reconstructive option due to its low complications, most of them compatible with everyday life.

**P-1711****THE USE OF REVASCULARIZED AUTOGRAFTS FOR THE ELIMINATION OF DEFECTS IN THE MIDFACE**

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*Purpose:* To improve the results of the functional rehabilitation of patients with defects of the midface.

*Materials and methods:* between 2002 and 2012 operations were performed on 15 patients with combined defects of the midface with differing localization and aetiology: gunshot wounds - 6, post-traumatic deformation -2 , cancer - 7.

All patients underwent computed tomography and ultrasound analysis, as well as computer simulations, the movement of the vascular pedicle and the position of dental obstructions.

Based on the size, location of the defect, its relation to the nasal cavity and the condition of the recipient vessels, a choice was made about the rational use of autografts.

The following were used: fibula flap -7, radial flap -5, rib flap -2, femoral flap -3, iliac flap -3

*Results:* Of the 15 transplanted autografts 14 settled down completely. In one case there was necrosis due to venous thrombosis. Dental implants were used in five clinical cases.

*Conclusions:* The use of revascularized flaps can reliably repair defects of the midface and create a proper environment for dental-maxillary rehabilitation.

For extensive defects of the upper jaw a fibula flap is preferable, for limited and isolated defects - a femoral flap, and if there are defects in the palate - a radial flap.



**P-1712****A BIOMECHANICAL ANALYSIS AFTER FIBULAR FREE FLAP HARVEST BASED ON LOWER LIMB AXIS MEASUREMENTS: A NEW TOOL IN THE DONOR LEG CHOICE?**

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**Introduction:** Since Hidalgo reported the first series of mandibular reconstruction using the fibular free flap in 1989, it became the workhorse flap in this location. There is no agreement on which preoperative studies should be performed in donor leg to avoid further complications. Controversy is mainly focused on anatomical vascular abnormalities that could jeopardize foot vascularization or flap viability, whereas biomechanical outcomes in donor leg and gait disturbance have been poorly studied. We tried to understand which leg should be chosen depending on lower limb axis measurements, with the aim of decrease disturbances on donor leg biomechanics in those cases where both legs are equally suitable for flap harvesting from the point of view of vascular anatomy.

**Material and methods:** Fifteen consecutive patients who underwent mandibular reconstruction using the microvascularized osteocutaneous fibular free flap, with a mean age of 53 years old (26 – 66) were selected. After a mean postoperative time of 49.7 months (8 - 102), frontal tele-radiographies of lower limbs were taken in order to compare lower limb axis variation between both legs, using the contralateral leg as a control. This axis is defined as the imaginary line from femoral head rotational centre to the ankle center, and it defines the genu varus and genu valgus deformities, which may lead to undesirable walking disturbances.

**Results.** Lower limb axis variation meaning a valgus deformity in the donor leg compared with the control was observed in 12 of the 15 patients (mean difference: 7.4 mm). This finding is consistent with other reports in the literature. The difference resulted to be higher in those patients with longest following times, in elderly patients and in women, although these associations were not statistically significant.

**Conclusion.** In cases both legs could be used for fibular flap raising, presurgical lower limbs telerradiography should be performed in order to select the leg that presents less valgus (or more varus) deformity limb axis. This is justified because after the surgery, the leg is expected to develop a valgus deformity and it is preferable to maintain the limb axis as near to the knee centre as possible.

**P-1713****DETERMINATION OF LOCALIZATION OF THE FACIAL ARTERY AND VEIN IN THE CHEEK WITH COLOR DOPPLER ULTRASOUND FOR INTRAORAL MICROVASCULAR ANASTOMOSIS.**

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**Introduction:** “There is no scar like no scar” – that is why during reconstructions of the face or oral cavity with free flaps it might be better to perform microsurgical anastomosis intraorally instead of at the neck. But identification of facial vessels under cheek mucosa is time consuming and technically demanding.

**Aim:** To define course of the facial artery and vein on the cheek with the open mouth.

**Material and methods:** 25 healthy volunteers were examined. Mean age was 25, F/M ratio was 10:15. All measurements were made with the subject in supine position, with standard rubber distractor put between molars and premolars. The ultrasound probe (Color Doppler Ultrasound HITACHI EUB-7500) was applied horizontally to the cheek skin on the both sides of the face. Localization of the facial artery and vein were determined at lower border of the mandible and on the line between cheilion and antitragus. The diameter and the distance between vessels were measured.

**Results:** The main branch of the facial artery was detected at the lower mandibular border in 100% (n=50) of cases. The accompanying facial vein was found also in 100% (n=50) of cases, lateral to the artery in all cases. At the lower mandibular border the flow diameter of the facial artery was 1 to 2.4 mm (average 1.85 mm); the facial vein's diameter ranged from 1.5 to 2.5 (average 1.92). The distance between the facial artery and vein was on average 4.5 mm. At the line between cheilion and antitragus 49 out of 50 arteries and veins (97,5%) could be localized. The facial artery's diameter was 0.5 to 1.7 mm (average 1.14); vein's diameter: 0.9 to 1.8 mm (average 1.32). The facial artery was located on average 18 mm; facial vein 40 mm from the cheilion (average distance between artery and vein 22 mm).

**Conclusion:** Opening mouth changes location of facial vessels and distance between these vessels. The results of our study suggest that intraoperative USG for localization of facial vessels, performed with mouth open, is advisable. If not possible, preoperative USG with open mouth and marking of vessels position is necessary.

**P-1714****MANDIBULAR RECONSTRUCTION: SPECIAL CONSIDERATIONS IN CONDYLE, RAMUS AND BODY**

Nasser Hachem<sup>1,\*</sup>

<sup>1</sup>AHACHEM58

**Introduction:** A multi-disciplinary team of doctors and surgeons, in our Hospital in Abu Dhabi, recently performed a complex, 4 recurrent Ameloblastomas of the maxillofacial surgery. The surgery included a radical resection of the patient mandible, and floor of mouth, from the high subcondyle area, mandibular angle, Body, symphyseal region into mandibular lateral incisor opposite side, while the patient leg free fibular iliac bone microvascular transplant was used to reconstruct his jaw.

**Problem:** A 42, 32, 28 and 25 year-old male and female Patient performed from November 2009 to November 2011 surgeons excised the mandible, and floor of the

mouth of the Patient. The patients suffered from a polycystic, monocystic primary or recurrent Ameloblastoma. The Patients presented to Maxillofacial Outpatient Clinic of our Hospital with a massive tumour in his face. The lymph nodes were removed from right sides of his neck during the surgery, Supraomohyoidale funktionell Neck Dissection, and then 40 to 60 % of the Mandible and oral mucosa were placed on the mouth floor to re-construct entire mandible. Additional procedures will be needed to perfect the appearance of the lower Face with dental endosseal Implantation from the (Straumann Company).

*Material and Methods:* From November 2009, to November 2011 4 patients with mandibular bone Reconstruction included in study from 2 institutions, 4 men and 1 women with mean age of 33 year. 3 underwent fibula free flap harvest without STSG or Muscles, One underwent iliac grafting, the majority were large tumours

*Results:* One donor sites from the left leg, The length is 21 cm Fibular bone for the reconstruction of the right ramus, body and symphyseal area to region 31, by recurrent Ameloblastoma., No intra- extraoraly complications, Need for additional surgery, Correction of the Ramus and mandibular Body. Primary Tumours composed of 4 Ameloblastomas , The tumour, as large as a 18x3.5 cm, was extracted completely from the patient's face during the surgery. What made this situation so compelling, was that a much smaller surgery could have been performed if it had received the proper care years ago. I have tremendous respect for the patient who worked tirelessly for years to see that himself finally received the proper care. I also salute the patient as well, who faced the surgery and all his care with tremendous courage for such a young man.

## 18. MISCELLANEOUS

### P-1801

#### A CASE OF CONGENITAL DEFICIENCY OF FACTOR VII DIAGNOSED DUE TO POSTEXTRACTION HEMORRHAGE

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Congenital deficiency of factor VII (FVII) is a rare congenital coagulation abnormality. It shows autosomal recessive inheritance, and the frequency of occurrence is one out of 500,000. The present report describes a case of FVII deficiency diagnosed due to postextraction haemorrhage.

Case: 15-year-old girl. There was no significant problem in the past medical and family histories.

History of present illness: The patient presented to a neighbouring dental practice with a chief complaint of prolonged retention of deciduous teeth. The upper right second primary molar was extracted due to the eruption disturbance of a permanent tooth. Local haemostasis was performed to stop postextraction haemorrhage by her family dentist. The patient was referred to our department for further examination and extraction of other deciduous teeth with prolonged retention due to abnormal bleeding.

Present illness: Systemic findings: Medium body type, good nutrition status

Intraoral findings: Prolonged retention was observed of the bilateral lower second primary molar, left upper second premolar. No bleeding from the gum was observed.

Blood test: There was no abnormality in blood and biochemical findings. A coagulation test showed a modest increase in PT-INR to 1.44.

Course of treatment: Coagulation abnormality was suspected based on the history of the present illness and blood test, and further examination was requested to the paediatric department. The results of the blood test showed low factor VII of 35%. Other coagulation factors were normal. The patient was diagnosed with congenital deficiency of factor VII. The patient's mother and sister showed no decrease in factor VII. We collaborated with the Department of Pediatrics, and rFVIIa was administered before and after extraction. One point two milligrams of rFVIIa was administered 30 minutes before tooth extraction. Extraction was performed under local anaesthesia after confirming that FVII and PT-INR were 93% and 0.96, respectively. A haemostatic cover was placed after extraction, and 1.2 mg of rFVIIa was administered 5 hours postoperatively. The prognosis was uneventful, without postextraction haemorrhage. One point two milligrams of rFVIIa was administered one week after extraction, and the haemostatic cover was removed. The condition of the wounded area is favorable, and the patient has been followed.

### P-1802

#### ARE WE OVER FASTING MAXILLOFACIAL SURGERY PATIENTS? A PROSPECTIVE AUDIT AND STAFF SURVEY OF KNOWLEDGE OF GUIDELINES.

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<sup>1</sup>Sunderland Royal Hospital

Pre-operative fasting for general anaesthesia is routine practice in Oral and

Maxillofacial Surgery (OMFS). This period of abstinence from normal diet is

recommended due to the mode of anaesthesia rather than the nature of surgery.

Aspiration of stomach contents is a recognised complication of general anaesthesia.

This can lead to acute airway obstruction, diffuse inflammatory reaction and nosocomial pneumonia.

In an attempt to reduce the incidence of regurgitation and aspiration of stomach

contents during general anaesthesia, a period of abstinence from normal diet is

recommended.

There is much variation in the duration and extent of this fasting period.

Traditional 'nil by mouth' instructions infer that neither solid nor liquid diet be

taken after the specified time (typically midnight). In addition to the discomfort and distress caused to patients,

prolonged fluid fasting has the potential to cause dehydration and electrolyte

disturbance. There may be an increased risk of failed cannulation.

The Royal College of Anaesthetists has published guidance on the number of hours of perioperative fasting in adults and children, as "2 – 4 – 6". Where "2" refers to clear

fluids, "4" breast milk and "6" solid foods/non-clear liquids.

We prospectively audited the fasting times of 102 adult and paediatric patients undergoing maxillofacial surgery at Sunderland Royal Hospital. We also conducted a survey of 52 staff members (a mixture of medical/nursing/theatre staff) knowledge of fasting guidelines.

Solid food fasting ranged from 6 hours to 23.5 hours with a mean of 14.55 hours.

Clear fluid fasting ranged from 2 hours to 23 hours with a mean of 9.47 hours.

90.9 % of respondents indicated that patients should be fasted six hours after solid

foods. Fewer were correct with respect to clear fluids, with only 58.2% correctly

indicating two hours. 67.3% stated that oral medications should be stopped as part of

fasting. Interestingly there was little difference between elective and emergency patients. Children were generally less over-fasted.

The following factors were identified as contributing to over-fasting: ambiguity in written patient information, staff knowledge and logistic difficulties.

**P-1803****A RARE CASE OF A HAEMATOLOGIC DISORDER CONCERNING THE FACIAL COMPLEX**

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<sup>1</sup>Faculty of medicine Sibiu, <sup>2</sup>Private practice

We present the case of a man suffering of a rare hematologic condition known as plasmocytoma. With it's multiple sites in evolution maxilla is the last affected, inflicting functional and aesthetic impairment. The indication of surgical treatment is secondary in the therapeutic algorithm but this case has the recommendation for the latter discussed. We are going to describe the surgical history of this condition and the present concerning impairment of the facial complex.

**P-1804****TRANS-ORAL APPROACH FOR RADIOFREQUENCY TO THE SPHENOPALATINE GANGLION – A CADAVERIC STUDY**

Liviu Hanu-Cernat<sup>1,\*</sup>, Dalvina Hanu-Cernat<sup>2</sup>

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The involvement of the sphenopalatine ganglion in the pathogenesis of cluster headache and atypical facial pain has been the subject of debate for decades. Trans-facial or trans-nasal pulsed radiofrequency to the sphenopalatine ganglion has been shown to be effective.

The percutaneous infra and supra-zygomatic approaches require cumbersome patient positioning and fluoroscopy control while the trans-nasal or trans-antral approaches demand naso-endoscopy skills.

Anatomically, the sphenopalatine ganglion is also accessible through the mouth via the greater palatine canal and on the basis of this consideration it should be possible that a radiofrequency needle could be advanced through the palatal mucosa into the greater palatine canal reaching the sphenopalatine ganglion with ease.

**Method:** Three cadaver heads with six trial sites were used to test the method of trans-oral insertion of radiofrequency needles under fluoroscopic control in order to ascertain the position of the tip of the needle into the sphenopalatine ganglion from both a lateral and AP perspective. Only three trials were carried out at each site so that needle tracks were not created.

**Results:** A total of 18 attempts were performed with needle depth measurements and fluoroscopic evaluation of needle tip position.

The parameters for localisation of the greater palatine foramen, needle progression, depth measurements and final needle position are scrutinised and discussed.

**Conclusion:** Based on this cadaveric study the transoral approach for pulsed radiofrequency to the sphenopalatine ganglion is straightforward, requiring minimal or no fluoroscopic control as the location of the needle tip can be judged by the needle depth.

**P-1805****NIPARA, A NEW VENTILATION DEVICE FOR MANAGEMENT OF DIFFICULT AIRWAY IN EDENTULOUS AND JAW IMPAIRMENT PATIENTS.**

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**Objectives:** The Difficult Airway Algorithm of the American Society of Anaesthesiologists (ASA), was developed to guide physicians in the management of the patient who is predicted to have a difficult airway. The aim of this report is to describe and provide evidence about NIPARA, as a new device that prevents air escape, impacting the ASA Practice Guidelines for Management of the Difficult Airway, during artificial ventilation using a face mask in unconscious edentulous or jaws impairments patients in different scenarios that include: surgery rooms, intensive care units, emergency departments and resuscitation area.

**Materials and Method:** NIPARA device was developed by a maxillofacial surgeon and three anaesthesiologists. It is a U shaped plate device, latex free and anatomically designed with the features necessary to restore the normal oral anatomy of edentulous patients or having jaw impairments. This device had been tested in twenty (20) edentulous patients, with difficult airway predictors; it was attached to an oropharyngeal cannula (Guedel Cannula), Fig 1, before endotracheal intubation.

**Results:** NIPARA was used in patients with 99% arterial oxygen saturation and airway escape, obtaining improvement in ventilation when using the facial mask, and avoiding four-hand ventilation technique.

NIPARA device achieved better ventilation scores at least in one degree, showing improvement in peak pressure and also tidal volumes were observed; which can be explained by the restoration of the face structures to their normal anatomical position. None of the patients showed any signs of injury during the use of NIPARA device.

**Conclusion:** We developed NIPARA device, as a novel difficult ventilation tool. We achieved a significant decrease in the grade of difficulty for face mask ventilation, with positive pressure in edentulous patients, making an optimal seal between the patient and the mask, and got tidal volume improvement after the use of NIPARA. Therefore this device should be taken into account in airway management algorithm.

**Summary:** Edentulous patient is a challenge in the ventilation management. We present a device created to restore the oral anatomy of the patient without teeth to achieve better ventilation conditions in these patients.

**P-1806****METHODS OF SECURING DRAINS IN ORAL, MAXILLOFACIAL, HEAD AND NECK SURGERY – INTRODUCING A NOVEL NEW DEVICE.**

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**Introduction:** Drains are routinely used in Oral, Maxillofacial, Head and Neck surgery and they play a vital role especially after major surgery. Drain security is paramount for maintaining drainage and patient comfort. If drains are not secured properly they can often increase morbidity and burden to on call surgical teams. There are many ways to secure drains and every surgeon has his/her own preferred method. The ideal way to secure drains should cause no morbidity to patients, easy to use, secure and remove.

**Method:** We show different methods of securing drains with examples and also introduce a new device called the 'Braidlock'.

This device has been used by LC in Oral, Maxillofacial, Head and Neck Surgical cases in North East London and has proved to be simple to use and well liked by patients and nursing staff.

**Discussion:** There are many methods in fixation of drains to patients. Drains can be left in situ for varying amounts of time depending on the indication and amount drained. We show several traditional methods and some less well-known devices, for example, Tielok and Braidlock.

**Conclusion:** We feel that the Braidlock device is cost effective and easy to use. With its ergonomic design, it is easy to maintain drain and skin hygiene. It also allows the shortening of the drain by ward staff with minimal amount of training.

**P-1807****ADOPTING THE TRANSTHEORETICAL MODEL OF BEHAVIOUR CHANGE (TTM) TO EXPLORE HOW ORAL & MAXILLOFACIAL SURGEONS (OMFS) CAN INFLUENCE STOP SMOKING BEHAVIOUR**

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**Introduction:** Smokers go through 5 stages of the transtheoretical model of behaviour change (TTM) where these behaviours are influenced by different factors depicted in the health belief model.

An understanding of smokers' health beliefs will assist health professionals to provide appropriate support with cessation attempts. Such methods of implementing psychological models in smoking intervention of OMFS patients have not been explored. We therefore undertook a survey to assess the stages of smokers' TTM.

**Method and Materials:** Self-report questionnaires were

given to all 252 patients in the OMFS consultant clinics over a 2 week period. The information was utilised by the clinicians.

**Results:** 47 smokers were identified and 78% was in the contemplation phase of the TTM. One patient was categorised in the pre-contemplation stage. 25% of patients were preparing to quit smoking and 17% were at the action stage of TTM. 20 smokers were contacted by the stop smoking service within a week and half would like their help to stop smoking.

**Discussion:** For smokers in contemplation stage, raising awareness about dependency, effects of smoking and exploring ways of stopping will motivate individuals to quit. For those in preparation and action stages, a more action oriented program with the use of motivational interviewing (involving praise, support and motivating techniques) will facilitate the goal of smoke cessation.

**Conclusion:** The OMFS team can play a pivotal role in assisting and encouraging patients to move through the different stages of the TTM and reach the end goal of permanent smoking cessation.

**P-1808****THE PREVALENCE OF SMOKING AND SMOKERS' HEALTH BELIEFS AMONGST ORAL AND MAXILLOFACIAL SURGERY (OMFS) PATIENTS**

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**Introduction:** Smoking contributes to one-fifth of adult deaths and 1.4 million hospital admissions in England, UK. It is the duty of all healthcare professionals to give smoke cessation advice. With combined support and medication, smokers were four times more likely to quit than doing it alone.

**Aim:** To determine smoking status of each OMFS patient attending consultant clinics in 4 weeks.

**Materials and Methods:** All patients in the OMFS consultant clinic waiting area who claimed to be smokers were asked to complete a questionnaire.

**Results:** Out of 434 patients approached, 312 (72%) were non-smokers, 32 (7%) refused to participate and 90 (21%) were smokers. For those smokers identified, clinicians were informed and provided a fast-track referral to the stop smoking service within the hospital. 89 out of the 90 smokers were at least in the contemplation stage of the Transtheoretical Beliefs Model.

**Discussion:** The proportion of OMFS patients who smoked equal to the national average for 2009. The smokers were aware of the benefits of quitting. Although receiving mixed responses for the 'costs' of stopping, the severity of and susceptibility to smoking-related diseases, respondents showed a lack of confidence in believing they had the self-control to quit.

*Conclusion:* This survey showed almost all smokers had contemplated quitting, but lacked the self efficacy to change their smoking behaviour. With motivational interviewing from the stop smoking service to increase patients' motivation and to help plan their quit attempt in overcoming obstacles, smokers are more likely to stop smoking with support and medication than relying on themselves alone.

**P-1809****A NOVEL USE OF CHEST DRAIN**

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*Introduction:* Tissue space infections in the head and neck due to odontogenic cause are well recognised. Pattern of tissue space involvement is governed by the teeth involved and location of bone erosion/perforation secondary to the untreated infections. Ludwig's angina results if all of the primary mandibular spaces (submandibular, sublingual and submental) become involved with the infection bilaterally. Life-threatening conditions can occur as infection progress beyond the above areas and into deep cervical spaces.

*Case report:* We present a case of a 61 year old female patient with multiple co-morbidities who present with clinical findings consistent with Ludwig's angina, resulting from her grossly neglected dentition and multiple un-restorable molars. The patient was morbidly obese (Weight= 150kg, BMI>50), suffers from atrial fibrillation, congestive cardiac failure and poorly controlled NIDDM. Incision and drainage with exploration of all commonly affected tissue spaces was promptly performed. After a temporary (24hours) improvement, her condition deteriorated with persistent pyrexia and elevation of inflammatory markers. CT scan revealed a large retropharyngeal abscess, this was explored using the neck dissection approach. A Foley's catheter was inserted into the retropharyngeal space to aid further drainage. Despite the above, no clinical improvement was observed. Further exploration discovered an occluded Foley's catheter under the weight of the patient's soft tissue. This was replaced by a chest drain taking advantage of its rigidity. The chest drain served its purpose until the patient subsequently encountered a fatal myocardial event.

*Conclusion:* We have described an unconventional use of the traditional chest drain.

**P-1810****PHOTOGRAPHIC RETRACTORS CAN SERVE MORE THAN ONE PURPOSE**

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*Introduction and Aims:* Photographic retractors are widely available in most Oral & Maxillofacial Surgery and Orthodontic departments. They provide buccal extension to hold the lips and cheeks away from dentition resulting in improved intra-oral photography. Aside from this primary purpose, we found the use of double-ended U-shape re-

tractors extremely helpful while performing trauma surgery. This is especially true in cases when the assistant is struggling with multiple demands. A secured photographic retractor allows the assistant to concentrate on maintaining the desired occlusion that is paramount during open reduction and internal fixation of fractured mandibles.

*Method:* This article recommends a technique to optimise intra-operative conditions during some trauma procedures. A sterile double-ended U-shape photographic retractor can be inserted and simply secured with a 2/0 silk suture on a straight needle. It allows a full occlusal assessment and maximises light exposure without the need for multiple cheek retractors. This can be used in conjunction with the transbuccal kit in cases of mandibular angle fractures where irrigation is required with occlusion maintenance for optimal fracture reduction. Despite the initial step, we have found the use of this device to shorten operative time overall.

*Conclusion:* This technique has a number of advantages. Firstly, photographic retractors are autoclavable and are readily available with no extra cost implications. This approach improves intra-operative view for the operating surgeon as well as the assistant allowing better teaching opportunities. The patients are left with no additional scars. And finally these photographic retractors do provide perfect retraction for any intra-operative photographs!

**P-1811****LYMPH NODE COMPRESSION OF THE LESSER OCCIPITAL NERVE: A CAUSE OF MIGRAINE**

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Recent investigation has focussed on the concept of peripherally triggered migraine headaches caused by compression, irritation or entrapment of the sensory nerves in the head and neck. We report a case of a 52-year-old male suffering from an occipitoparietal migraine that presented with a mass in the right occipital area. The mass was found in the deep layer of subcutaneous tissue just over the semispinalis muscle, sitting on top of the lesser occipital nerve, which was preserved through delicate dissection using loupe magnification. Histopathological findings of the mass were reported as benign, reactive hyperplasia of the lymph node. After removal of the mass, the patient reported complete resolution of headaches. Sensation of the scalp was not altered. This is the first report of a case of hyperplastic lymph node causing migraine through physical compression of a peripheral nerve.

*Key words:* Occipital nerve; Migraine; Lymph node

## 19. NASAL RECONSTRUCTION

### P-1901

#### RADIAL FOREARM FREE FLAP IN NASAL RECONSTRUCTION.

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**Purpose:** Nasal reconstruction presents a challenge for any surgeon. It is the central pillar of the face and the most difficult facial feature to reconstruct. The main objectives are preserving its respiratory function and maintaining the nasal structure as similar as possible to the initial state. It is necessary to know the several subunits of the nose in order to carry out a correct reconstruction of the nasal pyramid. In this way, we will be able to consider different options for the reconstruction depending on the tissues that we have to provide.

**Material and Methods:** we present a 41 years female with a squamous cell carcinoma in nasal dorsum. So far, she had been treated 3 times with different techniques, in a different hospital, where the surgeon used skin grafts to close the defect. The patient presented with an exophytic lesion in nasal dorsum of about 2cm diameter. It is difficult to identify the limits of this lesion because the patient has a systemic lupus erythematosus with facial skin affection. We performed a wide resection in the dorsum, side-walls and tip of the nose, and also checked the integrity of cartilage and nasal bone. Finally, we used a radial forearm free flap to close the defect using facial vessels for the anastomosis.

**Results:** After 10 months of follow-up, the patient had an excellent aesthetic and functional result without recurrences.

**Discussion:** Nasal reconstruction always involves surgical difficulties, especially when a large lesion is to be treated. Our patient had a recurrence on a skin graft, with a dermatologic disease in facial skin, for that reason, the limits of the carcinoma were not clear, and local flaps will provide affected skin. For this surgery we planned a wide resection with generous margins. Many authors prefer local flaps such as forehead flap, but in this case, we used a microvascular free flap because it provides enough tissue, free of tension, and better aesthetic results in just one surgical time.

## 20. NON-MICROVASCULAR RECONSTRUCTION IN HEAD AND NECK

### P-2001

#### THE FULL-THICKNESS PARIETAL OSTEOFASCIAL FLAP PEDICLED TO SUPERFICIAL TEMPORAL ARTERY: AN ALTERNATIVE TO MICROSURGERY FOR MANDIBULAR RECONSTRUCTION. A CASE REPORT

*María Pombo<sup>1,\*</sup>, Jose Luis López-Cedrún<sup>1</sup>, Ramón Luaces<sup>1</sup>, Javier Collado<sup>1</sup>, Álvaro García-Rozado<sup>1</sup>, Jose Ferreras<sup>1</sup>, Ana Otero<sup>1</sup>, Vanessa Chávez<sup>1</sup>, Miguel Iglesias<sup>1</sup>, José Cachaldora<sup>1</sup>*

<sup>1</sup>Complejo Hospitalario Universitario A Coruña

**Introduction:** The goal in mandibular reconstruction is to restore masticatory function and to achieve a mandibular continuity with an aesthetic and symmetric facial appearance. To get this, many different techniques have been described in the literature during the years. Nowadays, free tissue transfer is accepted as the gold standard technique for mandibular reconstruction in most situations. But when this kind of procedures can not be performed, because of patient conditions, the full-thickness parietal osteofascial flap, pedicled to the superficial temporal artery, represents a good alternative to microsurgery. The appropriate bone shape and thickness, the proximity to mandibular defects, the constant vascularisation and the easy rotation of the pedicle of this flap, make it an excellent option to reconstruct mandibular defects.

**Case Report:** We are presenting a fifty-nine-years-old man, operated six years before for a squamous cell carcinoma in right retromolar trigone region (T4N2M0). Tumour resection (including segmentary mandibulectomy) with free margins, right radical neck dissection and primary reconstruction of the defect with a free myocutaneous flap from the left abdominal rectus, were performed. One month after, because of necrosis of the flap, it was resected and a pedicled pectoralis major flap was used to close the defect. The patient received complementary radiotherapy and chemotherapy. Five years after the first surgery, mandibular reconstruction was performed, using a full-thickness parietal osteofascial flap based on the superficial temporal artery. Nine months after, seven endosteal implants were placed and an implant supported- prosthesis was designed, achieving a functional oral rehabilitation of the patient and improving his facial aesthetic.

**Conclusion:** The full-thickness parietal osteofascial flap, pedicled to the superficial temporal artery, represents a good alternative for mandibular reconstruction when microsurgery is not possible; it allows the placement of endosteal implants, providing a functional and aesthetic oral rehabilitation and, thereby, improving the quality of life of the patient.

### P-2002

#### THE PECTORALIS MAJOR FLAP RECONSTRUCTION IN HEAD AND NECK CANCER; A SEVEN YEAR RETROSPECTIVE REVIEW

*Philippa Cullingham<sup>1,\*</sup>, Ayesha Dalal<sup>1</sup>, Michael Esson<sup>1</sup>*  
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**Introduction:** The pectoralis major flap is a pedicled myocutaneous or muscle-only flap described originally by Ariyan in 1979 for use in reconstructing Head and Neck defects. It is a Type V muscle based on the thoracoaromial artery which has long been considered a “workhorse” to reconstruct both intra- and extra-oral ablative defects.

**Results:** We present a review of the patient demographics, indications for use and site reconstructed with the pectoralis major flap in a consecutive series of 44 patients treated over a seven year period in the Head & Neck Unit at the Royal Devon & Exeter Hospital. We also describe our complications and morbidity. In our series, the overall complication rate was 27%, however successful reconstruction was achieved in 93% of cases.

**Conclusion:** Despite the increasing use of microvascular reconstruction, we conclude that reconstruction using the pectoralis major flap following Head & Neck resection continues to be a robust, versatile, functional and reliable alternative to other flaps used regularly in head and neck oncology. Our results show a high success rate with low morbidity.

### P-2003

#### EXTERNAL FIXATION: AN OPTION IN MAXILLOFACIAL SURGERY

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The extensive or exophytic tumours in jaw present a problem in reconstruction of the previous occlusion and the anatomical correction of the defect, because the registration of the reconstruction plates prior the osteotomy is impossible.

The aim of our poster is to demonstrate a technique using external fixation which allows us to reproduce the pre-operative occlusion after surgery to excise exophytic tumours of the jaws. We present the case of a man of 78, he presented with a recurrence of epidermoid carcinoma of the jaw with the characteristics described above. We placed external fixation before the osteotomy that let us reproduce the patients anatomy and to obtain an excellent result regarding the occlusion. The reconstruction of the defect was made with a pectoralis major flap and a reconstruction plate.

We have found two cases described in a review of the literature with the same aim, we consider this is an option to bear in mind in patients with this kind of tumours. The technique to its collocation is simple and we have checked excellent anatomical results.



**P-2004****A CASE OF PSEUDOARTHROSIS ON ILIAC CREST FREE FLAP WITH IMPLANT REHABILITATION AND ITS TREATMENT USING NONVASCULARIZED BONE GRAFTING**

*Alba García Sevilla<sup>1,\*</sup>, Manuel Tousidonis<sup>1</sup>, Julio Acero<sup>1</sup>, Santiago Ochandiano<sup>1</sup>, Carlos Navarro Cuéllar<sup>1</sup>, Carlos Navarro Vila<sup>1</sup>*

<sup>1</sup>Hospital General Universitario Gregorio Marañón

**Introduction:** The iliac crest free flap allows us to reconstruct critical height bone defects in the segmental mandibular resections including intraoperative implant placement for dental rehabilitation. On the other hand, the iliac crest is also an excellent corticocancellous bone frequently used as the donor site for nonvascularized bone grafts.

**Objectives:** We present a case of pseudoarthrosis at the junction of the iliac crest flap and the remaining mandible and discuss its treatment.

**Materials and methods:** We present the case of a 55 year old male treated two years earlier for a mandibular ameloblastoma reconstructed with a microsurgical iliac crest free flap and immediate implant placement. Progressively after reconstruction the patient showed mandibular fragment mobility and dysocclusion. A radiolucent area was observed in an orthopantomogram at the junction of the flap and the remaining mandible. Nonunion was diagnosed due to a lack of consolidation. Curettage of the interfragmentary area through a mandibular approach was carried out. The postoperative defect (about 1,5 cm) was repaired by a nonvascularized corticocancellous free flap from the contralateral iliac crest. Osteosynthesis with two plates was performed according to the standard biomechanical principles.

**Results:** After one year follow-up the patient shows good consolidation with excellent functional and aesthetic results.

**Conclusion:** The iliac crest is an excellent donor site allowing for the repair of complex mandibular defects under different circumstances.

**P-2005****PECTORALIS MAJOR MYOCUTANEOUS FLAP IN A 2 YEAR OLD PATIENT**

*Bruno Santos Gomes<sup>1,\*</sup>*

<sup>1</sup>Hospital de São José Lisboa

This case report is about a 2 year old boy bitten by a dog. The resulting wound was a total defect of the soft tissues of the chin, two thirds avulsion of the lower lip total thickness with exposure of the mandibular symphysis, right and left parasymphysis, mental protuberance and lower border bone structures.

The choices of donor site, recipient vessels, and the optimal age for reconstruction of paediatric facial defects with microvascular flaps are still undefined, mostly due to the lack of retrospective or prospective studies for the usage of these surgical techniques in such young population. The difficulty to examine these variables and the pressure for quick and effective surgery for the infant of this case led us to use a different procedure which is demonstrably safe, and, in the majority of cases, with good/satisfactory func-

tional and aesthetics outcomes.

The pectoralis major myocutaneous flap and myofascial flap variations are utilized in a large variety of head and neck reconstructive procedures that can include coverage of mucosal, muscular and/or cutaneous defects. The extent of coverage and the reach of the flap are dependent on the anatomy of the patient, modifications of the standard techniques of elevation, and inset. The upper limits are generally considered the zygomatic arch area externally and the superior tonsillar pole internally - patient body habitus may either limit extension short of these landmarks, or permit extension beyond.

Thus the defect was reconstructed utilizing a pectoralis major flap. After analyzing international bibliography, the technique was never described before in such a young patient. The main intraoperative difficulty was to find the small and erratic localized vascular pedicle, due to age anatomical specifications. In order to achieve this we resorted to Doppler ultrasound scan during the main dissection and elevation of the myocutaneous flap.

One year post op, we have achieved a satisfactory aesthetic outcome with minimal compromise of arm mobility.

**P-2006****ONE STAGE RECONSTRUCTION OF THE FLOOR OF THE MOUTH WITH THE BILATERAL SUBCUTANEOUS PEDICLED NASOLABIAL FLAP – AN ALTERNATIVE TO MICROVASCULAR RECONSTRUCTION**

*Tiago Neto<sup>1,\*</sup>, Rui Balhau<sup>1</sup>, Lígia Coelho<sup>1</sup>, Isabel Pinto<sup>1</sup>, Inês Correia-Sá<sup>2</sup>, Álvaro Silva<sup>2</sup>*

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**Objectives:** Cancer of the floor of the mouth (FOM) accounts for 28 to 35% of all oral cancers. Treatment often requires extensive resection, associated with neck dissection and adjunctive radiotherapy.

To avoid anatomic distortion and subsequent limitation of function even relatively small defects of the oral cavity often require reconstruction. Reconstruction of these defects should ensure functional integrity of the FOM, essential to tongue mobility, articulation and deglutition, in addition to restoring the best possible aesthetic outcome.

The bilateral inferiorly based pedicled nasolabial flap (NLF) is an option for the reconstruction of defects of the FOM. This work describes the successful use of the bilateral NLF in reconstruction of FOM defects, offering an alternative to microsurgical reconstruction.

**Material and Method:** Two consecutive clinical cases with cancer of the FOM reconstructed with bilateral NLF and review of the recent literature.

In this study we outline and discuss the indications, advantages, technique, complications and experience with this flap for one stage reconstruction of the floor of the mouth.

**Results:** The patients underwent surgical excision of FOM cancers with simultaneous ipsilateral or bilateral neck dissection. One stage reconstruction of the defect was done with a bilateral subcutaneous inferiorly based NLF, with the two flaps interdigitated and sutured to the defect. Both patients underwent adjunctive radiotherapy.

Infection, wound dehiscence and intraoral growth of hair were the encountered complications related to the flap. The aesthetic deformity was minimal in both patients. Both patients had satisfactory masticatory and speech function.

**Summary:** The bilateral NLF proved to be a useful, simple, safe and effective flap, used has a one stage reconstruction, after resection of malignant tumours of the FOM, for defects up to 5x5cm.

The flap proved to be a reliable option when combined with neck dissection, even when the facial artery was ligated.

The NLF proved to be an alternative to microvascular or more complex flaps, for reconstruction of small to medium defects of the FOM, with good functional and aesthetic results, specially in older, edentulous and high risk patients.

#### P-2007

### LOCOREGIONAL FLAPS FOR ORAL DEFECTS RECONSTRUCTION

*Jorge Guñales Díaz de Cevallos<sup>1,\*</sup>, Javier Gonzalez Martin-Moro<sup>1</sup>, José Luis Del Castillo Pardo de Vera<sup>1</sup>, Miguel Burgueño García<sup>1</sup>*

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**Introduction:** Oral mucosa defects secondary to oncological surgery can be repaired in different ways according to their size and location. Reconstructive alternatives, in order of increasing complexity, encompass: second intention healing, primary closure, local flaps of the oral mucosa, regional flaps and microvascular free flaps. Currently, microvascular flaps are considered the reference option for the reconstruction of medium and large-sized defects of the oral mucosa, by offering the best aesthetic and functional results. However, they present a number of disadvantages including: the morbidity of the donor site, the increase time and complexity of the surgical procedure, the reconstruction of intraoral defects with histologically different tissues and the possibility of leading to an increase of the intraoral volume, especially in small and medium-sized defects that could interfere with the functional outcome.

Locoregional flaps postulate as an alternative therapy for the reconstruction of small and medium-sized defects of the oral mucosa, especially in advanced aged and pluripathological patients in which the microsurgical reconstruction is not feasible.

**Materials and methods:** We present a selection of 9 patients with secondary defects to oncological extirpations, which were reconstructed each with one of the major locoregional reconstructive options for oral cavity defects, including: buccinator flap, lingual mucosa flap, palatine flap, Bichat's buccal fat pad, facial artery musculomucosal flap, nasolabial, sternocleidomastoid flap, temporal muscle flap and submental flap.

**Results:** Adequate coverage of the defects was achieved in all cases with good aesthetic and functional results. The main complications of these procedures are partial necrosis flap and infection, which in any case had prevented a proper healing of the defect.

**Conclusions:** Locoregional flaps, as an alternative to

microsurgery reconstruction for oral mucosa defects, represent a valid option with excellent outcomes especially for small and medium-sized defects and in non-candidate patients to more complex procedures.

#### P-2008

### USE OF TISSUE EXPANDERS IN HEAD AND NECK RECONSTRUCTIVE SURGERY: OUR EXPERIENCE

*Manuel Acosta-Feria<sup>1,\*</sup>, Benito Ramos-Medina<sup>1</sup>, Antonio López-Davis<sup>1</sup>, Juan José Haro-Luna<sup>1</sup>, Raquel Villar-Puchades<sup>1</sup>*

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**Introduction:** Although the use of tissue expanders in reconstructive surgery of the head and neck is not widespread in our specialty, we believe that its use constitutes a valid and safe alternative especially when we must include skin in the reconstruction; avoiding the extraction of free skin grafts in many cases, thus reducing the morbidity of surgical intervention.

In our experience, the location of the tissue Expander and its size, varies according to the anatomical region and the surgical defect to rebuild. Your placement previously to the definitive surgery, is carried out quickly and easily, and can be performed with local anaesthesia and sedation techniques.

**Materials and methods:** Our series consists of eight patients, of which seven were previously diagnosed with cutaneous carcinoma and an eighth patient presented a partial loss of free skin graft placed previously to retro-mandibular level. The expanders used mainly had a capacity of 125cc and 225cc respectively, the frontoparietal region being the most frequent place of placement for making a nasofrontal flap reconstruction after tumour excision. In the case of the patient with postoperative sequel, was placed at the cervical level. The frequency with which we injected volume to the tissue expander was 15 days, being the average volume injected into each session of 20 cc.

Considering complications arising during the process of expansion, in a patient we had to remove the expander by exposure of the same and in another was insufficient expansion, so it was necessary to complete the reconstruction using free skin graft. The most observed complication were the inconvenience originated in the days after the injection volume, which were resolved with common analgesics.

**Conclusion:** The use of tissue expanders, so widespread in other surgical specialties, is an alternative when it comes to fundamentally skin reconstruction, in head and neck surgery. It uses, although it is not without complications, we consider it safe, simple in its method of placement, and which certainly increases our capacity and armament for surgical reconstruction.

#### P-2009

### RECENT ADVANCES IN RECONSTRUCTIVE ORAL AND MAXILLOFACIAL SURGERY

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**Introduction:** Reconstruction within the head and neck is

challenging. Tissue grafts and flaps are the current gold standard but carry many disadvantages. A literature review has been performed to identify current advances in reconstruction within oral and maxillofacial surgery.

*Methods:* A review of the literature was performed on PubMed using the following search terms, “reconstruction, head, neck.”

*Results:* Navigation systems aim to improve the accuracy of existing reconstructive methods used to restore facial fractures. The techniques, which include three-dimensional imaging, can be used to construct stereolithographic models and custom-made implants. This permits reconstructions to be carried out more rapidly and accurately. Robotic surgery uses conventional reconstructive techniques but it allows for the resection and insertion of free flaps into the oropharynx without the need for a mandibulotomy. Tissue engineers have used growth factors that stimulate bony growth within patients to reconstruct defects of the mandible. However evidence for tissue engineering is limited to mainly laboratory and animal models. Distraction osteogenesis has been used to reconstruct defects of the mandible, negating the need for a donor bone graft. Recently, facial allotransplantation has been described. It permits the replacement of whole facial anatomical units with the possibility of sensory recovery and facial reanimation being completed in a single procedure. However, it is necessary for patients to be on life-long immunosuppression and therefore should only be used in carefully selected patients.

*Conclusions:* This review confirms that the ideal system for reconstruction within the head and neck is yet to be identified.

#### **P-2010**

#### **APPLICATION OF POROUS HYDROXYAPATITE BLOCK FOR MAXILLOFACIAL DEFORMITY**

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In maxillofacial surgery, a concave deformity, including hypoplasia of the parapiiformis of cleft lip and palate and posttraumatic deformity, often needs augmentation in hard tissue. To improve these deformities, an osteotomy that involves the occlusal change is unlikely to be used, and augmentation of hard tissue is more suitable. Autologous bone graft is one indication, however, in the cases that need onlay graft on the facial bone, artificial materials have following advantages. 1. easy to form finely. 2. rarely absorbed. 3. no donor site. Porous hydroxyapatite block is composed of calcium phosphate ceramic, which has the same major mineral component as bone. It does not undergo substantial absorption, and does not produce a clinically significant foreign-body reaction because of its remarkable biocompatibility. Furthermore, it has 100 to 300 micrometer open pores in it, which allow vascular and bony ingrowth. These allow it to be used safely and to produce a predictable result.

We have implanted hydroxyapatite blocks for concave maxillofacial deformity in a simple procedure. Firstly the block is manually formed imaging concave plus augmentation, and a precise and minimum subperiosteal pocket is

dissected, then the block is inserted into the pocket. Generally the blocks are not fixed with suture or wire. This procedure is minimally-invasive, and in implanting small block it can be done even under local anaesthesia. We have used this procedure in 21 cases with maxillofacial concave deformity including hypoplasia of the parapiiformis of cleft lip and palate patient and posttraumatic deformity from 1992 to 2011. In this time, we present the procedure, the results and our concept.

## 21. OBSTRUCTIVE SLEEP APNEA

### P-2101

#### PREDICTORS OF SNORING AND OBSTRUCTIVE SLEEP APNOEA IN CEPHALOMETRIC ANALYSIS

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This study was intended to evaluate the anatomical features of patients with OSA and snoring using lateral cephalogram to analyze the relationship between anatomical variables and severity of polysomnography (PSG) results in Korean patients.

50 patients who visited Sleep Disorder Clinic in Ajou University Hospital from January 2011 to February 2012 were included, and evaluated with polysomnograph(PSG) and lateral cephalography. The patients who had apnoea-hypopnea episodes (AHI) over 10 times per hour were diagnosed as OSA after overnight PSG. The patients were grouped as control and OSA group following PSG results. Lateral Cephalograms were analyzed with V-ceph 6.0 program® (CyberMed Co., Seoul, Korea). The correlation between the age, height, weight, body mass index (BMI) and AHI, and the differences between groups in the anatomical factors of the lateral cephalogram were assessed using SPSS® Program ver. 17.0 (SPSS Inc., Chicago, IL, USA).

The OSA Group (n=36) had significantly higher in age, weight, Body Mass Index(BMI) than control group (n=14). The distance between mandibular plane and hyoid bone of the OSA group was significantly longer than that of control group (p <0.05).

We suggest the lateral cephalogram as a useful method to evaluate OSA. The patient with long soft palate, narrow upper airway width, inferiorly positioned hyoid bone can be expected to have high risk of OSA. However, it should be emphasized that a comprehensive examination of the patient, including soft palate and tonsillar hypertrophy, and nasal structure is important because lateral cephalogram cannot reflect upper airway structures and dynamics completely.

### P-2102

#### COMBINATION OF SURGICAL TECHNIQUES FOR THE TREATMENT OF SEVERE MANDIBULAR RETRACTION, IN PATIENTS SUFFERING OF OSA. PRESENTATION OF THREE CASES.

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**Aim:** The severe mandibular retraction, congenital or acquired, may influence the flow of air into the airway, causing severe OSAS, with a difficult conventional surgical solution. We present three patients with severe dentofacial deformity who required sequential surgeries that combined different techniques.

**Material and Methods:** Case1 : A patient with bilateral temporomandibular joint ankylosis had, reconstruction of the TMJ 15 years before, with the costocondral graft. which had failed, with recurrence of the ankylosis. he was operated on in two phases: Lefort I Osteotomy with advancement and removal of the grafts. Placing custom made prosthesis.

Case 2: A patient with Treacher-Collins SD and mandibular hypoplasia. Operated on in two phases: bilateral bidirectional distraction of the mandible. In the second intervention, segmented Lefort impaction and bilateral BSSO.

Case 3: Patient with bilateral TMJ ankylosis and mandibular hypoplasia: Operated in three phases: vertical distraction of the condyles. Lefort Osteotomy and removal of blocks. Custom implant placement.

**Conclusions:** In certain cases of mandibular hypoplasia, a single surgical procedure can not resolve all the patients symptoms, so, distinct sequential techniques are necessary for standardizing the aesthetic and functional parameters.

### P-2103

#### NEW SURGICAL METHOD FOR NON-APNEIC SNORING: INITIAL RESULT (CASE REPORT)

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Sleep disorders affect more than 30% of the whole population in the industrial countries, and in 2012 the World Association of Sleep Medicine (WASM) declared 16 March to be the World Sleep Day. The slogan is "Breathe easily, sleep well".

Non-apnoeic snoring creates a sleep quality problem for a bed partner, but could also be a social problem in some other situations; for example, in prison, hospital etc. About 25% of adult population have permanent snoring problems and about 45% of adult population have a snoring problem occasionally. Due to the lack of reliable and objective snoring analysis, the evaluation by the bed partner is the most relevant criterion in estimating treatment success.

There is no efficient treatment for a lot of patients with a snoring problem. Various kinds of surgical procedures are available, together with the minimally invasive procedures and different oral appliances. Many of them have been used for decades with no satisfactory results in majority of cases. Some new methods have been used in the last five to ten years, such as pillar method, for example. Like some other new methods, the pillar method has promised good results for a lot of patients with a snoring problem, but unfortunately long-term results have proved to be significantly worse than short-term results.

With the experience in cleft surgery, I have tried a new surgical method for non-apnoeic snoring. A patient was a friend of mine, who underwent the procedure under general anaesthesia. He was 47 at the time of surgery and had had a non-apnoeic snoring problem for at least a decade. The procedure was a suspension of the soft palate with aptos threads (patented by M. Sulamanidze). The aptos threads have been used in feather lift, a method introduced into aesthetic surgery by Dr. Marlen A. Sulamanidze about ten years ago. About 18 months after the procedure, my friend's wife is still satisfied with the result.

## 22. OMFS EDUCATION & STRATEGIES

### P-2201

#### COMPARING HOSPITAL TELECOMMUNICATION SYSTEMS: COSTS, USER SATISFACTION AND EFFICACY.

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<sup>1</sup>Sunderland Royal Hospital

**Methods:** Efficacy study: this was conducted between Sunderland Royal Hospital and Newcastle Royal Victoria Infirmary, where Bleep and DECT are the official systems of use respectively. Two calls were made a day from an external phone using randomised times. 84 calls were planned over a three-week period. Cost analysis was carried out by requesting the information from the respective estate departments, and suppliers. A survey of user satisfaction with both systems was undertaken

**Results:** 84 calls were made in total, with 83 calls being answered. The time for the switchboard to answer was excluded from the total call time and was recorded separately. The response time for a DECT phone ranged between 0.9 to 130.8 seconds. The response time for Bleep ranged between 20.6 to 398.2 seconds. We estimate the potential clinical time (and therefore money) saving by using a DECT phone rather than a bleep. Users in our survey prefer the DECT phone to the pager.

**Conclusions:** There is much potential for improving hospital communication systems in the UK, which could have significant implications in terms of cost and clinical time saving. However, there is an initial start up cost, and running cost which would be higher than the current system. SMART phone based systems are already available and would integrate the benefits of pagers and DECT phones, with additional benefits.

### P-2202

#### A MIXED-METHOD ANALYSIS OF THE EFFECTS OF PREVIOUS SURGICAL EXPERIENCE OF MEDICALLY QUALIFIED GRADUATES STUDYING DENTISTRY IN ORDER TO PURSUE A CAREER IN ORAL AND MAXILLOFACIAL SURGERY.

Alexander Goodson<sup>1,\*</sup>, Karl Payne<sup>1</sup>, Arpan Tahim<sup>1</sup>, Lyndon Cabot<sup>1</sup>

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**Introduction.** Over recent years there have been increasing numbers of oral and maxillofacial surgery (OMFS) trainees in the UK who have studied medicine as a primary degree. Such trainees have various options regarding the timing of their return to dental school and as such will have differing levels of previous surgical and OMFS experience. This study looks to investigate the amount and nature of surgical experience and how this affects the outlook of time spent within dental school and a future career in OMFS.

**Method.** This was a mixed-methods study using online

questionnaire and focus group data capture methods. The study cohort consisted of students graduated from or currently enrolled on a 3-year dentistry programme.

**Results.** Quantitative analysis revealed a decreasing trend in the total length of time spent in clinical work between their two degrees. Earlier candidates had spent more time in the clinical environment and had more surgical experience. OMFS experience among all trainees showed no clear pattern, however more recent students had greater exposure to OMFS via taster weeks or student placements. Qualitative data analysis revealed important factors relating to a future career in OMFS, including personal sacrifices, financial restrictions and seamless progression through the training pathway.

**Conclusions.** The need to have a solid foundation in surgery prior to embarking on a specialist training scheme in OMFS is paramount. Over the last 5 years the amount of surgical exposure medical graduates have experienced prior to commencing their second degree in dentistry has fallen. This should be taken into consideration when designing OMFS training schemes. We discuss a possible correlation between falling surgical experience and changing outlooks while studying dentistry as a second degree.

### P-2203

#### A NOVEL APPLICATION OF SMARTPHONE TECHNOLOGY TO AID THE SINGLY-QUALIFIED SENIOR HOUSE OFFICER IN ORAL AND MAXILLOFACIAL SURGERY.

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**Background:** UK Oral and Maxillofacial Surgery (OMFS) departments commonly rely on junior staff of variable clinical experience, usually singly qualified in either dentistry or medicine. As the only on-site member of the team out of daytime hours, juniors are expected to manage complex acute maxillofacial presentations as well as medical and dental emergencies in both the Emergency Department and wards. We sought to evaluate how Senior House Officers (SHOs) access clinical education resources in the on-call setting and develop a tool to improve access to clinically useful information.

**Methods:** We surveyed OMFS SHOs in a central London tertiary referral trauma centre, using an online survey tool. As an intervention we developed a smartphone application (app) specific to the iPhone called 'Maxfax SHO'. The app divides clinical information into "A&E" and "Ward" categories and the app can be tailored to departmental specifics with "Favourites" and "Contacts" sections. The app was trialled locally, with a post-intervention survey undertaken.

**Results:** Of 21 responders, 15 described a need to access clinical information recourses 'often' during on-call shifts. Common methods of accessing information included the Internet, textbooks and senior colleagues. Nevertheless, 11 found it 'difficult' or 'very difficult' to access the required resources. The vast majority (15) owned an iPhone and 18 participants stated that they would use an app specific to OMFS SHOs if it were available.

Sixteen SHOs completed the post-intervention survey. Of

this group 12 SHOs had chosen to download the app. Seven participants used the app 'often' or 'sometimes', with 8 participants feeling more confident when dealing with acute OMFS presentations. Overall 66.7% (n=8/12) of participants stated the app saved them time during clinical activities.

All UK OMFS departments were informed of the app via mail drop, with UK and international app downloads of 657 and 1207 respectively.

**Conclusions:** There is a wealth of literature demonstrating smartphone apps as useful clinical tools to surgeons and an abundance of available clinical applications. However until now, there has been no app specific to OMFS SHOs. We demonstrate how smartphone technology can be incorporated into OMFS to improve the clinical activities of junior staff.

#### P-2204

### USE OF SURGICAL LOUPES AMONG ORAL AND MAXILLOFACIAL SURGERY SPECIALIST TRAINEES IN THE UNITED KINGDOM

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**Introduction:** Loupes are used where greater demand for visual performance is needed. Improved magnification, visual field and depth leads to identification of subtle differences in tissue planes, thus assisting the navigation around complex micro anatomical structures with ease. Oral and Maxillofacial Surgery (OMFS) has been identified as a speciality where loupes are often used.

**Aims and Objectives:** To determine the use of loupes among OMFS Specialist Trainees or Registrars in United Kingdom (UK) and what factors govern their purchase.

#### Methods

Proforma was designed and information was collected from OMFS Trainees through a telephone survey.

**Results:** Total of 153 OMFS units within UK was contacted. 51 trainees participated in the survey. The average age was 35 years (31-46 yrs) and Male to Female ratio was 3:1. Most trainees (70%) do wear loupes and on average have been using it for 3yrs and 4 months (0.5-10 yrs). Majority of loupe users (73%) started wearing loupes whilst working in the hospital and started using them to improve their work (76%). Magnification of 2.5 (81%) and through the lens loupe variety (65%) was the popular choice. Light source attachment was not considered (87%) by many whilst price (53%) and magnification (22%) were important factors considered during the purchase of loupes by the trainees. Among those who use loupes, variations in the use of loupes were noted in relation to the surgery involved. These include;

Head and Neck dissection 57%

Raising free flaps 87%

Parotid surgery 78%

Orthognathic surgery 14%

Facial aesthetic surgery 65%

Excision of lesions from facial region 68%

OMFS trainees who do not wear loupes identified surgical loupes to be an expensive accessory (50%). Despite this most (70%) are considering purchasing loupes and through the lens variety was the popular choice (67%).

Many would use it to improve their work (71%) but any future purchase would be influenced by price (46%) and magnification (27%).

**Conclusion:** Use of surgical loupes among British OMFS specialist trainees/registrars remains high. Price and magnification remains an important factor during purchase. Education and exposure to the use of loupes would assist non-users in making an informed decision.

#### P-2205

### THE AUDIT OF JUNIOR DENTISTS YEAR 2 (DENTAL FOUNDATION DOCTORS IN ENGLAND-DF2S) CONFIDENCE WITH DEALING WITH ACUTE MEDICAL CONDITIONS - EXPERIENCE FROM NORTHAMPTON GENERAL HOSPITAL

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The primary goals of this audit are to evaluate and improve DF2's ability to manage acute medical problems on the maxillo-facial ward. DF2 doctors are often the first responders in emergencies on their wards. Their clinical acumen and knowledge has a significant effect on patient treatment.

This project analyses basic knowledge of emergency medicine of seven DF2 doctors, who completed Basic Life Support (BLS) and Dentist on the Ward (DW) courses and are currently working in Maxillofacial Surgery in Northampton General Hospital in England.

The audit uses a multiple choice test (twenty questions) which was completed by each DF2 doctor. The test included questions about ABCD approach, life support algorithms, diagnosing and treatment of; - myocardial infarction, pulmonary embolism, hyperkalaemia, hypoglycemia, anaphylaxis, sepsis and delirium.

Topics tested in this audit were covered in 70% during BLS and DW, and 30% of questions were based on Immediate Life Support (ILS) algorithms. DF2 doctors scored between 20% and 50% of correct answers in this test (average 35.7%).

The project revealed topics well known to DF2 doctors, including; - treatment of myocardial infarction, treatment of hypoglycemia and ABCD rules. The topics poorly known by DF2's included; - treatment of anaphylaxis and hyperkaemia, BLS algorithm and interpretation of ECGs.

The second part of this audit, including mandatory teaching sessions with practical exercises for DF2's covering subjects of BLS, DW and elements of ILS courses showed a significant improvement of knowledge and confidence of all doctors included in this project.

#### P-2206

### AN ASSESSMENT OF A&E REFERRALS TO THE REGIONAL MAXILLOFACIAL SURGERY UNIT AT NORTHWICK PARK HOSPITAL

Daanesh Zakai<sup>1,\*</sup>, Samantha Haque<sup>1</sup>, Ee Lyn Low<sup>1</sup>, Ambika Chadha<sup>1</sup>, Bhavin Visavadia<sup>1</sup>

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**Aim:** The maxillofacial department at Northwick Park Hospital is a regional unit serving the population of North

West London, Hertfordshire and Berkshire (approximately 2 million people) receiving referrals from 11 hospitals in the area.

The aim was to identify whether current service provision is adequate by analysing the source and pattern of referrals. A key point being to avoid repeat radiographs being taken.

**Method:** Proforma sheets were provided for the on-call SHO to be filled in for each patient treated in A&E between the 23rd of November 2010 and the 21st of January 2011 a 60 day period. Any missing data was retrieved from electronically stored A&E notes retrospectively.

**Results:** A total of 355 patients attended during this period with peak attendance occurring at 2pm, 4pm and 6pm. 73% were male patients, 65% of all patients being between 17-49 with only 12% being under 17. Facial trauma (35%) and facial lacerations (24%) were the main reasons for attendance. 55% of imaging was sent on CD and only 23% electronically. There were 6 recorded incidences of radiographs needing to be retaken. 40% of patients were further reviewed 11% were admitted, 46% were discharged with no follow up.

**Conclusion:** The majority of referrals were males in the 17-29 age range which is consistent with published data. All radiographs should be transferred electronically to ensure safe transfer and availability during the patient's assessment.

CD drives should be made available in A&E. A dedicated laceration clinic in the Maxillofacial surgery department should be initiated.

#### **P-2207**

### **EVOLUTION OF THE SMARTPHONE – FROM INFORMATION RESOURCE TO DIAGNOSTIC TOOL IMPLICATIONS FOR THE OMF SURGEON**

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#### **Introduction**

The versatility of the smartphone in the clinical setting has been well documented. From applications that serve to act as up-to-date textbooks of medicine and surgery, to image viewers and search-engines, the smartphone has shown itself to be a useful aid to all doctors.

However, the smartphone can now be used to act as a real-time communication and diagnostic tool. We explore these developments, personal experience with them, and the implications to the practice of the oral and maxillofacial surgeon, particularly out-of-hours and in the developing world.

**Methods:** Information was sought by performing a literature review, analysing commercial publications, and our use of smartphone-based apps and hardware.

**Results:** A number of developments in smartphone technology of relevance to maxillofacial surgery, and surgery in general, were identified and reviewed.

Novel diagnostic tools include a hand-held ultrasound device attached to a smartphone, cheaper and more available than most ultrasound services, which may be used to determine a collection, in a neck swelling, for example.

Dermoscopes used to diagnose skin cancers are expensive

– we describe a phone attachment that acts as microscope, 6-10x more powerful than a dermoscope. The ease of access and lower cost than more conventional scopes might lead to increased opportunities for cancer diagnosis. We also describe how the capacitive touchscreen can be used to detect specific bacteria in saliva, and how bloods and ECGs can be accurately diagnosed remotely. The 'iTranslate' app allows the real-time translation of text- or voice-based conversation in almost 50 languages, particularly useful for *Conclusions*

The smartphone is a powerful device. It may serve to reduce delay to diagnosis and treatment, therefore playing a role in reducing morbidity and mortality, and will play an increasingly important role in oral and maxillofacial surgery, and surgery in general.

#### **P-2208**

### **TABLET COMPUTING AND ITS USES FOR ORAL AND MAXILLOFACIAL SURGEONS:**

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**Introduction:** Tablet computers are one of the fastest growing devices in technological advances and sales. They are becoming smaller and faster with greater applications. The touch screen accessibility makes them easy to use and the operating systems are very user friendly.

Along with their wireless functionality and development off applications they are fast becoming a device that a busy surgeon cannot do without.

The authors highlight how a tablet computer may enhance both clinical and non-clinical work.

**Method:** Demonstration of the a tablet computer. Various examples of uses with applications.

Examples include use of various applications in clinical and non-clinical scenarios.

**Conclusion:** Tablet computing will be a growing technology with great advances in functionality and portability. Their uses are going to increase especially in clinical applications. Oral and Maxillofacial surgeons must embrace these new technologies to advance our surgical practice.

## 23. ORBITAL PATHOLOGY

### P-2301

#### LATERAL ORBITOTOMY – A WINDOW TO INTRA-ORBITAL TUMORS

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**Introduction:** Orbital tumours have protean manifestations. Orbital swellings increase intraocular volume and cause a mass effect. Although the mass may be histologically benign, it can encroach on intraorbital or adjacent orbital structures and be considered anatomically or positionally malignant. Visual acuity or field compromise, diplopia, extraocular motility disturbances, or pupillary abnormalities can result from invasion or compression of intraorbital contents secondary to solid tumour or haemorrhage. Masses of the lacrimal fossa are caused by numerous conditions. However, inferior and medial displacement of the globe with no inflammatory signs or symptoms should raise suspicion of a neoplastic process. This case report intends to remind that pleomorphic adenoma of the lacrimal gland (PALG) is often confused with other benign diseases of this gland being mistakenly biopsied. In order to decrease the rate of recurrence and malignant transformation, resection must aim the complete removal of the capsule.

**Clinical case:** We describe a case of a 38-year-old man who presented a painless left exophthalmos and decreased visual acuity for 1.5 years. Computed tomography demonstrated a left intraorbital tumour. The patient underwent surgery with lateral orbitotomy access to excise the tumour.

**Results:** Anatomical pathology results revealed that it was a PALG. The tumour was completely removed with the capsule intact. In postoperative follow up there were no clinical or radiologic signs of recurrence. The functional and aesthetics results were excellent.

**Conclusions:** The lateral orbitotomy permits a good surgical field, allowing the complete removal of intra-orbital tumours with the necessary margins, being that the only curative treatment. Incisional biopsy must be avoided as incomplete excision predisposes to tumor recurrence, and such recurrence often infiltrates normal orbital structures. In addition, the recurrent tumours are prone to malignant transformation.

In the present clinical case, since the tumour was completely removed with the capsule intact, recurrence or malignant transformation is very unlikely.

### P-2302

#### ORBITAL HYDATID CYST: A REPORT OF 12 CASES

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**Background:** Orbital hydatidosis is a rare zoonosis. Its

incidence varies from 0.3 to 1.0% of all hydatid disease cases. But in highly endemic areas, orbital hydatid cyst represents 5 to 26% of all cystic orbital lesions.

**Methods:** In the records of the Avicenne Medical University Center between 1984 and 2008, we found 12 cases of orbital hydatid cyst.

**Results:** Among them, 8 males and 4 females; the age ranged from 2 to 60 years. The main symptoms of orbital hydatid cyst were slowly progressive unilateral proptosis (100%) with visual loss (90%). The presumptive diagnosis was made on the images obtained from computed tomography and / or magnetic resonance imaging. Surgical removal is the main treatment. A postoperative anti-helminthic treatment has been used.

**Conclusion:** Hydatid cyst is an endemic disease in Morocco. Orbital involvement should be considered in the differential diagnosis of proptosis in children

### P-2303

#### TEMPORO-ORBITARY PLEXIFORM NEUROFIBROMA. CLINIC CASE.

Maria Antonia Contreras Morillo<sup>1,\*</sup>, Jose Luis Salinas Sanchez<sup>1</sup>, Yolanda Aguilar Lizarralde<sup>1</sup>, Francisco Ruiz Delgado<sup>1</sup>, Antonio Valiente Alvarez<sup>1</sup>, Lucas Bermudo Añino<sup>1</sup>

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**Introduction.** Neurofibromatosis type 1 (Von Recklinghausen disease) is a disease caused by mutations in the gene located in 17q 11.2 AD. Clinically characterized by presence of  $\geq$  light brown skin spots,  $\geq$  2 neurofibromas of any type or one plexiform, bone dysplasia (temporal bone, sphenoid, etc.), epheles, optic glioma,  $\geq$  2 Lisch nodules. Neurofibromas may be cutaneous, deep nodules or plexiform tumors.

**Material and methods.** A 19 year old man from Equatorial Guinea with Von Recklinghausen disease presents a large tumour in the left temporo-orbit region since he was 4 years old. After embolization of tumour feeding vessels and ruling out other associated pathology, the surgery consisted on removing the lesion which depended of the zgomatico-malar sensitive branch, through a blepharoplasty, transconjunctival and hemicoronal approaches. Pathology anatomy confirmed plexiform neurofibroma with diffuse areas.

**Conclusions.** The plexiform type neurofibroma is typical of the paediatric age group especially for those in the face. It can infiltrate nerve branches as well as surrounding healthy tissues, causing hypertrophy of the same and therefore facial asymmetry. The presence of neurofibroma at early ages of life plays an important role in the development of bone dysplasia while structures such as cranial vault, base of the skull or orbit are being developed. Finally, it is important to consider the need to treat people who live in countries poorly developed and who are affected by this disease as well as others. In this case, our department, because of its geographic situation, is the reference Unit to treat patients who live in underdeveloped Africa.



## 24. ORTHOGNATHIC SURGERY

### P-2401

#### INFECTION RATES AFTER BILATERAL SAGITTAL SPLIT OSTEOTOMY, LE FORT I OSTEOTOMY, AND GENIOPLASTY USING AN ABSORBABLE PLATE IN COMBINATION WITH SELF-SETTING ALPHA-TRICALCIUM PHOSPHATE

Katsuhiko Okabe<sup>1,\*</sup>, Koichiro Ueki<sup>1</sup>, Kohei Marukawa<sup>1</sup>, Akinori Moroi<sup>1</sup>, Maho Miyazaki<sup>1</sup>, Aya Mukozawa<sup>1</sup>, Syuichi Kawashiri<sup>1</sup>

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**Purpose:** The present retrospective cohort study was performed to compare the infection rates after bilateral sagittal split osteotomy (BSSO), Le Fort I osteotomy and genioplasty using an absorbable plate in combination with self-setting a-tricalcium phosphate.

**Materials and Methods:** The sample consisted of 80 subjects. Eighteen patients had BSSO, 1 patients had Le Fort I osteotomy, 26 patients had BSSO and Le Fort I, 1 patients had genioplasty, and 1 patient had BSSO and genioplasty using an absorbable plate in combination with self-setting a-tricalcium phosphate. Fourteen patients had BSSO, 1 patient had Le Fort I osteotomy, 16 patients had BSSO and Le Fort I, 1 patient had genioplasty, and 1 patient had BSSO and genioplasty using an absorbable plate in combination without self-setting a-tricalcium phosphate.

**Results:** Two patients who had BSSO and 2 patients had genioplasty using an absorbable plate in combination with self-setting a-tricalcium phosphate developed infection. There were no cases of infection among patients without self-setting a-tricalcium phosphate

**Conclusion:** Use of self-setting a-tricalcium phosphate for orthognathic surgery is an accepted risk factor for infection. However, infection was seen only on the mandible, especially in mental.

### P-2402

#### ASSESSMENT OF BONE HEALING AND HYPOESTHESIA IN UPPER LIP AFTER LE FORT I OSTEOTOMY WITH SELF-SETTING A-TRICALCIUM PHOSPHATE AND ABSORBABLE PLATES

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**Purpose.** The purpose of this study was to evaluate hypoesthesia of upper lip and bone formation using self-setting  $\alpha$ -tricalcium phosphate (Biopex®) between the segments following Le Fort I osteotomy with bent absorbable plate fixation.

**Subjects and Methods.** The subjects were 47 patients (94 sides) who underwent Le Fort I osteotomy with and without mandibular osteotomy. They were divided into a Biopex® group (48 sides) and a control group (46 sides). The

Biopex® was inserted into the anterior part of the gap between the segments in the Biopex® group. Trigeminal nerve hypoesthesia at the region of the upper lip was assessed bilaterally by the trigeminal somatosensory-evoked potential (TSEP) method. The area of the Biopex® at the anterior part in the maxilla was assessed immediately after surgery and 1 year postoperatively by computed tomography (CT).

**Results.** The mean measurable period and standard deviation were 13.2±18.5 weeks in the control group, 14.5±17.9 weeks in the Biopex® group, and there was no significant difference in TSEP. The area of the Biopex® after 1 year was significantly smaller than that immediately after surgery (right side: P=0.0024, left side: P=0.0001) and bone defects between segments could not be found in the Biopex® group. In the control group, although the areas of bone defect after 1 year were significantly smaller than that immediately after surgery on the right side (P=0.0133) and left side (P=0.0469) in the frontal view, the complete healing of the bone defects could be seen in 12 of 46 sides after 1 year.

**Conclusion.** This study suggested that inserting Biopex® in the gap between the maxillary segments was useful for new bone formation and it did not prevent the recovery of upper lip hypoesthesia after Le Fort I osteotomy with bent absorbable plate fixation.

### P-2403

#### VARIATION OF MIDFACIAL OSTEOTOMIES AND DIFFERENT TECHNIQUES FOR CORRECTION MIDFACIAL DEFORMITIES

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**Purpose:** to show advantages and disadvantages of different techniques for correction midfacial deformities ( cleft/noncleft cases).

**Method:** We present our cases and experience in management midfacial deformities : using conventional orthognathic surgical techniques (standard and modified osteotomies) and Distraction Osteogenesis ( a new variation of orthognathic surgical procedure ) for correction midfacial deformities.

**Result:** for most midfacial deformities, the Le Fort I osteotomy and its variations are adequate.

**Conclusion:** the choice of surgical technique depends on the specific deformity, patient's conditions and experience of maxillofacial surgeon.

**P-2404****IS LEVEL 2 CARE NECESSARY FOR PATIENTS IN THE IMMEDIATE POST-OPERATIVE PERIOD AFTER ELECTIVE ORTHOGNATHIC SURGERY?**

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We present the results of a retrospective review of all elective single- and double-jaw orthognathic procedures undertaken at our regional OMFS unit over the previous 3-years.

Procedure, length of surgery, duration of hospital stay, transfusion requirements and complications were assessed. These results were compared against those in the recent literature.

Ward area occupied during the in-patient stay was also reviewed. Our hypothesis was that patients are occupying beds in areas where the level of care is excessive to their likely need. If supported, de-escalation of location of overnight stay for selected patients would enable provision of orthognathic surgery more cost-effectively and reduce on the day cancellations due to a shortage of level 2 beds. This change would increase the efficient use of available resources within an increasingly austere and stretched NHS budget for more appropriate utilisation elsewhere whilst also increasing hospital revenues.

**P-2405****CLINICAL EVALUATION OF INVERTED -L OSTEOTOMY.**

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**Aim** ; Aim of this presentation is to evaluate of the clinical outcome using inverted-L osteotomy.

**Patients and methods** ; In a retrospective review, 10 patients who had undergone inverted-L osteotomy (ILO) in 2008-2012 at Yokohama Rosai Hospital, were examined for postoperative stability and neurosensory alteration in the chin.

**Result** ; All patients showed normal thresholds of the 2 measurement techniques in this methods. Postoperative stability was satisfactory maintained one year past.

**P-2406****ORTHOGNATHIC SURGERY FOLLOWING INVISIBLE ORTHODONTICS**

Rafael Gómez Fernández<sup>1,\*</sup>, Jose Miguel Cantera García<sup>1</sup>, Carlos Jacobo Baró Alonso<sup>1</sup>, Alberto Strange<sup>1</sup>

<sup>1</sup>Hospital Universitario Río Hortega

**Introduction:** Our patients are worried about the appearance of final outcomes and the ongoing treatment. Orthodontics have become less conspicuous to satisfy these demanding patients.

**Material and methods:** Five patients with craniofacial deformity (two Angle's class II and three class III) received invisible orthodontics (Invisalign) during a period

of time lasting from 6 to 12 months. After this period orthognathic surgery was performed to obtain an optimal maxillary-mandibular relationship. No brackets and no metal arches were needed for the surgery. Instead, a special splint was build to guide the intermediate and final maxillary relationship, helped by intermaxillary fixation screws.

**Results:** All patients were greatly satisfied. No complications were notified.

**Discussion:** As patients are demanding less conspicuous treatment, we should be able to offer a combination of an invisible orthodontics with our more aggressive orthognathic procedures to minimize the discomfort of these lengthy procedures.

**P-2407****IMPLANT-PROTHESIS REHABILITATION IN PATIENTS WITH SEVERE MAXILLARY ATROPHY THROUGH BONE GRAFT AND LEFORT I ADVANCEMENT OSTEOTOMY.**

Rafael Gómez Fernández<sup>1,\*</sup>, Alberto Serrat Soto<sup>1</sup>, Ángel Espero Ferrero<sup>1</sup>, Verrier Hernández<sup>1</sup>

<sup>1</sup>Hospital Universitario Río Hortega

**Introduction:** Maxillary atrophy means a significant variation in vertical height (Tallgren) as well as horizontal dimension (Cawood), resulting in an alteration not only in the inferior facial third but also in the intermaxillary relationship, resembling a false Angle's class III.

**Material and methods:** Two patients in their 60s, showing a severe maxillary and moderate mandibular atrophy leading to a great sagittal maxillo-mandibular discrepancy attended our hospital. Sinus lift and on-lay bone grafts were held in a first step. After six months implants were placed in both maxillas. A year later, a LeFort I advancement osteotomy under general anaesthesia was completed to reduce the sagittal discrepancy. The implant-prosthesis was finally fixed 3 months after this procedure.

**Results:** Both patients had no complications neither in the immediate nor at 3 months after surgery. They showed a great satisfaction with the aesthetics and confirmed a good functional and occlusal result.

**Discussion:** A great amount of techniques have been described for severe maxillary atrophy rehabilitation: on-lay and in-lay implants, sinus lift, alveolar crest distraction. For large sagittal discrepancy, Sailer has proposed a LeFort I advancement and declining osteotomy filling the gaps with bone implants. Keller has set a modification operating the patients twice, setting the implants once the grafts were integrated.

We have first proceeded with the sinus-lift and bone graft to obtain more bone volume before the LeFort I was completed. Fixing the implants before the LeFort I was also of great help to plan the amount of advancement to get an optimal maxillo-mandibular relationship.

**P-2408****PNEUMOMEDIASTINUM AFTER ORTHOGNATHIC SURGERY. CASE REPORT AND REVIEW OF THE LITERATURE**

Susanne Jung<sup>1,\*</sup>, Thomas Prien<sup>1</sup>, Claudia Rudack<sup>1</sup>, Tobias Annussek<sup>1</sup>, Johannes Kleinheinz<sup>1</sup>

<sup>1</sup>University Hospital Muenster

**Introduction:** Orthognathic surgery in general addresses young patients and aims to improve their bite function and to harmonize their facial aesthetics. Secure surgical standards and a defined post-surgical protocol of after-care are indispensable to reduce surgical as well as anaesthesiological risks in this area of complex elective surgery. The development of pneumomediastinum is a rare incident but threatens the patients' physical integrity.

**Patient and diagnosis:** We report the case of a young healthy male who underwent Le Fort I osteotomy in combination with bilateral mandibular sagittal split osteotomy and postoperatively developed pneumomediastinum. The initial diagnostic intervention included an ECG, the laboratory investigation of heart specific enzymes, and a CT-scan of the thorax to exclude pulmonary embolism or myocardial infarction.

**Results:** During endoscopy two small lacerations, one in the right nasal cavity and one in the posterior pharyngopalatine arch were detected and sutured. Despite a thorough inspection, a relevant penetration of the cervical fascia as a possible site for air entry into the retropharyngeal tissues was not found. The patient was re-intubated and the removal of the orotracheal tube was delayed for two days.

Under continuous ventilation there was no progression of the mediastinal emphysema, but a successive resorption of the pneumomediastinum could be illustrated radiologically

**Conclusion:** Pneumomediastinum – spontaneous or traumatic - is a rare but severe complication. After preclusion of pneumothorax or secondary causes, the appropriate treatment is expectant: cardiac and oxygen monitoring on an intensive care unit, avoidance of CPAP ventilation and radiologic control of the continuous air resorption.

**P-2409****A PROSPECTIVE RANDOMISED CONTROLLED CLINICAL TRIAL INVESTIGATING FACIAL SWELLING AND THE USE OF SURGICAL DRAINS IN ORTHOGNATHIC SURGERY**

Rachel Wilson<sup>1,\*</sup>, Robert Lee<sup>1</sup>, Avani Patel<sup>1</sup>, Nayeem Ali<sup>1</sup>, Mike Millwaters<sup>1</sup>, Pratik Sharma<sup>1</sup>

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**Objectives:** To investigate the effect of a surgical drain on facial swelling following orthognathic surgery. There is currently no published literature on the effectiveness of a surgical drain to reduce perceived pain and swelling after orthognathic surgery.

**Design:** A prospective randomised controlled clinical trial.

**Materials and Methods:** Following ethical approval the trial has been running for four years following CONSORT guidelines. A sample size of 36 was calculated using

Altman's Nomogram. Participants were selected from orthognathic patients requiring a mandibular osteotomy. 72 patients were assessed for eligibility of which 61 enrolled. Facial swelling analysis was carried out for 37 participants using a three dimensional imaging system (optical laser surface scanner). 43 participants also completed a visual analogue pain scale and questionnaire. This data was collected post-operatively at T1 (day two); T2 (day seven) and T3 (month six). Randomisation for side allocation of the drain was prepared in advance. A standardised surgical technique was used to place a Redivac surgical drain on the allocated side. No drain was placed on the opposite (control) side. Allocation concealment was carried out using sequentially numbered opaque sealed envelopes opened during surgery. The surgeon was blinded to the allocation side until after completion of the osteotomy.

**Results:** Data analysis involved descriptive statistics and highlights an overall median reduction in facial swelling of -416.18mm squared between T2 and T3 with the use of a drain. At T3 there was a median reduction of 162.60mm squared in swelling on the drain side.

The median pain score change between the drain and control side at T1 was not statistically different. At T2 a statistically significant difference was found (p= 0.014) suggesting that the use of the drain resulted in less perceived pain. At T3 no statistically significant difference in pain was found.

**Conclusions:** The use of a surgical drain in orthognathic patients has shown to be statistically significant in reducing perceived pain at day two and day seven. Its use has also been shown to be statistically significant in reducing facial swelling at day two and day seven post-operatively.

**P-2410****COMBINATION OF SURGICAL TONGUE REDUCTION AND ORTHODONTIC TREATMENT IN PATIENT WITH BECKWITH-WIEDEMANN SYNDROME**

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We present a 3-year follow-up in a patient with a Beckwith-Wiedemann syndrome after combination of surgical tongue reduction and orthodontic treatment. Omphalocele, macroglossia and gigantism are considered the crucial diagnostic triad of findings. Beckwith-Wiedemann syndrome occurs in between one in 13 700 birth as one in 14 300 birth, with approximately equal incidence in males and females.

An eight-year old girl was sent at the Maxillofacial Department with tongue protrusion, speech articulation problems and appearance of mandibular prognathism. Prior to that, patient was treated from the infant age by pediatricians and pediatric surgeons.

After physical examination, cephalometric studies were performed showing hypoplastic maxilla with relative mandibular prognathism. Mandible was deformed with flattening of the alveolar ridge due to the weight of the enlarged tongue resting upon it.

The first step of our treatment was surgical tongue reduction. Orthodontic treatment, with fixed orthodontic appli-

ances for the lower jaw and Delair's mask for advancement of the upper alveolar ridge, started four weeks after surgery. Occlusion was stabilized by fixed appliances on both jaws after sufficient advancement of the upper alveolar ridge was achieved. In follow up last three years tongue is completely within the oral cavity and articulation and physical appearance improved.

**P-2411****POSTOPERATIVE STABILITY AFTER SSRO WITH POSTERIOR BENDING OSTEOTOMY OF DISTAL SEGMENT TO MINIMIZE CONDYLAR TORQUE IN FACIAL ASYMMETRY**

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**Purpose:** This study was to evaluate bone healing and postoperative stability after posterior bending osteotomy (PBO) of distal segment in SSRO to minimize interferences between proximal and distal segments, and to evaluate the usefulness of PBO application in facial asymmetry.

**Methods:** PBO was done to minimize the interferences between proximal and distal segment after mandibular split by BSSRO patients with facial asymmetry (n = 13), while grinding method was used in minor interferences (n = 9). Preoperative, immediate postoperative, 6 months postoperative PA and lateral cephalograms were evaluated. The changes of menton on PA cephalograms and B point on lateral cephalograms were calculated for evaluating postoperative stability of mandible and statistically analyzed. In addition, the adaptation and bone healing of PBO segment was assessed by 3 month-postoperative CT image and 3D reconstruction using Mimics 13.0 (Materialise NV, Belgium).

**Results:** The postoperative stability on PA and lateral cephalograms did not show statistically significant difference between PBO and grinding method. 11 of 13 patients with PBO showed proper bone healing. In cases of non-fixation of PBO segment with positioning screw (n = 2) bone healing was poor, even though the PBO segments were well-maintained at desirable position.

**Conclusion:** PBO group showed favourable postoperative stability and satisfactory bone healing as well. Therefore, PBO could be suggested as a stable technique to minimize the interferences between proximal and distal segment in BSSRO of facial asymmetry patients.

**P-2412****EFFECT OF MODIFIED INTRAORAL VERTICAL RAMUS OSTEOTOMY ON POST-OPERATIVE STABILITY IN UNILATERAL MANDIBULAR ADVANCEMENT FOR FACIAL ASYMMETRY CORRECTION**

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Intraoral vertical ramus osteotomy (IVRO) is a useful surgical procedure for mandibular setback in patients with mandibular prognathism or asymmetry. In the case of

orthognathic surgical planning for mandibular prognathism and retrognathism, bony segments can only be moved in an antero-posterior direction. But in the case of facial asymmetry, a combination of antero-posterior, lateral, and rotational movements may be included, allowing one segment to make a forward movement while the other moves backwards. Compared to other techniques IVRO has been effective in improving facial asymmetry and TMJ disorders. However, sometimes its use is limited due to the difficulty of placing the bone segments in an overlapped position without compromising either bone healing or stability.

This report describes a modified IVRO for guiding both proximal and distal segments to primary healing after mandibular advancement based on the hypothesis that the callus formation between segments may be promoted by allowing physiologic movement of the proximal segment through a loose fixation. The effect of this method on postoperative stability was evaluated in fifteen cases after unilateral mandibular advancement for facial asymmetry correction through analysis of serial postoperative lateral and frontal cephalometric radiographs.

**P-2413****ALTERED LIGHT TOUCH SENSATION AFTER BILATERAL SAGITTAL-SPLIT OSTEOTOMY**

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This report is a prospective evaluation of the incidence of change in light-touch sensation in the innervated area of the lower alveolar nerve after BSSO with attention on time that it takes to rebuild the function of the inferior alveolar nerve. The sample consisted of 30 women and 20 men, with a mean age 22.14 (3.3) years. The neurosensory test was conducted with a 20-mm long monofilament of suture material Prolene (3-0) connected to a plastic holder.

These tests were performed one day preoperatively and every two weeks during first two months after surgery. After that, patients were tested once every month until the end of the first year. All patients had disturbance of light touch sensation after BSSO, but none of these changes was permanent. The average duration of hypoesthesia was 6.6 (1.2) with a range from 4 to 9 months. The average duration of hypoesthesia for women was 6.27(1.0) months, and men had hypoesthesia for 7.1 (1.2) months on average. This difference was statistically significant. The two oldest female patients, who were 33 and 37 years old at the time of the surgery, experienced altered sensitivity for only 4 months. After BSSO, all patients experienced disturbed light-touch sensation in the innervated area of the lower alveolar nerve. Fastest recovery in the oldest patients and statistically significant difference between the sexes should be interpreted with caution.

**P-2414****CHANGE IN LIP CLOSING FORCE AFTER SURGICAL CORRECTION OF SKELETAL CLASS III MALOCCLUSION: A FOLLOW-UP STUDY**

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We previously compared lip closing force of patients with Class III malocclusion before surgical correction with those measured 6 months after the surgery. The aim of the present study was to perform follow-up investigation of the patients and obtain a new set of measurements for the 1-year time point. As in our previous study, patients with mandibular protrusion or maxillary retrusion (31 men, 32 women) were investigated and individuals with normal occlusion (20 men, 20 women) served as controls. Statistical analysis was performed to compare the difference in lip closing force before and after surgery. A Lip De Cum strain measuring device was used to measure maximum lip closure strength. Our previous study showed that the maximum force was higher in men than women in all cases and was higher in the control group than in the Class III patient group in both sexes. In addition, the maximum values obtained 6 months after surgery were higher than those obtained before surgery. In the present study, at 1 year after the surgery, the maximum forces were significantly higher after surgery in both sexes (men, p

**P-2415****POSTERIOR FACE AUTOROTATION USING INTRAORAL DISTRACTORS: REPORTS OF A CASE**

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A 30 years female presented to my clinic after completion of the orthodontic treatment that lasted for two years, complaining about retruded chin and lip incompetence.

Clinical examination and cephalometric analysis showed a skeletal class II relation with mandibular retrusion. She had a dental Class I relation as the result of a previous orthodontic treatment. Her profile exhibited retruded chin and frontal view showed asymmetry of the lower jaw with chin deviating to the Rt. She had mentalis strength during lip closure.

Treatment plan included:

- Short orthodontic preparation for the orthognathic surgery with straight wire appliance that lasted for 6 months.
- Le fort I Osteotomy for Maxillary posterior down grafting using intraoral distraction( KLS Martin)
- -BSSRO for Mandibular autorotation, genioplasty and bilateral coronoidectomy

The bone fragments were used as autogenous bone graft to support the maxilla posteriorly on both sides.

The healing was satisfactory. Orthodontic treatment postsurgically lasted for 8 months in order to finalize the occlusion. Aesthetic and functional results were achieved without sensory disturbances.

**P-2416****EFFECTS OF ALAR BASE CINCH SUTURE IN LE FORT1 OSTEOTOMY FOR PATIENTS WITH FACIAL ASYMMETRY**

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Purpose: The alar width and upper lip show morphological changes after Le Fort 1 osteotomy (L1). Alar base cinch suture is effective to prevent excessive changes. However, there have been few reports regarding the effects of alar base cinch suture in patients with facial asymmetry. We investigated the effects of alar base cinch suture in L1 in patients with facial asymmetry.

Material and Method: Forty patients treated with L1 were divided into the asymmetry group or symmetry group (n = 20 each). We reconstructed the CT-3D volume rendering data (hard tissue and soft tissue) with Aquarius Net (Terarecon, Foster City, CA) before and 1 year after surgery. Measurements were taken in the frontal view. The x-axis was defined as a straight line parallel to the FH plane and on the line joining the two points on the zygomatic frontal suture in hard tissue. The y-axis was perpendicular to the x-axis. In the soft tissue, we defined a straight line passing through the left and right alar base (ab), a straight line passing through the left and right alar (al), a straight line passing through the intersection point of the left and right upper lip, lower lip (l), and a straight line passing through the midpoint of cupid's bow on the upper lip and the midpoint of the alar base (bl). We measured the angles of the x-axis and ab (AB), x-axis and al (AL), x-axis and l (L), and y-axis and bl(BL). In addition, we calculated the length of the straight line connecting the left and right alar base (BB), and the longest part of the left and right alar width (AL-AL).

Results: In the asymmetric group, significant differences were observed in AL-AL, AL, L, and BL. In the symmetric group, significant differences were observed in AL-AL and BL.

Conclusions: In the asymmetric group, the asymmetry in soft tissue improved after surgery. Moreover, alar base cinch suture showed good effects as there were no changes in the angle or width of the alar base in either group.

**P-2417****COMPARISON OF THE DELAIRE'S TWO-DIMENSIONAL AND THREE-DIMENSIONAL CEPHALOMETRIC ANALYSIS IN KOREAN ADULTS**

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The cephalometric analysis is a specialized tool for the evaluation of craniofacial dysmorphism and malocclusion. It allows the clinicians understand the discrepancies in the position and size of the maxillary, mandibular, and dental-alveolar architecture and structure, as well as the soft tissue. Among the diverse two-dimensional (2D) cephalometric analyses, the Delaire analysis has established the special position for the architectural and structural craniofacial analysis. Geometric allocation of cranial and craniofacial lines represents the state of dysmorphic architecture in relation to individual craniofacial characteristics.

The validity and reliability of conventional cephalometric

analysis can be restricted by the nature of their 2D evaluation for three-dimensional (3D) structures. The 3D application of Delaire's 2D cephalometric analysis has been well introduced. But, there are not available data yet, which can be used for the normal standard values as those in 2D cephalometry. The purpose of this study was to present and compare the normal standard values in Korean adults of both 2D and 3D craniofacial analysis of Delaire. A total of 201 Korean adults who had skeletal class I, II, or III malocclusions underwent both conventional 2D cephalometric radiographs and the computed tomography (CT)-based 3D Delaire's analysis. The comparison of some measurement values were found to differ significantly between 2D and 3D Delaire's analyses. And the inter and intra-observer reliability were higher for measurements in 3D cephalometries. These results indicated that the 3D cephalometric analysis of Delaire can be accepted again as a valuable tool for diagnosis/treatment planning and research works for dysmorphosis.

**P-2418****CORRECTION OF SEVERE ANTERIOR OPEN BITE BY TWO JAW SURGERY WITH THE AID OF A CONDYLAR POSITIONING DEVICE**

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**Introduction:** Skeletal anterior open bite is considered to be one of the most difficult deficiencies to treat because of its complex and multifactorial nature. Surgical repositioning of maxilla or both jaws offers the most effective treatment of skeletal open bite. Postoperative positioning of the condyle is essential during the operation since improper positioning may cause various problems (limitation of mouth opening, pain and clicking in the temporomandibular joint, idiopathic condylar resorption (ICR) and short-term relapse) in those cases.

**Case Report:** The 21 year-old male patient referred to our clinic with complaint of difficulty in eating and speaking due to anterior open bite. The patient presented with a severe open bite malocclusion of 14 mm inter incisor distance and a high-angle profile with S-N/Go-Me and N-Me values 65o and 148.2 mm respectively. The open bite was so severe that there were two divergent occlusal planes starting from the maxillary 2nd molars. Treatment plan was simulated on a stereolithographic skull model. We performed Le Fort I and bilateral sagittal split osteotomy with autorotation to close open bite. An 80 mm reconstruction plate was adapted on each side from zygoma to mandibular angle, during fixation of mandible to stabilize the proximal segment, in order to avoid any postoperative complications related with temporomandibular joint. The final outcome of treatment was a substantial improvement in function and aesthetics.

**Conclusion:** The treatment of severe open bite using this combined orthognathic surgical procedure is a convenient method in adult patients. The proper positioning of condylar device during operation reduces postoperative complaints. Using a stereolithographic skull model to adjust the reconstruction plate shortens the duration of the operation and increases the efficiency.

**P-2419****SURGERY-FIRST APPROACH FOR SKELETAL CLASS III CORRECTION USING 3-DIMENSIONAL SIMULATION**

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Recently, Surgery-First approach (SFA) is proposed for several advantages in comparison with conventional treatment. (Early relief of patient's chief complaint, efficient decompensation, and shortened treatment time)

In SFA, it is hard to predict the result of preoperative orthodontic treatment. But we could get more accurate results by using 3-Dimensional Simulation(3DS).

For SFA, we got 3D LASER scan data of the initial cast (A). After superimposing it to 3D CT image, we simulated tooth movement 3-dimensionally to the position of right before surgery (B) and tried surgery simulation. After that we changed (B) to (A) again. Finally, we got a wafer by a rapid prototyping method.

Right after the real surgery, soft tissue profile was improved as the patient wanted and overbite/overjet became normal.

It needs to be evaluated the differences between 3DS and actual teeth movement, but we overcame existing limitations in SFA by 3DS and got satisfactory outcomes.

**P-2420****MANDIBULAR HARD TISSUE AND SOFT TISSUE CHANGES ASSOCIATED WITH TREATMENT IN BIMAXILLARY PROTRUSION : A ORTHOGNATHIC TREATMENT WITH AN ANTERIOR SEGMENTAL OSTEOTOMY VS A CONVENTIONAL ORTHODONTIC TREATMENT WITH PREMOLAR EXTRACTION.**

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Bimaxillary protrusion commonly occurs in Asians, with protrusion of upper and lower lip and lip incompetency in severe cases. Because of severe labioversion of upper and lower incisors and small interincisal angle, patients usually need orthodontic treatment through extracting 4 upper and lower 1st premolar in such cases. When it is hard to close extraction space orthodontically due to short root, periodontal problem and thin labial cortical bone, it is effective to perform anterior segmental osteotomy(ASO). It is able to make an aesthetic outcome faster than orthodontic treatment through extraction and to change incisal angulation without labial bone resorption. However, post-surgery complications such as temporary numbness due to exposure and retraction of the inferior alveolar nerve, ranula caused by damage of sublingual gland and necrosis of bone segment could be occurred . In this study, we compared patients with bimaxillary protrusion who got orthodontic treatment through extraction and patients who had ASO by evaluating changes of hard tissue and soft tissue when extraction space is closed after the treatment using pre- and post- lateral cephalograms.

**P-2421****2-JAW SURGERY WITH COUNTER CLOCKWISE ROTATION OF THE OCCLUSAL PLANE IN CII PATIENT WITH GUMMY SMILE : A REPORT OF CASES**

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There are several ways to treat gummy smile, which are aesthetic crown lengthening, orthodontic treatment using anchorage, lip repositioning, Botox injection, 2-jaw surgery and so far. Counter clockwise rotation with anterior impaction could be one the good choices in treating CII patients with severe mandible retrognathism. Anterior impaction can resolve gummy smile, and counter clockwise rotation can produce fair amount of mandible advance. We present this article, since we were able to see the desirable results after practicing counter clockwise rotation in three young females with gummy smile.

**P-2422****OBWEGESER 2 METHOD FOR TREATMENT OF SEVERE MANDIBULAR PROTRUSION. - RECOVERY PROCESS OF SENSORY DISTURBANCE -**

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The Obwegeser 2 method is usually indicated in the treatment of severe mandibular prognathism when the amount of mandibular set back is 15 mm or more. This method was reported by Obwegeser for first time 1964. As for this method, it is reported that the inferior alveolar nerve is excavated from the mandibular canal and risk of the nerve damage is high. However, prognosis of sensory disturbance for mental nerve is unknown.

We observed recovery process of sensory disturbance after Obwegeser 2 surgical procedure. This patient was a 25-y-o, male. He came to our hospital for orthognathic surgery. After pre orthodontic treatment, we performed two jaws surgery. Firstly, the maxilla was advanced 5.5mm by Le Fort 1 osteotomy. Secondly, the mandible was set back 16mm in the right side and 19mm in the left side by Obwegeser 2 osteotomy. In during the osteotomy for mandible, we couldn't find the damage of inferior alveolar neuro-vascular bundle. After surgery, pharmacotherapy and stellate ganglion block(SGB) were performed. With regard to recovery process of sensory disturbance, SW test was indicated 5.18 Fmg in both side at one week after surgery. After that, SW improved with time, and the results were normal (SW:1.65) at one month after surgery. 2PD was indicated undetectable at on week after surgery in both side at one week after surgery. 2PD improved with time, and the results were normal (under 7mm) in both side at three months after surgery. Thermal sensation(coolness and warmth) and pain sensation could be perceived in three months after surgery. Concerning subjective symptoms at 12 months after surgery, slight paraesthesia remained, but dysaesthesia and allodynia were absent. Those were similar in 24 months after surgery.

In previous reports, sensation either completely recovered at about 6 months or was mostly absent. In the present study, qualitative and quantitative testing demonstrated bilateral recovery to within standard values within 3 months and alleviation of subjective symptoms by around 6 months. While slight paraesthesia remained at 12 months postoperatively, activities of daily life were unaffected.

These findings indicate a comparatively favourable process of sensory disturbance recovery following Obwegeser II osteotomy.

**P-2423****SPECIFIC COMBINATION THERAPY OF PATIENTS WITH OPEN BITE ACCOMPANIED BY "LONG FACE SYNDROME" AND GINGIVAL SMILE.**

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*Introduction:* Treatment of patients with dentofacial deformity becomes more challenging as people strive for greater improvement in quality of life with an increase in educational level and material welfare. In parallel to those requirements there was a quantum leap in capabilities of orthodontics and oral surgery stipulated by the development of new treatment options.

*Materials and methods:* We have treated 15 patients "long face syndrome" and a gingival smile during the period of 2009-2011. All the patients had maxillary constriction combined with the increase of vertical parameters and mandibular macrognathia. All the patients were given a multi-stage combination therapy.

stage I – rapid maxillary expansion, including fixation and activation of a distraction unit. Upon achievement of required transversal maxillary dimensions we proceeded to treatment stage II – orthodontic preparation to orthognathic surgery. This stage consisted of: correction of tooth rotations, vertical alignment of adjacent teeth, correction of overcrowding of teeth, normalization of dental arches shape and size, coordination of dental arch sizes, incisors alignment to the required inclination. Stage III included surgery planning using Dolphin Imaging 11.0, producing of positioners for intraoperative control of jaw movement, mandibular osteotomy and segmental maxillary osteotomy with ostectomy to correction of gingival smile, intracortical manibular osteotomy with retraction and rotation, chin osteotomy. Stage IV – post-operative orthodontic correction of occlusion and retention.

*Results:* All the patients who received treatment under the above pathway showed positive aesthetic and functionally stable results.

*Conclusions:* Thus, to correct the so-called "long face syndrome" and gingival smile besides thorough orthodontic preparation and standard surgery in both jaws, segmental maxillary osteotomy shall be performed in order to minimize repeated vertical disclusion, partial maxillary ostectomy to correct gingival smile, chin osteotomy to normalize face proportions.

**P-2424****ULTRASOUND OSTEOTOMES IN SURGICAL ORTHODONTICS AND ORTHOGNATHIC SURGERY**

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**Objectives:** Ultrasound instruments have revolutionised surgical approach: surgery is more precise, successful, predictable and less traumatic for soft tissues. Healing is improved.

This technique was introduced shortly after second world war in orthopaedic surgery, and is now used in oral and maxillo-facial surgery. More recently has been introduced in orthodontics to perform interdental osteotomies and corticotomies. The use of such procedures is thus described.

**Materials and methods:**

- each case is documented by radiographic evaluation, study models, photographic records
- Location and extension of osteotomies must be defined prior to surgery
- A team work of surgeon and orthodontist is essential both in surgical orthodontics and orthognathic surgery to define clinical objectives to be reached

**Results:** o Surgical maxillary expansion is usually necessary to correct cross bite or prior to mandibular advancement. With ultrasound osteotomes the procedure is less traumatic and healing is improved

o Mandibular ostotomies are easily performed with ultrasound osteotomes because the operation field is almost bloodless and surgery is more precise

o Ultrasound interdental osteotomes allow to treat adult orthodontic patients at risk of dental recessions or radicular resorptions

**Conclusions:** Ultrasound osteotomes have revolutionised maxillofacial surgery.

The management of such instruments is different from traditional ones and an adequate learning curve has to be allowed for the surgeon.

It is advantageous to use ultrasound osteotomes in many traditional surgical maxillofacial procedures.

More recently we have experienced ultrasound osteotomes in surgical orthodontics, treating periodontal at risk patients.

**P-2425****THREE-DIMENSIONAL PLANNING SURGERY TREATMENT THE PATIENT WITH JAW ASYMMETRIES**

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**Objectives:** The aim of study was to optimize planning of treatment for patient with asymmetry.

**Introduction:** We can move facial structures in three planes that considerably improve the appearance of the patient. Such asymmetries may be caused by TMJ disorders, bite infringement, abnormal growth a facial skeleton.

The obtained data CT was used to create a 3D model of the patient's head in the software for planning surgery.

**Methods:** The patients were clinically and anthropometrically inspected and x-ray examination was performed. For the documentation and additional studying of aesthetic proportions face, soft tissue was studied before and after complex orthodontic and surgical of the treatments as well as patients' photos and 3D models. All obtained data were brought in the special software for 3D planning based on the aesthetic facial parameters, of the soft tissue and occlusion relations.

Patients with mandibular asymmetries had maxillary, BSSO and chin osteotomies for correction of aesthetic parameters. After operation all patients were subject final orthodontic treatment, which was aimed to achieve maximal dental interdigitation.

**Conclusions:** For inspection and operative treatment of patients with maxilla facial asymmetries it is necessary to use algorithm of actions based on clinical examination and carrying out correct planning operation on 3D models using special software, thus it is possible to achieve high functional and predictable aesthetic results.

**P-2426****MODIFIED MANDIBULAR PLATE IN BONE-ANCHORED MAXILLARY PROTRACTION**

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**Objective:** Our aim was to describe a technical modification of the mandibular plates, originally invented by De Clerck et al. and modified by Wilmes et al., used during Bone Anchored Maxillary Protraction (BAMP) procedure.

**Methods:** At the 1st Department of Paediatrics and at the Department of Paedodontics and Orthodontics at the Semmelweis University Budapest Class III patients are addressed at an age of 9-11 years by the means of placing orthodontic bone anchors at the zygomatic buttresses and at the menton. The maxillary components were single plates with a hook at the supragingival end, fixed by 3 self-drilling medical grade titanium screws each. The mandibular components were united in a single H-form plate, which is fixed by 4 self-drilling medical grade titanium screws.

**Results:** In the last 6 months, this modified mandibular plate was used in 5 patients. We could place the mandibular plate and screws with the same operative technique as with the 2-plate technique. We had no time delay and no higher costs. There was slightly more oedema, which could be managed easily. We did not notice any adverse effects or inflammatory reaction, nor loosening or plate fracture.

**Conclusion:** This technical modification gives more stability for the mandibular components used by the BAMP. This is achieved with the same operative burden, time and costs. This modification might help preventing inflammation and screw loosening.



**P-2427****AN ACCURATE MAXILLARY SUPERIOR REPOSITIONING TECHNIQUE WITHOUT INTRAOPERATIVE MEASUREMENT IN BIMAXILLARY ORTHOGNATHIC SURGERY**

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In orthognathic surgery, previously reported techniques for repositioning the maxilla required intraoperative measurement using internal and external reference points and intraoperative measurement often has to be repeated several times for accurate repositioning, until the maxilla is moved into the planned position, which is time-consuming and troublesome. We introduced a simple technique with straight locking miniplates (SLMs) for accurate maxillary superior repositioning without any intraoperative measurement. This technique is based on the principle that three-dimensional (3D) positioning of the maxilla can be achieved precisely if the vertical dimension from skull base to mandible is kept constant during splint fabrication in model surgery and transoperative time.

Before down-fracture, the maxillo-mandibular complex with interpositioning wafer guiding CR position is fixed by SLMs bilaterally. After removal of SLMs, down-fracture is performed. The maxilla is then mobilized. Bone that interferes with desired repositioning of the maxilla is removed with a small round bur. The maxilla is placed in the planned position using an intermediate splint. SLMs are fixed bilaterally only on the side of the mandible. If any further bony interference is present, SLMs cannot be fixed to the previous position on the side of the maxilla. In that case, additional bone removal should be carried out until the screw holes of the SLM match with the corresponding holes drilled previously on the zygomatic buttress. When SLMs are secured with two screws bilaterally, the maxilla can be moved into the planned position accurately as in the model surgery. SLMs act as temporary fixation of the maxilla, keeping it in the new position without manual control. The maxilla is fixed with miniplates at the piriform rim and anterior wall bilaterally. Furthermore, SLMs can act as a condylar positioning device. This method does not require intraoperative measurement or any special device except for commonly used locking miniplates. Using the SLMs technique, the complex procedure of bimaxillary orthognathic surgery can be simplified and the outcome of surgery will be more predictable even if performed by a less-experienced surgeon.

**P-2428****FACIAL MOBILITY AFTER BIMAXILLARY SURGERY IN CLASS III PATIENTS: A THREE-DIMENSIONAL STUDY**

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**Introduction:** Quantifying soft tissue changes after orthognathic surgery is increasingly important in surgical planning, but little is actually known about the changes in

facial mobility after surgery. In the current study, we investigated facial mimics in patients before and after orthognathic surgery.

**Patients and Methods:** Eleven patients with jaw discrepancy requiring maxillary and/or mandibular surgery were considered. Facial landmarks were applied, and facial surface data were acquired using a three-dimensional laser scanner before surgery and after 3, 6 and 12 months. The facial movements were frowning, eye closure, grimace, smiling, and lip purse. They were described in terms of surface and landmark displacements. Mean and SD were calculated for the right and left sides of the face and compared with normal values previously obtained in control subjects. We compared the results in 4 groups of patients: all the patients together (group A), bimaxillary surgery (group B), basal surgery without ancillary procedures (group C), and basal surgery plus rhinoplasty and/or genioplasty (group D).

**Results:** After surgery, modifications of symmetry were evident in many subjects, but after 1 year, facial movements were statistically similar to presurgical registrations. In smiling, the single case observations revealed a postsurgical improvement of amplitude in 8 subjects. In conclusion, orthognathic surgery did not significantly modify facial mobility in the long term. On the contrary, the amplitude of movement during smiling seems to increase in the majority of subjects.

**Conclusion:** Our evaluation of three-dimensional laser scanning of facial movement showed that it can detect small post treatment changes on soft tissues.

**P-2429****TREATMENT PLANNING OF PATIENTS WITH CLASS III MALOCCLUSION ACCOMPANIED BY NARROW MAXILLA**

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**Objectives.** The aim of the study was to optimize the diagnostic protocol and treatment planning for adults with Class III malocclusion accompanied by narrow maxilla.

**Introduction.** Contemporary techniques in maxillo-facial surgery and growing concern about appearance motivates patients with Class III malocclusion to seek medical help. Many authors report stable long-term functional and aesthetic results of combined orthodontic and surgical treatment of this category of patients. Class III malocclusion is quite often accompanied by narrow maxilla which requires orthodontic and surgical treatment.

**Methods.** 51 adults with Class III malocclusion accompanied by narrow maxilla have been fully examined and treated at our clinic since 2007. We performed the following diagnostic and combined orthodontic and surgical treatment planning protocol of this patient category. The diagnostics includes clinical examination, anthropometric analysis of patient's face and jaws' plaster models, x-ray examination (computed tomography of maxillofacial area, x-rays), electroodontodiagnosis of upper teeth. Initial stage

of combined treatment is surgical, which is rapid maxilla expansion (RME), consisting of Le-Fort I and central palatal suture osteotomies with palatal distraction device (PDD) fixation. PDD is then regularly activated at the postoperative stage until the normal transverse maxilla size is achieved. After the pre-surgical orthodontic treatment, 2D and 3D planning, the next stage of combined treatment – orthognathic surgery (Le-Fort I osteotomy, BSSO and chin osteotomy) is performed. The final steps are post-surgical orthodontic treatment and retention period.

**Results** of treatment. 1 year is the period of maxilla expansion. CT and bone density measurement at the median palatal suture were performed 6 months after the RME surgery. The bone density was 420 to 890 HU (D2-D3) in case of 1 to 4 mm distraction, which allows to proceed to the next surgical stage.

**Conclusion.** RME before orthodontic treatment and orthognathic surgery allows to achieve stable maxilla size most suitable for further stages of combined treatment of patients with Class III malocclusion.

#### P-2430

### ACTINOMYCOSIS - RARE COMPLICATION AFTER ORTHOGNATHIC SURGERY. CASE REPORT.

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Actinomycosis as an infectious complication rarely associated with orthognathic surgery. Only a few cases are described in the literature. The aim of the presentation is to describe the possible occurrence of this rare complication. We describe a case of a 20-years old patient observed in a collection of 627 patients after orthognathic surgery in the period from 1990 to 2009 and compare this incidence with other cases in the international literature. At the same time we have focused on risks associated with the treatment.

#### P-2431

### HILOTHERM©-THERAPY VERSUS COOLING WITH ICE PACKS IN TREATMENT OF POSTOPERATIVE SWELLING AND PAIN FOLLOWING ORTHOGNATHIC SURGERY. A RANDOMIZED CONTROLLED TRIAL USING QUANTITATIVE 3D- PHOTOGRAMMETRY.

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After orthognathic surgery considerable swelling of the middle and lower face is seen frequently. The Hilotherm©-therapy is an innovative method for postoperative cooling with specially shaped masks and a constant temperature.

In a randomized controlled trial Hilotherm©-therapy was compared with the conventional cooling method with ice packs by quantitative three-dimensional photogrammetry (Canfield Systems, USA). 20 patients after bimaxillary osteotomies and 16 after monomaxillary osteotomies were distributed and randomly assigned to the cooling methods.

In both groups (n = 18) postoperative swelling was photo-documented daily three-dimensionally. An evaluation was performed by analysis of the swelling by quantitative 3D-photogrammetry. Pain was evaluated by patient retrieval of pain medication in both groups.

On each of the observed 7 postoperative days the swelling in the Hilotherm©-group was less than in the conventional group. The maximum swelling was observed on the first postoperative day in the conventional cooling group ( $18.92 \pm 7.64\%$  vs.  $13.41 \pm 10.18\%$ ). Additional retrieval of pain medication by the patients was significantly reduced in the Hilotherm©-group (p

The Hilotherm©-therapy is a suitable method for cooling after orthognathic surgery. After application of Hilotherm©-therapy a reduced swelling and a positive effect on postoperative pain could be observed.

#### P-2432

### SLO WITHOUT FIXATION; THE NEW CONCEPT OF MANDIBULAR OSTEOTOMY-FLOATING BONE CONCEPT-

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Sagittal Split Ramus Osteotomy (SSRO), a well-known orthognathic surgical technique, has a wide range of application and used frequently. However, the movement of mandibular bone segments might be difficult sometimes because the distal segment of osteotomy become more prominent posteriorly as larger amount of mandibular setback are needed. Moreover, the bony interference between proximal and distal segments of mandible causes the outer displacement of the proximal segment in mandibular asymmetry cases. Short Lingual Osteotomy (SLO) is modified technique of SSRO such that mandibular osteotomy is cut further anteriorly to overcome these above SSRO shortcomings.

SSRO sometimes needs a longer operation time because repositioning of condyle requires precise manipulations to fix bone segments rigidly during the surgery. Even though the repositioning of condyle was done accurately, postoperative instability is still unpredictable, such risk of late relapse is another disadvantage of SSRO. In contrast, bone fixations are not necessary in Intraoral Vertical Ramus Osteotomy (IVRO) so that unrestricted proximal segment including condyle can be repositioned physiologically by jaw exercise. Thus, IVRO can be used also for treatment of temporomandibular disorder (TMD).

Our present concept, "The Floating Bone Concept", a new treatment strategy to solve problems related to conventional orthognathic surgeries, is advocated. We performed an osteotomy according to SLO and developed our new concept similar to a postoperative management of IVRO that has no need of bone fixation after mandibular osteotomy. Moreover, jaw exercise was started with elastics at the second day of post surgery in order to minimize pa-

tients' discomfort related to the longer period of time for rigid maxilla-mandible fixation. The purpose of this study is to confirm the floating bone concept suggested by us can provide great postoperative dental and skeletal stabilities without causing any TMD symptoms. .

In this study, 15 patients of skeletal mandibular prognathism were treated by surgery with the floating bone concept, and the postoperative stability was evaluated as compared with previous studies of SSRO. Consequently, a great stability was confirmed as a result of this study. Therefore, we assure that the floating bone concept can contribute to new treatment approach for mandibular jaw deformities.

#### P-2433

### COMPARATIVE STUDY BETWEEN 2 METHODS OF MOUNTING MODELS IN SEMIADJUSTABLE ARTICULATOR FOR ORTHOGNATHIC SURGERY

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*Purpose:* compare the traditional method of mounting dental casts on a semiadjustable articulator and the new method suggested by Wolford and Galiano,1 analyzing the inclination of maxillary occlusal plane in relation to FHP

*Materials and Methods:* Two casts of 10 patients were obtained. One of them was used for mounting of models on a traditional articulator, by using a face bow transfer system and the other one was used to mounting models at Occlusal Plane Indicator platform (OPI), using the SAM articulator. After that, na analysis of the accuracy of mounting models was performed. The angle made by de occlusal plane and FHP on the cephalogram should be equal the angle between the occlusal plane and the upper member of the articulator.

*Results:* The measures were tabulated in Microsoft Excell® and calculated using a 1-way analysis variance. Statistically, the results did not reveal significant differences among the measures.

*Conclusion:* OPI and face bow presents similar results but more studies are needed to verify its accuracy relative to the maxillary cant in OPI or develop new techniques able to solve the disadvantages of each technique.

#### P-2434

### FATAL DELAYED HEMORRHAGE AFTER LE FORT I OSTEOTOMY: CASE REPORT

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Delayed hemorrhage after Le Fort I osteotomy osteotomy is extremely rare. Lanigan and West presented the management of postoperative bleeding after Le Fort I in 1984.

They suggested that the uncontrolled bleeding would require the nasal packing or surgical intervention in severe cases. The most frequent vessels involved were the greater palatine artery, the internal maxillary artery, or the pterygoid venous plexus. In this study, we are reporting the case of delayed haemorrhage twelve days after Le Fort I osteotomy.

#### P-2435

### EVALUATION OF SWALLOWING FUNCTION BEFORE AND AFTER SAGITTAL SPLIT RAMUS OSTEOTOMY

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Sagittal split ramus osteotomy (SSRO) is a common treatment for mandibular prognathism that has good functional and aesthetic outcomes. The mandibular setback associated with SSRO affects the tongue and pharyngeal airway. We studied the effects of SSRO on craniofacial and pharyngeal morphology and swallowing function.

*Material & Method:* The subjects were 14 patients with skeletal class III malocclusions who underwent setback surgery by bilateral SSRO. Morphological changes were studied on cephalograms, and swallowing function was evaluated by videofluorography. Morphological changes were evaluated on lateral cephalometric radiographs that were obtained before operation (T0), and at 1-2 days (T1), 3 months (T2), and 6 months (T3). Videofluorography was performed at the same times, and the results were analyzed qualitatively and quantitatively. The qualitative evaluation included five variables (barium inflow into the pharynx before swallowing, lingual movement, soft palate movement, epiglottic movement, oral cavity stasis). The quantitative evaluation included oral transit time, pharyngeal transit time, and total transit time.

*Result:* Mandibular setback was 7.65±3.23 mm. HSN degree and the sella-hyoid distance increased significantly at T1, but they did not increase at T2 and T3. The hyoid bone returned to the preoperative position at T2. There were no significant changes in the oropharyngeal spaces at any time. However, the MPS distance after surgery (T1, T2, T3) tended slightly shorter than that before surgery. On videofluorographic assessment, lingual movement, soft palate movement, epiglottic movement, and oral cavity stasis decreased at T1, but all patients recovered at T2. Oral transit time was significantly longer at T1 than T0 and was significantly shorter at T3 than at T1. Pharyngeal transit time was significantly shorter at T1 than T0 and was significantly longer at T3 than at T1. There were no differences in total transit time at any time(T1, T2, T3).

*Conclusion:* HSN degree and sella-hyoid distance increased just after operation. The hyoid bone returned to the preoperative position at 3 months. MPS distance after surgery tended shorter than before surgery. In early postoperative period, oral transit time was prolonged and pharyngeal transit time was shorted.

**P-2436****PATIENT PERCEPTION OF ORTHOGNATHIC SURGERY - WHAT DO THEY UNDERSTAND?**Nabeela Ahmed<sup>1</sup>, \*, Natasha Wright<sup>1</sup>, Philip Stenhouse<sup>1</sup><sup>1</sup>King's College Hospital, UK

**Introduction:** Orthognathic surgery is a complex surgical procedure which requires careful planning.

We present the results of an audit of their understanding prior to surgery.

**Method:** We asked patients undergoing orthognathic surgery to complete a questionnaire on the day of surgery. Data collected included basic demographics and details of the surgery planned. They were asked regarding their perception of the procedure proposed, what changes they expected, how long they expected paraesthesia and swelling to last and regarding any post-operative instructions and appointments they may have been advised of. They were also asked to list complications they recall being warned about.

**Results:** We present the preliminary results of 36 patients undergoing surgery at King's College Hospital over a three month period and correlated the responses with information provided via patient information leaflets (provided by the British Orthodontic Society given at the first appointment) and the written consent form signed by the patient prior to surgery. Paraesthesia remains a poorly understood complication alongside perceptions of pain/swelling and need for time to recuperate are underestimated by patients.

**Conclusion:** Despite the lengthy treatment planning process involved in orthognathic surgery, patients have a different perception of what surgery involves, and recall different aspects of potential complications and post-operative care. This audit suggests that further information needs to be provided to patients, and despite this information being provided in written and verbal forms, patient understanding of this remains limited.

**P-2437****SURGIICAL ASSISTED RAPID PALATAL EXPANSION IN THE TREATMENT OF MAXILLARY HYPOPLASIA: A CASE REPORT**Metin Şençimen<sup>1</sup>, Eda Arat Maden<sup>2</sup>, \*, Ersin Yildirim<sup>3</sup>  
<sup>1</sup>Department Of Oral And Maxillofacial Surgery, <sup>2</sup>Department Of Pediatric Dentistry, <sup>3</sup>Department Of Orthodontics

**Aim:** The aim of this paper is to report our experience in the surgical treatment of a 20 years old patient treated with surgically assisted rapid palatal expansion (SARPE) for midfacial retrusion and significant transverse deficiency.

**Case Report:** A 20-year-old male patient presented for orthodontic treatment with a complaint of eating difficulty and aesthetics problem. Patient was systemically healthy and there was no history of trauma. Intraoral examination revealed significant bilateral posterior maxillary crossbite. He presented with bilateral Class II molar relationship in centric occlusion, bilateral Class II canine relationship on the left side, class III canine relationship on the right side. Depending lack of space in the upper jaw, left upper lateral incisor was in palatal position. The four first premolar teeth were extracted to obtain space in the upper and lower dental arch. Because of the age of the patient and skeletal maturity had been reached it was too late to begin orthodontic treatment for palatal expansion and decided to SARPE.

**Conclusion:** SARPE has gradually gained popularity as a treatment option to correct maxillary transverse deficiency. It allows clinicians to achieve effective maxillary expansion in a skeletally mature patient. The use of SARPE to treat maxillary transverse deficiency decreases unwanted effects of orthopedic or orthodontic expansion.

## 25. OTOPLASTY AND EAR RECONSTRUCTION

**P-2501**

### **PREAURICULAR PEDICLED FLAP FOR THE RECONSTRUCTION OF THE EAR LOBE**

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The traumatic amputation of the ear is a complete avulsion of a part or of the total ear tissue. In general it is an unusual emergency. There are several techniques described to restore it, and for choosing one of them we have to bear some factors in mind, such as the size of the amputated fragment and the lobe involvement. The technique used to reconstruct the ear lobe is a posterior pedicle flap. In 1965 it was the first time that previous ear pedicle was described by Pennisi et al. to correct the ear lobe. It has been used to cover another kind of defects, however is it not usual the application in the common practise of lobe removal.

We present the case of a man patient of 34 with a traumatic removal of the left ear lobe that has been reconstructed by the previous pedicle flap.

#### *Conclusion:*

Limited morbidity and direct closure in donor area. Easy and secure surgical technique. It is made under local anaesthesia in only one surgical time. Excellent aesthetic results.

**P-2502**

### **CORRECTION OF UPPER HELICAL DEFORMITIES BY STRUT CARTILAGE GRAFT IN CRYPTOTIA**

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*Introduction:* In cryptotia, the upper third of the auricle is buried under temporal skin and a combined anomaly of upper auricular cartilages also may appear. For the correction of cryptotia, various surgical techniques have been described in the literature, such as V-Y plasty, Z-plasty, skin graft, local skin flaps and so on. However, in many cases, combined upper auricular cartilage deformities make the results less satisfactory. Therefore, the correction of abnormalities of upper auricular cartilage as well as the formation of auriculocephalic sulcus should be performed in cryptotia. We have used cartilage strut graft techniques to correct the upper auricular cartilage in cryptotia.

*Methods:* Triangular flap was designed on the scalp and skin over the supraauricular area for correction of cryptotia. The triangular flap was elevated toward the upper auricle and the deformed cartilage was fully exposed. Then, fibrous tissue between the postauricular surface and upper auricular cartilage was released. The deformed helical cartilage was corrected with cartilage strut graft

(1.5-2.0 x 0.5-0.7cm), which was harvested from the ipsilateral concha. According to the deformed shape, the cartilage was grafted in the inner side (inlay graft) or outside (onlay graft) of the deformed auricular cartilage. If the helical rim was collapsed, the graft was put inside the helical rim (inlay graft). If irregular contour of helix was present, the cartilage graft was applied on the outside of deformed helical cartilage. The constricted and irregular deformity of helix was expanded and stretched out by the strut cartilage graft.

After the deformed cartilage was corrected, the flap was advanced inferiorly and posteriorly to form the auriculocephalic sulcus.

*Results:* By using this method, 17 cryptotia with upper auricular deformities were corrected. Inlay cartilage strut grafts were used in 8 cases and onlay cartilage strut grafts were used in 9 cases. The patients were followed up for more than 3 months. The auricles showed a smooth expanded helical contour without any postoperative complication

*Conclusion:* By using this method (V-Y advancement flap combined with a cartilage strut graft), cryptotias with upper helical deformities were corrected well. And we believe that the cartilage strut graft can be widely used for other congenital ear anomalies with helical deformities such as constricted ear.

## 26. PREPROSTHETIC SURGERY AND IMPLANTOLOGY

### P-2601

#### TACHOSIL PATCH USING IN SUB-MUCOSA PROTECTION OF THE COVERING BONE IN PRE-IMPLANT SURGERY: EXPERIMENTAL AND PROSPECTIVE CLINICAL TRIAL OF 45 CASES.

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The surgery to increase bone of the lateral segments by covering presents risks of mucosa disunity. The interposition membrane between the mucosa and the graft is a useful protection in the large volume increases, but the difficulties during the application (restraint, stability) led us to seek a process that meets these criteria.

An experimental histological study in rats assessed the cellular changes in contact with the membrane (Case-control study of bone apposition in the rat tibia covered by the membrane). The prospective clinical trial was conducted on 45 patients operated by the same surgeon, in 2010 and 2011. It was a covering of the pre-maxillary and the mandibular lateral segments.

The thickness of the average bone gain was 5 mm (thickness and/or height). At the level of the pre-maxillary the average initial thickness was 3 mm (between 1 and 4 mm). One patch of TachoSil was positioned in each case.

Grafts of parietal origin have always been used, a mucosal dehiscence occurred in 3 cases and led to a partial loss of the graft, did not have to modify the implant project.

The patch of TachoSil seems to be a useful aid in pre-implant surgery and meets the requested criteria. It does not cause cellular contact reaction. It is very adherent to the covering by simple finger pressure, and it is perfectly suited to the operating site. It has an important haemostatic potential (liver surgery indication at the origin).

These 3 criteria (tissue sealing/adhesion, smoothness and haemostasis) assist protection and retention of the covering, important condition in the pre-implant surgery.

### P-2602

#### CHRONIC SINUS REACTIONS TO ZYGOMA IMPLANTS: RETROSPECTIVE CLINICAL AND RADIOLOGICAL STUDY ON 40 PATIENTS WITH 46 UNILATERAL ZYGOMA IMPLANTS FOLLOWED FOR 33 MONTHS

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In the edentulous patient with severe maxilla bone atrophy, the zygoma implant can offer an alternative to bone grafting for dental rehabilitation. The zygoma implant crosses the sinus, and may constitute a foreign body promoting maxillary sinusitis. The purpose of this retrospective study is to assess the incidence of maxilla sinusitis

after zygoma implants placement.

Over an average period of 33 months, 40 patients were treated with one or two unilateral zygoma implants following the intra-sinus technique described by Branemark. The maxillary sinus on the other side was free of zygoma implant, and was considered as control. A total of 46 implants were placed. We compared the incidence of maxilla sinusitis on the side of the sinus crossed by the implant to the sinus free of implant. The diagnosis of maxilla sinusitis was established on the basis of a medical assessment. In those patients with a positive anamnesis, the diagnosis of maxillary sinusitis was confirmed by CT-scan.

On 40 patients, 5 developed maxilla sinusitis. The incidence of maxilla sinusitis was 12,5% (p< 0.05) in the implanted sinuses. No sinusitis was found in the sinuses free of implants. In one patient, the zygoma implant had to be removed due to resistant sinusitis despite of medical and surgical treatment. The success rate of the implants was 98%.

The incidence of maxilla sinusitis in this study was 12,5%. This percentage is similar to what is described in the literature and comparable to maxilla sinusitis mentioned following bone graft of the maxillary sinus. No risk factor could be clearly defined and further observations have to be done.

Zygoma implants demonstrate reliable results and a good success rate for dental rehabilitation on patients with severe maxilla bone atrophy. The incidence of sinusitis seems to be similar in both techniques. Treatments of sinusitis in patients with zygoma implants are possible and mainly don't affect the success rate. The advantages of the zygoma implants are his less heavy surgical procedure, an easier follow up, reduced risk of morbidity and a faster dental rehabilitation.

### P-2603

#### SPONTANEOUS DENTAL IMPLANT DISPLACEMENT INTO THE MAXILLARY SINUS DURING OSTEOINTEGRATION PERIOD.

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<sup>1</sup>Karadeniz Technical University Faculty of Dentistry Department of Oral and Maxillofacial Surgery

43 years-old female patient referred to our clinic for dental implant treatment. Total of 12 implants were installed both maxilla and mandible. Left maxillary posterior region was treated with 3 dental implants using conventional sinus lift technique and the others placed with conventional methods.

On the follow up period, first month radiographs showed no evidence of significant bone loss or implant displacement, however, on control radiograph of the third month, one implant that was placed at left side of maxilla was totally displaced into maxillary sinus. Lateral wall approach with arthroscope was performed to explore maxillary sinus and to remove the implant. Despite this, the implant in maxillary sinus could not found and another operation was planned for caldwell-luc surgery under general anaesthesia in case of need for further surgeries. After opening the maxillary sinus through the canine fossa the implant was removed easily. After the removal of implant, curettage and irrigation of the maxillary sinus with saline for removal of inflamed sinus mucosa were done.

In conclusion, the application of the appropriate sinus augmentation technique, are critical aspects that should be controlled to minimize the risk of implant migration into the maxillary sinus cavity

**P-2604****FUNCTIONAL EVALUATION OF IMPLANT TREATMENT AFTER SURGICAL RESECTION OF ORAL CANCER**

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**Objectives:** In surgery for oral cancer, a jaw resection involves residual ridge and tooth loss, as well as oral soft tissue loss, resulting in cosmetic disturbance and dysfunction. Significantly masticatory disturbance is often caused, particularly in edentulous cases. In such cases, implant treatment is considered useful in the reconstruction of occlusion and functional recovery. The aim of this study was to evaluate the oral function of edentulous patients where implant treatment was performed after surgical resection of oral cancer.

**Methods:** Five edentulous patients (maxilla: 2 patients, mandible: 3 patients) underwent implant treatment after surgical resection of oral cancer were included in this study. Of the 5 patients, bone-anchored bridge-type implant prosthesis was performed in 3 and an implant-retained overdenture in 2. Test foods were divided into 5 groups from those that are easy to chew to those that are not, for evaluating masticatory function using Sato et al.'s questionnaire preoperatively and postoperatively.

**Results:** The results of the masticatory functional evaluation were as follows: Sufficient chewing ability in 3 mandibular and 2 maxillary patients before treatment was seen only up to Group 1 and Group 2 of the foods, respectively, whereas after prosthodontic rehabilitation, sufficient chewing ability in all patients was seen with a slight ingenuity up to Group 4. The scores of chewing ability were as follows: 55% to 65% in cases with bone-anchored bridge-type implant prosthesis were "chewing normally", 80% to 85% "chewing with a slight ingenuity"; 35% to 60% in cases with an implant-retained overdenture were "chewing normally", 70% to 80% "chewing with a slight ingenuity".

**Conclusion:** Implant treatment was performed to reconstruct occlusion and to evaluate masticatory function in edentulous patients after surgical resection of oral cancer, resulting in recovery of satisfactory oral function, and thus its usefulness is indicated.

**Reference:** Sato Y, Ishida E, Minagi S, Akagawa Y, Tsuru H. The aspect of dietary intake of full denture wearers. J Jpn Prosthodont Soc 1988; 32:774-779.

**P-2605****LE FORT I AND SIMULTANEOUS ZYGOMATIC IMPLANTS INSERTION IN PREPROSTHETIC SURGERY: CASE REPORT.**

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Traditional procedures for upper jaw preprosthetic augmentation such as onlay and inlay bone grafts, Le Fort I osteotomy with interpositional grafts and in selected cases distraction osteogenesis, have been used traditionally to increase bone volume in the atrophic maxillae before implant placement.

Two zygomatic implants can be used as an alternative to grafting procedures in the atrophic maxillae when adequate anterior bone is available to insert traditional implants, but minimal posterior maxillary bone is present.

Four zygomatic implants can be used when a class V or VI (according to Cawood classification) of maxillary atrophy is present to avoid a Le Fort I plus bone grafts or a revascularized free bone flap procedure.

The potential advantages of zygomatic implants are numerous compared with bone grafts augmentation combined with traditional endosseous implant placement; in fact is eliminated the donor site morbidity, is reduced the total treatment length in term of final prosthetic rehabilitation, with the possibility of immediate loading, fewer implants are required to support the prosthetic rehabilitation compared to traditional procedures (bone graft plus implants), and the success rate of zygomatic implants is very high (90-100%).

Of course there are also some drawbacks such as the technical difficulty in implant placement related to the anatomy of the zygoma, the palatal emergence profile and some low incidence of reported complication such as oroantral fistula formation, pain, facial oedema, epistaxis, gingival inflammation and orbital injury.

Another drawback is related to the sagittal discrepancy, i.e. pseudo or third class malocclusion patient; the traditional insertion of two or four zygomatic implants and subsequent prosthetic rehabilitation could not in some cases correct the negative over jet due to sagittal bone discrepancy.

We report the case of a patient with extreme maxillary atrophy, who underwent a Le Fort I advancement and simultaneous insertion of four zygomatic implants, to correct the sagittal discrepancy and at the same time provide mechanical stability and retention for an implant supported fixed prosthesis.

**P-2606****RESTORATIVE TREATMENT OF SOFT TISSUE DEFECTS AFTER REMOVAL OF GINGIVAL TUMOURS EXCEEDING MUCO-GINGIVAL JUNCTION**

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**Introduction:** The excision of a gingival tumour outwith the muco-gingival junction without covering the arising defect of the soft tissue may lead to the lack of attached gingiva and to the development of gingival recession.

**Aim:** The study is to describe two methods of coverage of gingival defects after tumour excision.

**Material and methods:** The study describes four cases of patients treated for gingival tumours of dentate alveolar process outwith the muco-gingival junction. The histo-

pathological examination revealed three cases of fibrous hyperplasia and one peripheral ossifying fibroma. Each time, surgical treatment was preceded by a full mouth disinfection and hygiene instructions.

In two cases the soft tissue defects were covered with connective tissue grafts collected from the palate and with coronally positioned mucosal flap or a bilateral pedicle flap.

In the two remaining cases the defects were covered with muco-periosteal, full-thickness flaps.

**Results:** During the three-year follow-up no recurrences were observed. In both cases of bilaminar and in one case of unilaminar coverage the regeneration was complete and a stable. In the remaining case treated with unilaminar coverage a gingival recession developed. In patients with bilaminar coverage of the defects, the comparison of the width of the attached gingiva to adjacent or analogical teeth from the opposite side showed no substantial differences. In one patient with bilaminar coverage an increased thickness of gingival tissue was observed. This effect is qualified as positive in periodontal surgery in recession coverage. In case of restorative treatment of the defects developed after an excision of a tumour there must be a differentiation from a recurrence, and the excessive tissue should be corrected. The gingival contouring performed on this patient produced good aesthetical result. The histopathological examination revealed no recurrence.

**Conclusions:**

1. Both methods of covering the gingival defects after an excision of tumours outwith the mucogingival junction may be used to achieve good functional and aesthetical results.
2. Bilaminar coverage with connective tissue graft collected from the palate seems to produce more predictable results and allow to obtain a wider area of attached gingiva. Unilaminar coverage may lead to gingival recession, the lack of - or too narrow area of attached gingiva.
3. In performing the bilaminar coverage, it is important to plan the appropriate thickness of the graft to avoid excessive gingival thickening.

#### P-2607

### IMMEDIATE IMPLANT PLACEMENT AND IMMEDIATE LOADING, IN A FLAPLESS PROCEDURE: A CASE SERIES OF 25 IMPLANTS.

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**Introduction:** Several factors affect perimplant tissues after an immediate implant. Soft tissue architecture must be maintained even when the gap is not regenerated.

**Aim:** To obtain a soft tissue architecture stable enough to reduce tissue changes and avoiding bone graft biomaterials, a new flapless approach is presented for implant placement immediately after tooth extraction, immediate loaded with an abutment with the gingival profile similar to the extracted tooth.

**Material and Methods:** A no flap atraumatic extractions in non-viable upper premolars, were carried out in 25 patients (age:28-56 years). The gingival sulcular fibbers were preserved, and an implant placed on the palatal side of the socket, with an insertion torque greater than 30 Ncm to allow immediate loading. All gaps were higher than

2.5mm and no graft biomaterials were used. A good stabilization of coagulum was achieved with both suture and provisional crown. A definitive abutment, similar to the one used for the definitive crown, was used in order to allow a gingival stabilization as fast as possible. A custom provisional crown, with the same form of the extracted crown was cemented. After osteointegration a definitive crown was delivered and tissue stability was assess on year after load.

**Results:** All probing measurements 1 year after implant insertion were lower than 4mm and bone loss assessment (both mesial and distal) through X-ray was lower than 0.5mm.

**Conclusion:** This paper points out that without a flap elevation and rupture of gingival fibbers that supports the "bundle" bone, and with an abutment profile similar to the extracted tooth in order to achieve coagulum and soft tissue stability the tissue architecture changes may be reduced and graft biomaterials may be avoided.

#### P-2608

### VERTICAL BONE FORMATION CHARACTERISTICS OF THE DENTAL IMPLANTS WITH CALCIUM-PHOSPHATE COATED SURFACES

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**Introduction:** Osteoconductive characteristics of different implant surface coatings are in the focus of current interest. The aim of the present study was to compare the vertical osteoconductivity at the implant shoulder of supra-crestal inserted titanium implants from calcium-phosphate coated (SLA-CaP; Bioactive®) compared to conventional sand-blasted/acid-etched (SLA) surfaces in a rabbit model.

**Materials and methods:** SLA-CaP and SLA implants (3.5 mm x 6 mm; Alfa Gate Dental Implants, Kfar Qara, Israel) were inserted bilaterally in the mandible of 4 rabbits in a split-mouth design. The implants were placed 2 mm supra-crestal. After 3 weeks, at the left and right implant shoulder, the percentage of linear bone fill (PLF; %) as well as bone to implant contact (BIC-D; %) were determined.

**Results:** After 3 weeks, newly formed woven bone could be found at the shoulder of the most of both surface-treated implants (75%). PLF was significantly higher in SLA-CaP implants (11.2 % vs. 46.5 %; n = 8, p = 0.008). BIC-D was significantly increased in the SLA-CaP implants (13.0 % vs. 71.4 %; n = 8, p < 0.001) as well.

**Conclusion:** The results of this study show time that calcium-phosphate coated surfaces on supra-crestal inserted implants have vertical osteoconductive characteristics and increase the bone-implant contact at the implant shoulder significantly in a rabbit model. In clinical long-term settings, these implants may contribute to a better vertical bone height.



**P-2609****IDIOPATHIC ROOT RESORPTION OF THE MAXILLARY CENTRAL INCISORS – OR IS IT DUE TO PLAYING THE FLUTE?**

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**Background:** Dental root resorption is a condition characterized by partial lost of root cementum and dentin. Root resorption in permanent teeth may be classified into internal and external resorption. The latter may occur as a result of inflammatory conditions, traumatic injuries, neoplastic processes, systemic disorders or mechanical stimulation. Once all known etiological factors are excluded, the external root resorption is called idiopathic. The aim of this study is to present a case of severe root resorption of the maxillary central incisors that was originally considered idiopathic but following thorough history taking the probable etiological factor is thought to be playing the flute.

**Patient and methods:** An 18-year-old woman was referred to our orthodontic practice with congenitally missing upper lateral incisors and irregular dental arches. Radiographic examination revealed severe root resorption of the maxillary central incisors. Both the patient and her mother denied any previous trauma to her teeth. After excluding local and systemic disorders the root resorption was considered idiopathic. Orthodontic treatment commenced. Both central incisors were extracted and immediate implants were placed. The crowns of the removed teeth were used for temporary prosthesis. After completing the orthodontic treatment definitive implant borne crowns were placed. It was the patient's father who reported that his daughter had used to play the flute regularly in childhood and pressed her upper central incisors hard into the instrument. The flute was brought into the practice and was photographed. The impressions of the teeth are clearly visible on the instrument.

**Results:** The patient is satisfied with both the aesthetic and functional result.

**Conclusions:** Although it is well known that excessive occlusal forces can result in external root resorption, to the best of our knowledge, this is the first reported case of severe root resorption that was probably caused by playing the flute in childhood.

**P-2610****THE APPLICATION OF MINIIMPLANTS IN THE PROSTHETIC REHABILITATION OF A PATIENT AFTER PARTIAL RESECTION OF THE MANDIBLE**

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**Introduction:** Tumours of the oral cavity and maxillofacial region are diseases that usually involve the need to perform a comprehensive surgery significantly changing the structure of the preprosthetic conditions. The aforementioned group of patients requires every time a specific

treatment plan. After such an extensive surgery which is a partial resection of the mandible the prosthetic rehabilitation is much more difficult. Dental implants are often the only solution that guarantees the satisfaction of both aesthetic and functional treatment results.

**Aim of the study:** In this paper the prosthetic rehabilitation of a patient, after partial resection of the mandible, with the use of mini implants was presented.

**Materials and methods:** The poster presents the course of treatment of a patient after partial resection of the mandible. The lack of keratinized gingiva and very limited area for prosthetic treatment of edentulous mandible prevented the use of a denture. A small amount of bone was the indication for use of mini implants and further restoration with overdenture prosthesis.

**Results and conclusions:** Mini implants can be used in difficult clinical conditions. The treatment applied was uneventful and the patient accepted the prosthetic restoration. The installation of four implants in the mandible allows stable and predictable restoration of masticatory function.

**P-2611****VERTICAL BONE AUGMENTATION USING DEPROTEINIZED BOVINE BONE BLOCKS IN COMBINATION WITH RECOMBINANT HUMAN PLATELET-DERIVED GROWTH FACTOR-BB AND GUIDED BONE REGENERATION**

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**Background:** Bioactive optimizations of deproteinized bovine bone (DBB) with growth factors as well as with Guided Bone Regeneration (GBR)- techniques are possible options to enhance prognosis of vertical bone augmentation. The aim of the study is to evaluate new bone volume (NBV), new vertical bone height (VBH) and bone implant contact (BIC) after vertical augmentation with DBB in combination with rhPDGF-BB and GBR.

**Materials and methods:** In 12 rabbits, a DBB-block was fixed with a dental implant on the tibia bone. The following groups were included: DBB (1a, 3a), DBB+collagen membrane (1b, 3b), DBB+rhPDGF-BB (2a, 4a) and DBB+rhPDGF-BB (2b, 4b). On the left leg non-membrane augmentations and on the right leg GBR was used. A total of 24 samples were examined after 3 (n=12; group 1 and 2) and 6 (n=12; group 3 and 4) weeks.

**Results:** After 3 weeks, total mean NBV was 20% in group 1a, 16.3% in group 1b, 35.28% in group 2a and 15.4% in group 2b respectively. After six weeks, NBV was 2.47% in group 3a, 28.48% in group 3b, 5.3% in group 4a and 35.54% in group 4b respectively. Both membrane-groups showed a significant higher bone growth than the non-membrane groups. VBH after 3 weeks was 1.1 mm in group 1a, 0.87 mm in group 1b, 0.88 mm in group 2a and 0.7 mm in group 2b. After 3 weeks, VBH was 0.4 mm in group 3a, 2.02 mm in 3b, 0.62 mm in group 4a and 1.87 mm in group 4b. After 3 weeks, in group 1a a mean BIC

of 82.4%, in group 1b of 86.9%, in group 2a of 69.9% and in group 2b of 55.3% was seen. After 6 weeks, the mean BIC was 57% in group 3a, 87.5% in group 3b, 83.2% in group 4a and 72.5% in group 4b.

**Conclusions:** The study indicates that the addition of rhPDGF-BB to DBB-blocks may have a good potential to maintain early bone formation for vertical augmentation. Furthermore, the findings illustrate that after six weeks, GBR with a collagen membrane is the key to maximize the new bone volume and height.

#### P-2612

### REPORT OF ALVEOLAR BONE AUGMENTATION USING ONLAY BONE GRAFT

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A relevant vertical deficit of the alveolar ridge may render the use of dental implants difficult or impossible, due to an insufficient bone volume to support implants of adequate dimensions.

Moreover, vertical resorption of the alveolar ridge determines an increased interarch distance with unfavourable intermaxillary relationship, thus leading to unsatisfying prosthetic results from functional and aesthetic aspects. Onlay bone graft is a technique regarded as efficient in correcting vertical defects of edentulous ridges.

This retrospective study was performed to evaluate the bone quality changes, resorption rate, and outcome with implant rehabilitation after onlay block bone grafting. All 27 patients with 31 partially edentulous jaws who have been received onlay bone graft and 73 implants placement at the Department of Oral and Maxillofacial Surgery, Chonnam National University Dental Hospital were selected for this study. Vertical resorption of the grafted bone, peri-implant bone resorption, and complications were examined during follow-up period. Radiographic study and clinical examination were assessed and the following results were obtained.

1. The mean vertical bone gains were 5.9±2.3 mm (range: 2.5~13.0 mm), conversely the final vertical bone resorption were 1.6±1.8 mm (35.2%) after mean follow-up of 29.6 months.
2. Amount of periimplant bone resorption was 1.5±1.5 mm (0~8.3mm).
3. Complications associated with onlay bone graft were as following: complete resorption of graft (2 cases), paraesthesia on lower lip (1 case), exposure of graft (3 cases), & periimplantitis (2 cases).
4. Though two patients of onlay block bone graft showed complete bone resorption within 3 months of augmentation, total 75 implants were placed on those 31 bone graft sites. The cumulative success and survival rate of implant were 78.1% and 98.6% after 4 years of follow-up period.

#### P-2613

### ALVEOLAR DISTRACTION OSTEOGENESIS VERSUS AUTOGENOUS ONLAY BONE GRAFT FOR DENTAL IMPLANTS : 12-YEARS FOLLOW-UP STUDY

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Rehabilitation of edentulous patients by dental implants

has become a common procedure. Otherwise some local conditions of alveolar ridge, especially vertical bone defects limit appropriate implantation, followed by functional and aesthetic problems. Guided bone regeneration, onlay bone graft, alveolar distraction osteogenesis were proposed to overcome these conditions. Despite many studies reporting favourable results of each procedure, there are few comparative studies with long-term results. The aim of this study is to compare onlay bone graft and alveolar distraction osteogenesis with 12-year follow-up data by evaluation of the followings;

- 1) Peri-implant changes of vertical bone heights
- 2) Success rates and survival rates of implants inserted on grafted or distracted bone

Total 38 patients were treated of vertical bone defects with onlay bone graft or distraction osteogenesis. 24 patients (Group I) were treated by onlay graft, and 82 implants were inserted. 14 patients (Group II) were distracted and 39 implants were inserted. Implantation was undertaken at mean of 4.7 months, and 3.2 months after grafting (or distraction), respectively. Augmented bone was evaluated by measuring peri-implant bone changes at grafting, at implantation, at prosthetic loading, and at annual follow-up. Survival rates and success rates of implants inserted on augmented bone were examined, and special events or complications were recorded for evaluation for comparison of two procedures.

#### P-2614

### APPLICATION OF DENTAL IMPLANTS FOR THE PATIENTS WITH CLEFT LIP AND/OR PALATE

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**Purpose:** We think that an important goal in the treatment of cleft lip and/or palate patients is to normalize the function and anatomy of cleft region. Complete skeletal and dental reconstruction of alveolar cleft is of great importance because of congenital missing of lateral incisor. Most of cleft patients have benefited from alveolar bone grafting and orthodontic realignment and require little or no prosthodontic treatment. In addition, dental implant has been utilized for dental reconstruction for cleft patients. The purpose of this study was to evaluate the results of dental implant placement into the grafted alveoli.

**Material and methods:** 20 patients (9 male and 11 female) were selected. Dental implant treatment and final restoration had been performed at Cleft Lip and Palate Centre, Aichi-Gakuin University Hospital from 2005 to 2011. Eight patients were CLA and twelve were CLP patients. All patients received orthodontic treatment from the mixed dentition period and had removable retainers.

**Results** 13 patients received secondary alveolar bone grafting from ilium during orthodontic treatment. 7 patients had tertiary alveolar bone grafting for the purpose of implant placement. 13 patients needed alveolar augmentation for the purpose of implant placement. 29 implants were inserted. There was no implant loss in these treatments during observation period.

*Discussion:* It is concluded that alveolar bone grafting followed by implant placement is a reliable alternative for prosthetic rehabilitation of cleft patients. This treatment has the potential to overcome functional and psychological inconveniences for CLP patients.

**P-2615**

**CLINICAL APPLICATION OF PIEZOSURGERY TECHNIQUE IN MAXILLO-FACIAL SURGERY**

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*Introduction:* The piezoelectric bone surgery called “piezosurgery” is a new surgical technique that utilizes the ultrasonic frequency microvibration of scalpel. Thanks to its micrometric and selective cut surgical techniques can be performed with precision, security and with maximal intraoperative visibility.

*Object:* We applied piezosurgery device VarioSurg of NSK company for jaws' alveolar processes augmentation with bone blocks application during performance of open sinus lifting technique for lateral window formation and immediate dental implantation.

*Materials and methods*

40 patients had alveolar process augmentation.

*Results:* Bone blocks autotransplantation by piezoelectric device ensure less traumatic and vibration-free dissection performance since there is no vibration of powered tool and pressure force on the tool during osteotomy is minimal. During open sinus lifting procedure by traditional method mucous membrane perforations appear in 30% cases. Application of piezosurgery technique reduced this complications frequency to 7%. Tooth extraction using piezosurgery device VarioSurg minimize intraoperative bone tissue trauma especially during immediate dental implantation.

*Conclusion:* The comparative analysis shows that VarioSurg is easy-to-use, allows surgery in difficult clinical cases minimizing intraoperative trauma while a wide range of handpieces allows its use not only in implantology, but also in reconstructive maxillo-facial surgery.

**P-2616**

**VENEER TECHNIQUE FOR JAWS' ALVEOLAR PROCESSES AUGMENTATION**

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*Introduction:* Considerable alveolar process atrophy compromises intraosseous implantology performance as well as posing serious difficulties during prosthodontic treatment of patients with removable and fixed dentures.

*Object:* To apply veneer technique with autobone block augmentation to patients with the mixed alveolar process atrophy to improve dental implantation.

*Materials and methods:* Twenty patients were treated with bone blocks from the region of mandibular angle and mandibular symphysis. Initial graft sizes exceeded the width of alveolar process crest to compensate for volume

reduction due to so-called “adaptive atrophy”. Rigid fixation of bone blocks was achieved using titanium compressive screws.

*Results:* All the patients' postoperative periods were without complications. All the patients had rigid fixation of bone blocks in recipient zone region. For prevention of excess bone blocks resorption dental implants were installed not later than four months after transplantation.

*Conclusion:* Performance of autobone block augmentation restored the optimal structure of alveolar processes and surrounding soft tissue and formed favourable conditions for dental implants placement in the optimal position.

**P-2617**

**SURGICAL TREATMENT OF PATIENTS WITH DEFECTS OF THE ALVEOLAR BONE OF JAWS USING SUBMUCOSAL ENDOEXPANDERS**

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*Objective:* the aim of this study was to enhance the effectiveness of surgical treatment of patients with jaw soft and bone tissue defects using submucosal endoexpanders.

*Materials and Methods:* in 2011, 17 patients with jaw defects of various origin, localization and severity underwent reconstructive surgical treatment. There were 21 submucosal endoexpanders placed using the tunnel method under the mucosa of the oral vestibule as the first stage prior to bone plasty. During expansion an ultrasonic Doppler scan was made over the endoexpander in order to reveal the changes in the microvascular net. Also an intravital biomicroscopic research with a Leica 2 microscope was made. This allowed us to visualize the morphologic changes in the expanded oral mucosa on microscopic level. All patients with jaw defects underwent bone plasty with an autograft from the mandibular ramus or the symphyseal area with the use of a Martin ultrasonic resorbable plates and pins system. In case of soft tissue insufficiency we used expanded mucosa gained using balloon tissue expansion for autograft coverage. The flap was formed over the endoexpander with a nutritive base attached and was rotated or moved using the sliding method and sutured to the surrounding mucosa to cover the postoperative area.

*Results:* all data was correlated and compared. Using expansion of the oral vestibule mucosa as a first stage prior to bone plasty allows creation of the needed volume of soft tissue. It makes the local tissue plasty possible without flap tension and the need of vast skeletization. In 16 patients there were successful results with an excellent microvascular net and mucosa expansion allows us for full-rate soft tissue healing of the bone plasty site in the jaw by first intention. The richly vascularized expanded mucosa in these patients was morphologically homogeneous to the surrounding soft tissue of the recipient site and was functionally valid. Only in 1 patient there was necrosis of the flap.

*Conclusions:* therefore, the use of oral mucosa expansion makes the complex treatment of patients with jaw defects undergoing bone plasty more effective and allows for a

predictable functional and aesthetic outcome of surgery.

**P-2618**

**ORTHOGNATHIC, MICROVASCULAR AND IMPLANT-PROSTHETIC THERAPY OF UNTREATED CLEFT LIP AND PALATE IN ADULT PERSON**

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This paper presents a case report of an untreated cleft lip and a palate in the adult patient. Multidisciplinary team composed of maxillofacial surgeons, prosthetic and orthodontic specialist was involved in the planning and treatment.

The 44 year old woman came to maxillofacial surgery office due to difficulties with feeding, swallowing, speech and appearance which worsened after the loss of teeth. Diagnostic procedure determined a cleft of the primary and secondary palate with severe bone deficiency in the alveolar ridge, a cleft lip badly treated in the childhood, oronasal fistulas, deformity of the nasal pyramid, unilateral choanal atresia and severe skeletal malocclusion.

In the first surgery the narrow cleft maxilla required surgical expansion and the Le Fort I osteotomy with advancement and repositioning of the maxilla was done with prior orthodontic planning. The gaps of resected maxilla were filled with bone chips of corticocancellous iliac crest grafts. Microsurgical reconstruction of the alveolar ridge bone defect with the composite radial forearm free flap was done, together with closure of the oronasal fistula.

Six months after the maxillary continuity was maintained, the grafts were stable and the oronasal fistula was closed, so in the second surgery the osteosynthetic material was removed and the osseointegrated implants were inserted in the upper jaw. The last, third surgery was done 3 months after the implant placement. The rhinoplasty was done and the sulcus formers were placed.

Finally the good prosthetic rehabilitation with satisfying speech, good mastication and cosmetic appearance was achieved.

**P-2619**

**IMMEDIATE FUNCTION AND GRAFTLESS SOLUTION FOR COMPLETE LOSS OF ALVEOLAR RIDGE ON THE TWO JAWS WITH AN INDIVIDUALISABLE NEW IMPLANT TYPE AND THE NEW IMPLANT MATERIAL PEEK : A CASE DESCRIPTION**

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In edentulous maxilla and mandible, when alveolar atrophy makes normal implant procedures impossible on the grounds of lack of bone substance, commonly there is call for bone grafting which is poorly tolerated when all the disadvantages of the procedures are explained and understood.

The purpose of this study was to evaluate the feasibility of a protocol for immediate function of a standard basal implant in the material PEEK (poly-ether-ether-ketone) supporting a fixed PEEK - prosthesis. PEEK is an isoelastic to bone thermoplastic with sufficient physical properties to replace titanium in the jaws which makes comfortable-to-wear light and small structures in maxillo-facial surgery.

ble-to-wear light and small structures in maxillo-facial surgery.

This clinical study of one case concerns the surgical and prosthetic procedures with 7 basal PEEK implant and 5 crestal. Within 2 days we integrated new long time provisional bridges made in injected PEEK on the PEEK implant posts.

The male patient treated with immediate loading of PEEK-implants was followed for 12 months. The patient reported bearable to negligible post-operative pain and a slight swelling of his mid-face and lower -face after the first post-operation day. He reported stability during speech and mastication. The implant solution is in good function after 12 months. The patients' missing time at his work place was 2 days.

The patient could have been candidate for both -side sinus lifting and left-side lateral bone augmentation procedure prior to receive fixed prostheses for his upper and lower jaws – an operation procedure that means 8 days of incapacity to work at least. With our concept, the new PEEK material and the new crestal and basal PERSO- implant design this patient benefited from a less invasive procedure (one surgical procedure and no grafting), the best exploitation of the individual anatomical situation, the incorporation of osteoconductive material PEEK and immediate extremely light and small rehabilitation (prosthesis incorporated directly after surgery).

Survival of all implants after 12 months, increase in patient's immediate functional ability and reduction of morbidity following the one stage surgical procedure render this procedure a viable and feasible treatment option for the partially edentulous maxilla.

**Keywords:** atrophied maxilla, immediate loading, PEEK implants

**P-2620**

**DENTAL IMPLANTS SUCCESSFULLY PLACED ON A FIBULA FLAP IN A PATIENT WITH OSTEORADIONECROSIS (ORN) OF THE JAWS**

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**Introduction & Aims:** To report the clinical case of a patient diagnosed of ORN after complimentary treatment with radiotherapy (RT) and to show survival rate of dental implants inserted in a vascularized fibula bone flap and to carry out a literature review.

**Material & method:** A 48 year-old patient was initially treated for a squamous cell carcinoma of the floor of the mouth with bony involvement in the mandibular symphysis. A conservative bilateral neck node dissection was made with a segmental mandibular osteotomy from teeth 35 to 45. Immediate reconstruction was carried out with an osteocutaneous free flap from the left fibula. Three months later the treatment was completed with RT to a dose of 65 Gys. Follow-up was uneventful until 12 months after RT, when patient started with infectious processes on the symphysis, with fistulae and necrotic fragments. He was diagnosed with ORN on the lower jaw and on the previous fibula flap. After several surgeries for retrieval of some fragments of bone, patient underwent the first cycle of

hyperbaric oxygen camera (HBO), which improved his symptoms. After another 16 months without symptoms, he recurred again, and then a second cycle was applied, that definitely stabilized the process and further radiographic and CT test showed an improvement.

**Results:** Fourteen months later we decided to rehabilitate with osseointegrated titanium dental implants with external hexagonal connection (RP) and RBM (resorbable blasting media) surface (Mozo Grau, SL, Valladolid, España), inserting them with a transmucosal technique and abundant irrigation with complete drilling protocol to avoid an overheat of the bone; 4 implants of 4,25 x 11,5 mm length on the symphysis in the fibular flap were placed. After waiting 8 months for osseointegration a second surgery was performed to expose the implants and insert the healing screws, and an adequate stability was checked; 30 days later, a removable dental prosthesis over a bar was made and it offered an acceptable functional and aesthetic result to the patient. After 14 months, the patient remains disease-free and with good oral health.

**Discussion:** To date, no similar cases have been reported in the indexed medical literature. Implants remain still integrated and loaded to retain the dental prosthesis.

**Conclusions:** Fibula vascularized free flap may support a dental rehabilitation with osseointegrated dental implants, even in a case of a ORN successfully treated.

#### P-2621

### AN ANALYSIS OF THE INTERFACE DENTAL IMPLANT-BONE IN A VASCULARIZED ILIAC CREST GRAFT FOR MANDIBULAR RECONSTRUCTION.

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**Introduction:** Osseointegrated implants are an adequate option for dental rehabilitation in oncologic patients, although their osseointegration to vascularized grafts has not been still analyzed.

**Aims:** To study the existing interface between osseointegrated dental implants and the bone of a vascularized iliac crest free graft in an oncologic patients previously radiated, as well as to carry out a literature review.

**Material & method:** A 52 year-old patient was initially treated of a well-differentiated squamous cell carcinoma of the floor of the mouth with bony involvement of the horizontal ramus of the mandible. A homolateral functional neck node dissection was made along with a segmental osteotomy of the inferior jaw from teeth 41 to 46. An immediate reconstruction was achieved using an osseomyocutaneous iliac crest free graft from the right side, anastomosed to the cervical vessel using a microvascular technique. Eight months later, 5 dental implants were placed in the vascularized flap, with these sizes: 3,75 x 15 (1) x 18 (2) y x 20 mm (2), with external hexagonal connection (RP) and RBM (resorbable blasting media) surface (Mozo Grau, SL, Valladolid, Spain). The patient underwent rehabilitation with a fixed dental prosthesis after 8 months waiting for osseointegration. No implants were

lost. After carrying this prosthesis for 8 years, a local recurrence of the tumour was discovered. Therefore, a resective surgery with partial ostectomy sparing the basilar bone of the previous crest, was done. Sample included 2 dental implants and bone in one single piece.

**Results:** A histomorphometric analysis of the surgical specimen was carried out analyzing the interface between bone and dental implant with toluidine blue and Masson trichromic stains to different magnifications with previous inclusion in methacrylate polymer. An adequate osseointegration with presence of mature bone throughout all the length of the implant, with osteons and areas of thick and short bony trabeculae, was checked. Valleys of turns on the implant surface were completely full of mature, compact bone with very dense and parallel bony slices with presence of some osteons. Also, dark areas of remodelling are observed, that showed a recent osteoblastic activity.

**Conclusions:** In the indexed literature we have not found any reference to this topic. Dental implants are a valid option for the oral rehabilitation of oncologic patients reconstructed with bone vascularized flaps with microsurgical techniques, with an osseointegration index in the interface bone-implant similar to those in native bone.

#### P-2622

### MORPHOLOGICAL CHANGES OF OSTEOINTEGRATION WITH ACUPUNCTURE. AN EXPERIMENTAL CASE

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The aim was to compare the morphological changes of osteointegration in the dental implant bone system in dynamics with different experimental treatment methods. Objects and methods. The study was performed on 69 chinchilla rabbits of the same age and body weight. The experiment was carried out in accordance with requirements governing operations on experimental animals. Experimental animals were divided into two series. Series I (21 animals) had no additional treatment and was the series of control. Series II (the main) consisted of 48 animals treated with acupuncture during 10 days. Sampling of materials for pathological examination was performed at 3, 7, 14, 21 days, 1, 2, 6 months.

**Results** showed that maturation of cell-fibrous structures of connective layer between the implant and the mother bone was quicker in the second series than in the control series during all terms. The manifestation of necrosis on the edge of the mother bone was less in the main series. Its edges were more even and less jagged appearance. Resorptive changes were found in early terms and were insignificant by the end of the 1st month of observation. A more intensive development of bone formation processes in implantation region was discovered in the main series. Along the edges of the implantation area the fine and coarse-grain structures were formed more actively and in earlier terms from the new-formed osteoid substance. The processes of secondary reconstruction of the newly formed bone substance in the series 2 started in earlier term and were already evident in the osteoid matrix formation stage

resulting in the formation of a young small-loop bone among the fields of undifferentiated bone matrix.

**Conclusion.** Postoperative acupuncture treatment after dental implantation creates more favorable conditions for osteointegration processes in the dental implant bone system.

#### P-2623

### EXTRAORAL IMPLANTS FOR OCULAR EPITHESES, FOR THE REHABILITATION OF A PATIENT WITH ORBITAL MUTILATION RESULTING FROM NECROTIZING FASCIITIS

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Necrotizing fasciitis (NF) is a rare life threatening infection progressing along the superficial and deep fascias of the skin. Treatment consists first in aggressive surgical tissue debridement in order to eliminate completely all the necrotic tissues.

A 58-years old diabetic woman was referred to our department, for left eye pain with loss of light perception and ophthalmoplegia. The diagnosis of NF of dental origin was made. The patient was directly transferred to the operating room and a total exenteration of the orbit was performed guided by extemporaneous tissue biopsies followed by a subcutaneous debridement, and a homolateral maxillary teeth removal.

6 months later, three extraoral fixtures were inserted, two in the superior orbital rim and one in the inferior one, under general anaesthesia.

5 months after insertion, the fixtures were denuded under local anaesthesia, and prosthetic abutments were placed. Prosthetic steps were realized, and the patient was rehabilitated by a removable orbital prosthesis, fixed by three magnetic devices on the implants.

Surgical reconstruction following an orbital mutilation remains a challenge, due to the necessity to recreate the complex three-dimensional ocular form. Extraoral cranio-facial fixtures, with an average success of 95% in non irradiated patients have made it possible for the orbital epithesis to be considered as a forerunner in the strategies of cosmetic rehabilitation.

Satisfaction of the patient was achieved with this technique.

#### P-2624

### REHABILITATION OF THE ATROPHIC EDENTULOUS MAXILLA BY MEANS OF FOUR EXTRAMAXILLAR ZYGOMATIC FIXTURES, BILATERAL SINUS LIFT AND APPositionAL ALLOGRAFT AND PLATELET RICH FIBRIN (PRF)

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Zygomatic fixtures represent an alternative to bone grafts of the maxilla in case of extreme atrophy. Following initial

Bränemark technique, main complications of zygomatic implants were related to the occurrence of maxillary sinusitis. Following the more recent extramaxillar technique, penetration in the maxillary sinus is reduced.

Through the presentation of a case, we describe a technique of sinus lift simultaneous to the placement of four zygomatic fixtures, by means of piezosurgery, platelet-derived factors (PRF) in combination with an allograft (DFDBA).

Five months later, at the time of the second stage, immediate loading of the four zygomatic fixtures is realized.

Radiological postoperative evaluation shows that with this technique, the two posterior zygomatic fixtures are surrounded by bone in their upper transsinus part, and that the bone gained by this technique has a good density and quality.

The case presented here illustrates that four extramaxillary zygomatic fixtures completed by a bilateral sinus lift (piezosurgery, DFDBA and PRF) performed at the time of zygomatic fixtures placement allows the upper part of the more posterior zygomatic implant being surrounded by bone, thus decreasing the risk of maxillary sinusitis.

#### P-2625

### DEVELOPMENT OF A NEW BLOOD TEST BASED ON THE HELPER LYMPHOCYTES TH-17 RESPONSE FOR THE DIAGNOSIS OF ALLERGIES TO TITANIUM AND OTHER DENTAL METALS

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There is an increase in the prevalence of oral allergies to metals used in dental materials, but oral allergies remain under diagnosed by dental health professionals. Most often, dental metals may cause a type IV (contact) allergy, but sometimes a type I or III. Recently, titanium, considered as an inert material has been shown to be able to elicit allergic type reactions. The diagnosis of a contact/type IV allergy is typically based on the patient medical's record, clinical findings, and on the results of epicutaneous tests which lack sensitivity.

Interleukine-17 and Interleukine-22 are produced by a subset of recently defined lineage of T cells, named Th-17, implied in allergic reactions. The aim of this work is to look if measurement of the production of IL-17 and/or IL-22 by lymphocytes may represent a tool to diagnose with certainty, a sensitization or an allergy to a metal.

In eight allergic and non allergic subjects, a TTL and the dosage of Th1-specific cytokine response (IFN-gamma), as well as Th17 response (IL-17 and IL-22) in peripheral mononuclear blood cells cultures is realized, by ELISA or LUMINEX, in response to a stimulation with nickel or titanium. Cultures are performed with or without IL-7 and/or IL-23.

Preliminary results show that production of IL-17 and IL-22 is increased in response to the metal tested, in patient sensitized or allergic to the metal. These results are confronted with clinical datas and patch-tests results.

## 27. RECONSTRUCTIVE SURGERY OF CRANIOFACIAL MALFORMATIONS

### P-2701

#### IMPROVED ACCURACY OF FRONTO-ORBITAL ADVANCEMENT FOR METOPIC SYNOSTOSIS USING PREOPERATIVE PLANNING

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**Background:** Metopic synostosis results in trigonocephaly with bitemporal narrowing. Treatment involves differential fronto-orbital advancement, widening of the bitemporal region, and rounding the forehead. The purpose of this paper is to implement 3-D surgical planning to treat metopic synostosis, including use of intraoperative templates, and to test the accuracy of the results.

**Methods:** This is a prospectively analyzed series of retrospective patients with metopic synostosis. Consecutive cases treated by the senior authors (MLD and DMS) involving a simulated computer-aided planning session were reviewed. Demographic data was tabulated and 3-D quantitative data reviewed. Measurements obtained included, bifrontal angle, temporal advancement, and bitemporal distance and widening. Preoperative, simulated, and actual results were compared and analyzed using the t-test.

**Results:** 5 infants with metopic synostosis treated by this method were included (3 boys: 2 girls). The endocranial bifrontal angle changed from 111.25 preoperatively to 148.58 postoperatively ( $p=0.0001$ ), and simulated 145.61 (compared to actual 148.58) ( $p=0.5099$ ). The bitemporal distance preoperative averaged 73.72, compared to actual of 89.78 ( $p=0.019$ ), and was simulated to 89.28 (versus actual 89.78) ( $p=0.8815$ ).

**Conclusion:** The results show that simulated surgical planning can accurately and reproducibly be translated to actual surgical outcome during fronto-orbital advancement for trigonocephaly. The treatment goals for metopic synostosis are conserved and effectively achieved, including lateral orbital advancement, widening of the endocranial bifrontal angle, bitemporal expansion, and rounding of the forehead.

### P-2702

#### SIMULTANEOUS CORRECTION OF HUGE BASAL ENCEPHALOCELE WITH HYPERTELORISM AND MEDIAN CLEFT OF NOSE, UPPER LIP AND MAXILLA. CASE REPORT.

Alexandre Ivanov<sup>1,\*</sup>, Leonid Satanin<sup>2</sup>, Alexandre Sakharov<sup>2</sup>, Natalia Lemeneva<sup>2</sup>, Konstantin Popugaev<sup>2</sup>, Alexandre Kulikov<sup>2</sup>

<sup>1</sup>Central Research Institute of Stomatology and Maxillofacial Surgery, <sup>2</sup>Neurosurgery Institute named after N.N. Burdenko

The treatment of patients with complete midfacial clefts combined with basal encephalocele can be a challenge. In such cases there is a need of simultaneous correction of

neurosurgical and cranio-facial disorders. This is a case report of successful treatment of such patient.

A 1 year old boy with severe craniofacial malformation, complete median cleft of the face, orbital hypertelorism 3rd degree, basal encephalocele, multiple combined congenital malformations was presented to Burdenko Neurosurgery Institute. The standard clinical assessment protocol was applied. CT and MRI scans were performed. The huge naso-ethmoidal encephalocele was revealed penetrating up to the mouth cavity. The stereolithography biomodelling and computer planning were performed to simulate surgery.

The surgical procedure started with tracheostomy. Then using a coronal approach the bifrontal craniotomy was performed with subsequent separation and resection of encephalocele and dura defect closure. The orbito-maxillary osteomy was performed on both sides (similar for bipartition procedure) and mobilized bones brought and fixed together. Two pieces of maxilla were fixed to each other on the midline. The nose plasty was done. The soft tissue cleft of the nose and upper lip was closed. Cantopexy and bony defect closure using split calvarian bone.

The were no complications noted during postoperative period. The patient was decannulated on 5th day after surgery. On 12th day the patient was discharged. The cleft palate closure is planned in near future.

The surgical technique and treatment result are presented.

### P-2703

#### BILATERAL CORONAL AND PARTIAL SAGITTAL SYNOSTOSIS IN X-LINKED HYPOPHOSPHATEMIC RICKETS: SUBTOTAL CRANIAL VAULT REMODELLING WITH FRONTO-ORBITAL ADVANCEMENT AND RIGHT-ANGLED Z-OSTEOTOMIES

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Craniosynostosis can be gene-linked, or caused by metabolic diseases, such as rickets, which results from a deficiency or impaired metabolism of vitamin D, magnesium, phosphorus or calcium leading to hypomineralization of the bone. X-linked dominant hypophosphatemic rickets (XLHR) is the most prevalent genetic type of hypophosphatemic rickets and is caused by germ line mutations in the PHEX-gene. In XLHR, only few case reports of craniosynostosis were described.

Here, we present a clinical report of an 18 months old child with XLHR and a bilateral coronal and sagittal synostosis who was treated by subtotal cranial vault remodelling with fronto-orbital advancement and right-angled Z-osteotomies. As a consequence of the child's diminished bone regeneration capacity, surgery that is performed after the age of 1 year requires more extensive craniectomy, multiple osteotomies and rigid fixation for calvarial vault remodelling to prevent extensive bone defects.

**P-2704****CRANIAL VAULT REMODELLING IN MICROCEPHALIC OSTEODYSPLASTIC PRIMORDIAL DWARFISM TYPE II (MOPD II) AND CRANIOSYNOSTOSIS: SURGICAL OUTCOME IN THE LONG TERM FOLLOW UP**

Michael Engel<sup>1,\*</sup>, Gregor Castrillón-Oberndorfer<sup>1</sup>, Jürgen Hoffmann<sup>1</sup>, Christian Freudelsperger<sup>1</sup>, Oliver Christian Thiele<sup>1</sup>, Marcus Egermann<sup>2</sup>

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This is a report of the long term result after various surgical treatments of in a child with MOPD II and craniosynostosis. We describe a 17 year old patient with microcephalic osteodysplastic primordial dwarfism type II (MOPD II) but some unusual clinical signs including bilateral knee dislocation, a misplaced upper lobe bronchus and hypoplasia of the anterior corpus callosum. Due to premature fusion of several cranial sutures, the child developed signs of increased intracranial pressure with somnolence and papilloedema. Cranial vault remodelling with fronto-orbital advancement was performed twice at the age of 16 and 21 months to open the abnormally closed suture, increase the intracranial volume and relieve the elevated intracranial pressure. Following this procedure, the child's neurological situation recovered significantly. Surgical procedure of fronto-orbital advancement and the performed re-operation in our patient were safe with no major complication intra and postoperatively with good functionally and a satisfied aesthetic outcome in the long term follow up, voted by the patient, his parents and the surgeons.

**P-2705****CRANIOFACIAL TERATOMAS: 'THE GREAT ORMOND STREET EXPERIENCE'**

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<sup>1</sup>Great Ormond Street Hospital

**Introduction** Teratomas are tumours composed of all three embryonic germinal layers and present almost exclusively in neonates. Whilst mostly benign, the anatomical position and aggressive expansion of teratomas can make them particularly difficult to manage in the craniofacial region, and yet their relative resistance to chemotherapeutic agents means that surgery may be the primary modality of treatment.

**Materials/ Methods** We present a retrospective case series review of seven patients with craniofacial teratoma seen at the Craniofacial centre at Great Ormond Street hospital. The differing pathologies and success rates of surgical resection and reconstruction are assessed.

**Results/ Conclusions** Surgical resection of craniofacial teratomas and their functional and aesthetic reconstruction can be particularly demanding because of the difficult anatomical location of craniofacial teratomas. Experience of the management of such tumours and the difficulty in undertaking such resection in the very young child warrants highly specialised multidisciplinary care. This should be led by the paediatric oncologist, include regular imaging review by a specialist radiologist and the input of a

dedicated specialist surgical team including craniofacial and paediatric head and neck skull base surgeons.

**P-2706****THE BASAL NEUROSURGERY APPROACH AND COMBINED TRANSCRANIAL AND TRANSNASAL ENDOSCOPIC APPROACHES IN SURGICAL TREATMENT OF ANTERIOR AND BASAL ENCEPHALOCELE IN CHILDREN.**

Leonid Satanin<sup>1,\*</sup>, Dmitry Kapitanov<sup>1</sup>, Vitaly Roginsky<sup>2</sup>, Alexander Sakharov<sup>1</sup>, Alexander Ivanov<sup>2</sup>, Natalia Lemeneva<sup>1</sup>

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**Objectives:** Anterior and basal encephaloceles are very rare and most commonly present with a mass at the glabella or at the root of the nose, orbital hypertelorism, CSF rhinorrhea, recurrent episodes of meningitis or sometimes as a nasal mass. Nasal discharge along with a mass in the nasal cavity is sometimes misdiagnosed as nasal polyp. Biopsy or polypectomy may cause CSF leakage or intracranial hematoma. The computed tomography and magnetic resonance imaging may help in diagnosing this condition and designing of treatment.

**Material and Method:** We report 39 cases of anterior and basal encephaloceles operated by the different approaches. 20 were male and 19 were female; ages ranged from 2 month to 8 years (mean 18 months). Twenty-nine patients had anterior, 10 basal encephaloceles. All of them had been diagnosed with fronto-ethmoidal and basal encephaloceles with CT, MRI and nasal endoscopy.

**Results:** The goal of surgery is the resection of the encephalocele at early stage, through a transcranial or combined transcranial and transnasal endoscopic approaches, and achieving closure of the defect in the dura and bone. Bifrontal craniotomy was performed. Transcranial basal approaches included direct visualization of the bone defect and the potential to use a large vascularized pericranial flap. Then encephalocele was resected and skull base reconstruction was performed. After that the patient was treated via endoscopic endonasal approach. All patients were discharged home within two weeks. Follow up ranged from 3 months to 12 years. No postoperative complications were observed.

**Summary:** Basal neurosurgery approach in the treatment of anterior encephaloceles and combined transcranial-transnasal endoscopic approach in treatment of transtethmoidal encephalocele is the best in children with this pathology, because during one hospitalization can treat the child, and assure minimal stay in hospital.

**P-2707****MANAGEMENT OF ENCEPHALOCELE IN WEST AFRICA ON BOARD THE MERCY SHIPS**

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**Introduction:** Encephaloceles are rare neural tube defects



and is classified by the contents and location of the herniation of cranial content through openings in the skull. The aim of reparative surgery is to remove the protrusion and non-functional extracranial cerebral tissue with water-tight dural seal in order to avoid meningitis and mortality. We report a retrospective survey of encephalocele in West Africa managed on board the Mercy Ships.

**Methods and Materials:** The complete records of 27 consecutive patients who underwent reparative surgery over a 15-year period were used to analyse the details of the procedure, perioperative care and outcome.

**Results:** The most common encephalocele was frontoethmoidal (74%) followed by the occipital type (26%). The average age was 2.5 years (1 month to 13 years) with male to female ratio of 4:5. CT scan was performed to detect the bony defect and associated brain anomalies. 15 had cranial bone repair and 2 had rib graft for frontoethmoidal encephalocele. No bone repair was necessary for occipital encephalocele. 14 had correction of hypertelorism and orbital osteotomies. 11 had postoperative CSF leak and required spinal tap (9) and ventriculoperitoneal shunt (2).

**Conclusions.** Our experience in West Africa demonstrates that operative management of encephaloceles not only achieve good cosmetic outcome, but also remove the risks of meningitis from trauma to the herniation.

#### P-2708

### HEMIFACIAL MICROSOMIA WITH HERNIATION OF INTRACRANIAL MATTER TO THE NASOPHARYNX – A CASE REPORT OF AN INCIDENTAL FINDING

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Hemifacial Microsomia is the second most common facial birth defect, causing abnormalities of the facial the lower half due to development defects of the first and second branchial arches.

We present a case of a 20yr. female with Goldenhar syndrome with multiple malformations including ear, dysmorphic zygoma, orbit, temporal bone and a Pruzansky IIB mandibular deformity, that was proposed for bimaxillary surgery. During surgery, ectopic brilliant grey tissue was found after LeFort I downfracture procedure, which was sent for histologic examination, revealing nasal glial heterotopia. CT showed sphenoidal bone defect (sella) with herniation of intracranial matter to the nasopharynx, compatible with meningoencephalocele. Patient follow-up revealed no neurologic sequelae or CSF leak post-op.

This case presents an uncommon presentation, revealing the importance of careful examination and care of craniofacial syndromes to avoid serious long-term consequences and adverse outcomes.

#### P-2709

### LEHMAN SYNDROME – A CASE OF MICROGNATHIA

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**Objective:** Lehman syndrome is characterised by facial dysmorphism, multiple lateral meningoceles and skeletal abnormalities<sup>1</sup>. The main objective of this work is to report a case of child, with Lehman Syndrome, submitted to bilateral mandibular distraction with external nonresorbable devices for correction of micrognathia and obstructive sleep apnoea.

**Methods:** P.M.C.R., masculine, 2 years-old, presented at the Department of Plastic and Reconstructive Surgery of Hospital S.João, Porto, Portugal, with micrognathia and hypertelorism, associated with severe obstructive sleep apnoea. He was submitted to bilateral mandibular distraction with external nonresorbable devices with 3 years-old. Lately Lehman syndrome was diagnosed.

**Results:** An optimal lengthening of the mandible, an improvement of respiratory pattern and quality of life was achieved. At 6 years-old he presents roundly tapered palate with anterior open bite.

**Conclusion:** Distraction osteogenesis has become a safe, less-invasive procedure with a negligible risk of infection making it effective as first choice in treatment of patients with Lehman Syndrome presenting with micrognathia and life threatening airway obstruction.

#### P-2710

### CRANIOFACIAL ASYMMETRY IN CONGENITAL MUSCULAR TORTICOLLIS AFTER COMPLETE TIGHT FIBROUS BAND RELEASE AND RESECTION OF STERNOCLEIDOMASTOID MUSCLE

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Numerous reports have shown that neck motion, head tilt, and craniofacial asymmetry is improved in congenital muscular torticollis(CMT) after operation. However, most of studies did not show the association between surgical timing and craniofacial asymmetry appropriately. This study analyzed association between functional and craniofacial asymmetry and age.

The study reviewed 123 CMT patients who underwent complete tight fibrous band release/resection of SCM muscle (Table 1.). Cranial-vault-asymmetry index, inter-commissural angle, head tilt was measured from standardized photographs. Rotational and flexional deficit of neck were measured by physical examination. Measurements were analyzed according to age.

There was a positive correlation( $r=0.334$ ,  $P=0.000$ ) between preoperative inter-commissural angle and age(Fig 2.). Preoperative head tilt( $r=-0.178$ ,  $P=0.049$ ) and rotational deficit( $r=-0.229$ ,  $P=0.032$ ) decrease proportionally

to age. Preoperative CVAI and flexional deficit were not correlated to age. After operation, rotational and flexional deficit, and head tilt were improved significantly. Cranial( $\Delta$  1.21%,  $\Delta$  1.42%) and facial asymmetry( $\Delta$  0.62 degree,  $\Delta$  0.65 degree) were improved significantly in Age Group 1 and 2(P

Functional problem was resolved after surgical release regardless of age.

This study demonstrates cranial asymmetry is determined before 1-year, and facial asymmetry is progressive but improved significantly when the operation is done before 3-years.

## 28. RHINOPLASTY

### P-2801

#### SECONDARY RHINOPLASTY USING THE TURKISH DELIGHT TECHNIQUE – A CASE REPORT

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**Introduction:** Rhinoplasty is a demanding task in facial aesthetic surgery, especially when augmentation of the nasal contour is required. Although widely used, autologous cartilage grafts are challenging, and present potential complications as later visibility, distortion, and absorption. Contour and alignment of the graft are difficult goals, particularly in long term. We present a case of a successfully nasal dorsum augmentation in a secondary rhinoplasty with the Turkish Delight technique.

**Case report:** A 33 years old female, with history of complete unilateral cleft nasal deformity on the right side, and severe nasal deformity, previously submitted to: 1) tip rhinoplasty; 2) Le Fort I; 3) rhinoplasty with rib graft; 4) auricular cartilage grafting for columella correction; and 5) turbinate reduction, was referred to our Centre, as she was unsatisfied with the cosmetic result. As she presented a visible cartilage graft, previously performed, and a thin skin nose, it was decided to perform a Surgicel®-wrapped diced cartilage graft, the Turkish Delight technique, for augmentation and contouring of the dorsum.

The autograft was effective in increasing of the nasal dorsum although there was observed about 30% of graft absorption in 4 years. There was no evidence of extrusion of the cartilage graft. The patient is satisfied with the aesthetic result of the procedure.

**Conclusion:** The technique is effective in the reconstruction of complex dimorphism of the nasal dorsum, particularly in secondary rhinoplasty, allowing an appropriate contour and augmentation.

### P-2802

#### AESTHETIC SEPTORHINOPLASTY: CORRECTIVE SURGERY IN AESTHETIC RHINOPLASTY

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In the past, rhinoplasty surgeries were categorized as corrective, reconstructive, and aesthetic rhinoplasty for convenience purposes. In many cases, surgeons could not distinguish the exact boundaries between corrective and aesthetic rhinoplasty. It means that, nasal correction using septorhinoplasty is not always included in “corrective rhinoplasty”, which is a broad and vague category.

As correction of the deviated nose is the main concern of patients, surgeons may attempt various daring procedures, such as osteotomy, septoplasty, and turbinoplasty. Majority of patients wishing for rhinoplasty with aesthetic purposes, however have deviated nose accompanied by facial asymmetry. The deviation is recognized by some but is unrecognized by most patients. In the latter instance, only minor aesthetic improvements are required causing confusion to the surgeon in planning of the surgical procedures. Consideration has to be made on whether to focus only on the correction of the deviation or to focus equally on aggressive correction and aesthetic improvements. If the chief complaints of the patients are simply cosmetic, the preferred approaches to the nasal deviations are simple procedures such as camouflage utilizing implants or cartilages. However, in severe cases such as high septal deviation, complete correction is required for the achievement of the function and aesthetic purposes. In recent generalization of complex procedures such as septal approaches, osteotomy and turbinate interventions for aesthetic improvements, it is judged that application of more daring procedures are required for functional improvements even in surgeries with aesthetic purposes.

In this presentation, we will mention about the problems and concerns on appearances and function that rhinoplasty surgeons can encounter in approaching a deviated nose from an aesthetic perspective.

### P-2803

#### EXPANSION PROCEDURES OF THE NASAL ENVELOPE IN SHORT NOSE DEFORMITY

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Cartilage extension and nasal envelope expansion play a main role in correcting a short or contracted nose. Despite numerous studies for cartilage expansion, there have been no reports of nasal skin elongation methods. We hereby report a new method for expansion of the nasal envelope with a comprehensive understanding of anatomical structures. From April 2010 to September 2011, 6 patients underwent operations to correct short or contracted nose. Two separating procedures were included for nasal envelope elongation; division of muscle (Procerus, Transverse nasalis, Levator labii superior alaque nasi: PTL muscles) confluence located at nasal hinge and release of transverse nasalis sling. To estimate the degree of nasal envelope extension, forced skin traction test was performed. Comprehensive research with a fresh cadaver was held to study the relationship between nasal SMAS and surrounding structures. Average 3.8 mm elongation was documented by forced skin traction test after the procedure. In the fresh cadaver study, transverse nasalis sling and PTL muscle confluence were firmly attached to the supportive framework. From our clinical experience and cadaver study, we discovered that release of transverse nasalis sling and division of PTL muscle confluence were the main factors for nasal envelope expansion in short or contracted nose.

## 29. SALIVARY GLANDS - SURGERY AND PATHOLOGY

### P-2901

#### SEROLOGICAL MONITORING WITH CEA LEVELS OF MUCOEPIDERMOID CARCINOMA: CASE REPORT AND CONTROVERSY

Mireia Melero Luque<sup>1,\*</sup>, Carlos David Arranz Obispo<sup>1</sup>, Arnaud Morla<sup>1</sup>, Antonio Mari Roig<sup>1</sup>, Inmaculada Juarez Escalona<sup>1</sup>, Gonzalo Gomez San gil<sup>1</sup>, Silvia Cusco Alborns<sup>1</sup>, Antonio Monner Dieguez<sup>1</sup>

<sup>1</sup>Hospital Universitario de Bellvitge

**Introduction:** We report a case of mucoepidermoid carcinoma with elevated serological levels of carcinoembryonic antigen (CEA).

**Methods:** Clinical case report and review of the literature.

**Results and conclusions:** 86 years female patient controlled since 2000 by the General Surgery Service of our centre after excision of right colonic adenocarcinoma. She was referred to our department in January 2009 for upper lip tumour with 4 years of evolution. The analytical CEA values were progressive increasing during the last 4 years with negative colonoscopies. An incisional biopsy was performed and contrasted cervical computed tomography both diagnosed this as a malignant minor salivary gland tumour with bilateral lymph node involvement. Tumour resection and bilateral neck dissection was performed. Final pathology showed a T1N2c high-grade mucoepidermoid carcinoma. 4 weeks later the CEA values were normalized.

In January 2011 CEA control increased again without signs of local recurrence. PET was performed confirming cervical regional disease progression and mediastinal and abdominal metastasis from the mucoepidermoid carcinoma. Currently the patient is being monitored by the Palliative Care Unit.

In the literature there was just one case of pulmonary mucoepidermoid carcinoma with elevated serological levels of CEA and normalization after excision. The expression by glandular tumours of serological markers such as CEA may give us the possibility of long term clinical control by this type of markers.

### P-2902

#### NON-SEBACEOUS LYMPHADENOMA OF THE PAROTID GLAND. REPORT OF TWO CASES AND LITERATURE REVIEW

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**Introduction:** Non-sebaceous lymphadenoma (NSL) is an unusual benign salivary gland tumour characterized by a predominant lymphoid background, dense lymphoid infiltrate, and absence of sebaceous differentiation. Only 11 cases have been well documented and described in the medical literature.

**Aims:** To report the clinical cases of two patients diagnosed of NSL of the parotid gland and to carry out a review of the related medical literature.

**Material & method:** This is a report of two females with a non-sebaceous lymphadenoma that came to our hospital

with an onset of a slow-growing painless mass in the parotid area, one in the right side and the other in the left one. Medical history of the patients was uneventful, with no relevant antecedents. In both cases a MR test was made, and informed as a well defined tumour involving the superficial lobe of the parotid gland. Fine needle aspiration biopsy (FNAB) was not diagnostic and no malignant cells were found. With the presumptive diagnosis of benign tumour of the parotid gland a superficial standard parotidectomy was performed sparing the facial nerve. Postoperative recovery was uneventful and no recurrence was detected in follow-up one year later.

**Results:** The tumours were well-circumscribed masses with an epithelial component and a dense lymphoid pattern with well-defined follicles with reactive germinal centres and many plasma cells.

**Discussion:** Recently, basic criteria for diagnosis of NSL have been reported: no sebaceous differentiation; nononcocytic epithelium; predominant lymphocytic component; solid, glandular or cystic epithelial nests; and lack of nodal capsule or subcapsular sinusoids. On immunostaining, the epithelial component is shown to exhibit dual luminal cell and white cell differentiation.

**Conclusions:** Non-sebaceous lymphadenoma (NSL) is an unusual benign salivary gland tumour with good response to surgical treatment that must be considered in the differential diagnosis of parotid gland tumours.

### P-2903

#### IMPACT OF THE FACIAL NERVE PARALYSIS AFTER PAROTIDECTOMY FOR PLEOMORPHIC ADENOMA.

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**Introduction.** The most important complication after a superficial parotidectomy with facial nerve dissection for pleomorphic adenoma is the facial nerve paralysis. The literature review shows an incidence of facial nerve paresis between 15-65%, and of permanent paralysis between 0-5.5%. Also many associated complications may appear that can modify the impact of postoperative facial nerve dysfunction. However, no prospective studies have been assessed to determine the incidence of facial nerve paresis/paralysis, and how risk factors and complications can influence on the facial nerve dysfunction.

**Objectives.** Prospective analysis of the incidence of facial nerve paresis and paralysis after parotidectomy, the impact on facial nerve dysfunction and associated risk factors.

**Material and methods.** Prospective study on 79 patients who underwent superficial conservative parotidectomies with facial nerve dissection for pleomorphic adenoma located in the supra-facial part of the parotid gland, between 2008 and 2010. Postoperatively, we have reviewed the patients in the 1st week, 1st month, 3rd month, 6th months, and 1st year. We analyzed postoperative facial nerve function (measured with House-Brackmann scale and neurophysiological determination), and other surgical complications related.

**Results.** The overall incidence of postoperative facial paresis was 77.2% on the 1st week, and the permanent

paralysis was 0%. The magnitude of paresis was 13.53 on 36 (House-Brackmann scale). The most affected branches were the lower buccal branch and marginal mandibular branch (65%); the less affected branch was the temporal one. We found a statistically significant relationship between neurophysiological assessment, clinical assessment and recovery time of facial nerve dysfunction. Tumour size, location in the coronal part of the superficial gland and prolonged surgical time, were statistically significant correlated with the magnitude of paresis in patients. Complications after parotidectomy were few, and none have been linked to an increased rate or magnitude of postoperative facial dysfunction.

**Conclusion.** Although the incidence of patients with postoperative facial nerve paresis has been high, the magnitude of paresis has been low with a short recovery time (2 months). There is a statistically significant correlation between tumour size, tumour location and magnitude of facial nerve dysfunction.

#### P-2904

### ROLE OF MEDICAL THERMOGRAPHY IN TREATMENT OF FREY'S SYNDROME WITH BOTULINUM TOXIN A

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**Introduction:** Frey's syndrome is a common complication reported in up to 40% of cases following parotidectomy and classically causes gustatory sweating and facial flushing.(1)

First described in 1928, the standard investigation to demonstrate gustatory sweating is a Minor's starch iodine test (MSIT).

Stress thermography to produce a qualitative visual analysis of Frey's syndrome was described in 1997.(2) This method assesses both the sweating and cutaneous capillary response found in Frey's syndrome.

**Aim:** To show that stress thermography could be utilised in the investigation and treatment of Frey's syndrome with Botulinum toxin A instead of the standard MSIT. We also describe improvements in this technique to allow standardisation of the results.

**Method:** Two patients with symptomatic Frey's syndrome following unilateral superficial parotidectomy were imaged using a digital infrared camera in a microvascular diagnostic suite where environmental control of temperature and humidity could be obtained. Our protocol was 24°C and 30% relative humidity for 20 minutes. After capturing a base line image, stress thermography was undertaken with a sialogogue and images captured at regular intervals for 20 minutes.

Digital images of the areas of sweating and flushing were given to the clinician to guide administration of intracutaneous Botulinum toxin A to the affected sites.

Patients were re-imaged at 4 week utilising the same protocol.

**Results:** At four weeks both patients reported complete absence of both facial flushing and gustatory sweating.

Post treatment stress thermography showed a complete response.

**Conclusion:** We find this method of investigating and treating Frey's syndrome superior to the MSIT. It allows objective assessment of treatment response of both gustatory sweating and facial flushing. Furthermore our environmental protocol is simple and reproducible. As with personal digital cameras the equipment costs are a fraction of 1997 prices making this a cost-effective technique.

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#### P-2905

### SALIVARY GLAND TUMOURS: A 26-YEAR RETROSPECTIVE STUDY IN A SINGLE KOREAN INSTITUTION

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Salivary gland tumors are relatively rare, comprising less than 3% of all neoplasms of the head and neck region. Both clinical and histopathological appearances vary widely challenging the diagnosis and management of these tumors. Data of salivary gland tumors from various parts of the world can be helpful to understand the biology, clinical characteristics and differences in the incidence of salivary gland tumors. In Asian countries, particularly in Korea, clinicopathological analysis of these tumors is very scarce. The present study is a retrospective study of major and minor salivary glands tumors diagnosed at Yonsei University Health System between 1986 and 2012. Variables such as age, sex, duration of disease, symptoms, site of tumor involvement, tumor size, tumor histological type, and nature of growth (benign and malignant) were recorded.

#### P-2906

### PAROTID DERMOID CYST: A RARE ENTITY

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**Introduction:** A dermoid cyst (DC) is the result of inclusion, congenital or acquired, of epithelial cells along the lines of embryonic closure. The cyst contains ectodermic and mesodermal elements such as hair follicles and sebaceous glands. They are extremely rare in the parotid gland. To the best of the authors' knowledge, there have been only nine previous case reports in the English literature and eleven patients presenting with parotid DC.

**CASE-REPORT:** We describe the diagnosis, evaluation and surgical management of a parotid DC in a 43-year-old

man.

**Discussion:** Treatment of the DC is surgical excision. Malignant transformation has been reported at other anatomical locations with a probability of 5%, especially in localized cases in the ovary. The most common supervening malignancy is squamous cell carcinoma. Malignant transformation of head and neck DC is exceptionally rare, and could be a source of diagnostic confusion suggesting an erroneous diagnosis of metastatic carcinoma of unknown origin. In any case, a rapid recent increase in the size of a longstanding DC may herald malignancy, underscoring the necessity for diagnostic and surgical intervention. Incomplete excision and remnant cyst tissue may lead to recurrence.

**Conclusion:** To avoid recurrence, the DC needs to be treated by very careful surgical excision. Superficial parotidectomy, as in our patient, has been performed for treatment of the parotid DC in the literature with no recurrence reported in any of these cases. Concerning the patient who was the subject of this report, diagnostic imaging two years after the surgical intervention showed no local recurrence after total removal of the tumoural lesion.

#### P-2907

### SCLEROSING POLYCYSTIC ADENOSIS OF PAROTID GLAND

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**Background:** Sclerosing polycystic adenosis (SPA) is a rare salivary gland lesion, first described in 1996 by Smith et al. [1], sharing the histopathologic features of very frequent and well-described mammary fibrocystic lesions. Most cases of SPA were initially misdiagnosed as tumours both benign and malignant. Similarly, the clinical impression may suggest a salivary gland neoplasm. Most histopathologists are not familiar with this lesion. Therefore, the lesion can represent a distinctive differential diagnostic problem.

**Case Presentation:** A 7-year-old girl first presented with two firm nodules in her right parotid region, diagnosed histopathologically as a multicentric pleomorphic adenoma (PA). Two years later multiple nodules in the same gland were noted. Frozen section analysis suggested a recurrent PA, but routine histopathological examination revealed multiple well-circumscribed unencapsulated nodules of a peculiar pattern, composed of a proliferation of microcysts, ducts, and acinar structures in a densely sclerotic stroma. (fig.1). These findings were consistent with "adenoma" but lacking chondromyxoid matrix, essential for PA. Ten years later two, and after two years one additional nodules appeared under the surgical scar, and an extended parotidectomy followed. Histopathological diagnosis was a recurrent multilobular PA.

The recent revision of all available material disclosed a recurrent multifocal SPA.

**Discussion:** Sclerosing polycystic adenosis of the major salivary glands is rare and can simulate a slow growing tumour. The aetiology of SPA is still unknown. It has been demonstrated that SPA satisfied the criteria for monoclonality and is likely to be a neoplasm and not just a reactive process. The reported recurrence rates are between 19 and

30%. The multifocal nature of the lesion has been also documented, making its management difficult.

The preferable treatment is based on surgical excision of the lesion with safe margins. Surveillance should be continued over several years. On the other hand, treatment of patients with recurrent pleomorphic adenoma is difficult. Particularly, the risk of damaging the facial nerve is high, 15% to 30%, because it is often well ensheathed in scar tissue with distortion of the local anatomy.

**Conclusion:** Sclerosing polycystic adenosis is a benign entity with a positive outcome, which should be included in the working differential histopathologic diagnosis of both neoplastic and non-neoplastic lesions of salivary gland, in order to differentiate this entity from other more clinically sinister salivary gland pathology. Misdiagnosing may cause severe consequences.

#### P-2908

### GIANT SALIVARY CALCULI OF THE SUBMANDIBULAR GLAND

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**Introduction.** Sialolithiasis is the most common salivary gland disease, with 12 per 1000 adults reportedly suffering from the condition each year. However, cases of unusually large calculi are rare. We review the diagnosis and management of giant salivary calculi, and present the case of an unusually large sialolith arising in the submandibular gland.

**Subject & methods.** A previously well 58-year-old male patient was referred from his general dental practitioner with a short history of pain in the right floor of mouth and submandibular region, exacerbated by swallowing. Clinical examination and imaging revealed a giant salivary calculus of the submandibular gland and duct.

The patient underwent excision of the right submandibular gland and stone via a standard extra-oral approach, without complication. Examination of the stone revealed a hard, elongated calculus measuring 41mm and weighing 3.0g.

**Discussion.** Sialoliths measuring over 35mm are rare, with less than 20 cases published in the literature. Giant sialoliths almost exclusively arise in the submandibular gland, due to particular anatomical and physiological factors. The main goal of therapy in sialolithiasis of all sizes is the relief of symptoms and preservation of salivary function where possible. Subsequently, newer treatment modalities such as sialendoscopy and extra-corporeal short-wave lithotripsy are effective alternatives and gaining popularity. However, for giant sialoliths, sialadenectomy or trans-oral sialolithotomy remain the mainstay of treatment.

**Conclusions.** Giant salivary gland calculi are rare, and can present an interesting diagnostic and therapeutic challenge. Although traditional surgical management proved effective in the presented case, newer treatment modalities are likely to have increasing roles in future cases.

P-2909

**MUCOEPIDERMOID CARCINOMA OF THE HARD PALATE FOUND IN A CHILD: A CASE REPORT OF AN EIGHT YEARS GIRL***Hiroki Nagayasu<sup>1,\*</sup>, Yujiro Handa<sup>2</sup>, Yoshihiro Abiko<sup>3</sup>, Makoto Arisue<sup>1</sup>**<sup>1</sup>Department of Oral and Maxillofacial Surgery, School of Dentistry, Health Sciences University of Hokkaido, <sup>2</sup>Department of Basic Human Sciences, School of Dentistry, Health Sciences University of Hokkaido, <sup>3</sup>Department of Oral Medicine and Pathology, School of Dentistry, Health Sciences University of Hokkaido, <sup>4</sup>Department of Oral and Maxillofacial Surgery, School of Dentistry, Health Sciences University of Hokkaido*

The incidence of mucoepidermoid carcinoma in children is low, although this tumour is a common malignant salivary gland neoplasm in adults. We report a rare case of this tumour arising from the hard palate of an 8-year-old girl. She was referred to our hospital with a chief complaint of swelling on the left side of the hard palate, which was reportedly persistent more than 3 months. The clinical examination revealed a smooth and round mass, 25x17mm in size, involving her left hard palate. The mass was covered with an intact mucosa with partial redness. The patient showed no regional lymphadenopathy and the general physical examination was unremarkable. Computed tomography showed a well-demarcated and low attenuated, solid mass with features of bone destruction. A biopsy was, thereafter, performed for pathological diagnosis. Epithelial lined cyst wall with infiltrating nests of squamous and mucin producing cells were demonstrated in the specimen. Presence of mucin was confirmed by mucicarmine stain. Cytokeratin AE1/AE3 were positivity verified the epithelial nature of the tumour cells. The diagnosis of mucoepidermoid carcinoma was thereon established. The patient underwent excision of the tumour with partial maxillectomy and reconstruction using the buccal fat flaps under general anaesthesia. The postoperative course was unremarkable and the patient is asymptomatic without signs of recurrence 3 years postoperatively.

P-2910

**COMPARATIVE EVALUATION OF MORPHOLOGIC AND ECHOGRAPHIC CHARACTERISTICS OF MAJOR SALIVARY GLANDS TUMOURS***Svetlana Tarasenko<sup>1,\*</sup>, Tatiana Shipkova<sup>1</sup>, M Smyslenova<sup>1</sup>, Andrey Roudnev<sup>1</sup>, Andrey Shishkanov<sup>1</sup>*  
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**Background:** Tumours of major salivary glands make up from 3.0% to 5.0% of all neoplasms of the maxillofacial region. The frequency of errors in the diagnosis of salivary glands tumours makes up from 7.0% to 46.0%. Ultrasonography (US) is one of the leading methods of diagnosing major salivary glands, including tumours of various origins.

**Method:** 50 patients with tumours of major salivary glands underwent surgical treatment.

All patients underwent fine needle aspiration biopsy (FNAB), duplex US (brightness mode and color Doppler). The data obtained was used to determine the necessary of surgical treatment, preferred access in each case. Besides US of the histological examination of the tumours was performed to clarify type of the tumour and compare obtained results in both cases.

Comparison of FNAB results, histological studies, US in

vivo and in vitro (removed salivary glands tumours) have demonstrated the correlation of diagnostic data that indicates the prognostic value of US algorithm in patients with salivary glands tumours.

**Results:** Comparative analysis of ultrasound signs, according to diagnostic algorithm in 97% of cases reflected results of histological study, despite the discrepancy with the date of FNAB.

Three patients, who underwent the surgical treatment, including US algorithm, had facial nerve deficits (one branch), that confirms the correct way of surgical treatment and the efficacy of US algorithm.

**Conclusion:** Ultrasonography of major salivary glands tumours is closely linked with both FNAB and histological studies; it allows us to specify indications for the correct surgical approach. The comparative evaluation of preoperative ultrasonography of the tumours with removed tumours ultrasonography revealed no differences between them in similar positions.

P-2911

**PRESERVATION OF THE CONTRA LATERAL VASCULARISED NASAL LINING DURING PALATAL FENESTRATION PROCEDURES-A SIMPLE TECHNIQUE***Ketan Shah<sup>1,\*</sup>, Leo Stassen<sup>2</sup>*  
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The nasal lining is an often-overlooked and under appreciated aspect of nasal anatomy. While serving as a conduit for nasal airflow, its multidimensional anatomy, thinness, and excellent vascularity provide the base elements of the nasal infrastructure.

The respiratory nasal lining functions to keep the inhaled air warm, humid and dust free. It is well vascularised mainly by the sphenopalatine artery –branch of maxillary artery and anteriorly by the septal branch of facial artery.

The importance and usefulness of keeping this lining intact/repairs results in success during several commonly performed surgical procedures like alveolar bone grafting in cleft palate, composite nasal reconstructions and maxillary orthognathic procedures such as Le Forte 1 osteotomy.

However during planned palatal fenestration procedures for tumours of minor salivary glands involving the palatal mucosa and the underlying periosteum/bone close to the midline, this nasal lining on the contra lateral side is often sacrificed incidentally. This vascularised thin contra lateral nasal lining when uninvolved can easily be preserved and protected

**Aim-**The aim of this presentation is to popularise this easy 2 step technique to protect and preserve the contra lateral vascularised nasal lining during palatal fenestration procedures close to midline.

**Method-**Data regarding the above procedures performed by single surgeon are collected, the technique described and results presented after using this easy 2 step technique

**Conclusion-**The preservation of the contra lateral nasal lining aids in the early postoperative healing, decreases nasal secretions from contra lateral nose and thereby facilitates compliance of wearing the palatal prosthesis for

obturation.

#### P-2912

### CLINICAL FEATURES OF IGG4-RELATED DISEASE IN ORAL AND MAXILLOFACIAL REGION, AND USEFULNESS OF MINOR SALIVARY GLAND BIOPSY FOR THE DIAGNOSIS OF THIS DISEASE

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IgG4-related disease is a newly recognized fibro-inflammatory condition, and Mikulicz's disease (or syndrome) and Küttner's tumour are now considered to be part of the spectrum of IgG4-related disease. In this study, we attempted to clarify the clinical features of IgG4-related disease in oral and maxillofacial region, and usefulness of minor salivary gland biopsy for the diagnosis of this disease. Fifty four patients (42 men and 12 women) with a diagnosis of IgG4-related disease in our Hospital were subjected to the study. Serum concentrations of IgG and IgG4 in the patients were 2379.1 + 1033.7 and 468.3 + 410.8 mg/dl respectively. All of the patients showed negative results for anti-SSA and anti-SSB antibodies. Eleven of 54 patients showed clinical symptom in the oral and maxillofacial region. Eight patients showed the swelling of the submandibular glands, 2 patients showed the swelling of the parotid glands, 5 patients showed severe xerostomia, and 2 patients complained the irritation pain during the food taking. Sixteen of 54 patients were referred to our department. Five of 12 patients showed the decreased-salivary flow in the GUM test, and 4 of 11 patients showed the decreased-salivary flow in the SAX-ON test. Only 2 patients showed decreased results in both tests. Four of 9 patients showed dysfunction of salivary gland in the Tc-scintigram, and none of 8 patients showed abnormal view in the sialogram. In lip biopsy, 7 of 12 patients showed massive lymphoplasmacytic infiltration in the salivary glands, and 9 of 12 patients showed positive results for IgG4 immunostaining. However, in some cases, although massive lymphoplasmacytic infiltrations were observed, no plasma cells expressed IgG4. These results showed that clinical symptom of IgG4-related disease in oral and maxillofacial region was not frequent (only 20%), but minor salivary gland biopsy might have some value for diagnosis and monitoring the state of this disease or the effect of the drug (steroid) on the disease.

#### P-2913

### A RARE CASE OF ASYMPTOMATIC GIANT SIALOLITH INSIDE THE WHARTON'S DUCT OF THE RIGHT SUBMANDIBULAR GLAND

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Sialolithiasis is the most common disease of the submandibular gland, but giant sialolith is rarely mentioned in the medical literature. The submandibular gland and its duct are the most susceptible to this disease. We report a rare case of asymptomatic giant sialolith occurring solely in the Wharton's duct of a young man. Radiographical examination revealed a large radiopaque mass located in the right

floor of the mouth. Transoral removal of the stone was performed under local anesthesia and preservation of the submandibular gland. The stone was 30 mm long and 9 mm width. The gland was treated conservatively with sialogogues, antibiotics and analgesics. Having it under observation a certain period of time, it can be noticed that the gland is asymptomatic and it has no functional changes. In this case, the approach of a conservative treatment sparing the patient from the morbidity associated with excision of the submandibular gland.

#### P-2914

### DUCTAL CARCINOMA OF SALIVARY GLANDS: PRESENTATION OF TWO CASES

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**Introduction:** Ductal carcinoma of salivary glands is an epithelial tumour of high malignancy and poor clinical outcome for its high rate of recurrence, perineural spread, regional and distant metastasis. It occurs more often in the major salivary glands with great predominance in the parotid gland. Its name comes from its pathological and immunohistochemical similarity with the ductal breast carcinoma. It has an estimated incidence of 3-5% of all malignant salivary gland tumours, being more prevalent in men during the sixth decade of life.

**Material and methods:** We report two cases of ductal salivary carcinoma that underwent surgery at our centre in 2012. The first case involved a 78 year old man with submandibular gland ductal carcinoma who presented with a lesion adjacent to Wharton duct. Radiographically were a lytic lesion in the mandibular angle. The second case is a woman of 77 years with a history of ductal carcinoma of the parotid gland, having been made a parotidectomy with cervical lymph node dissection, debuted three years later with of a lytic lesion ipsilateral in the parasymphiseal mandibular area.

**Results:** After excluding both distant metastatic disease, we studied the vascularization of tibial-peroneal trunks, underwent surgery by performing a wide resection with segmental mandibulectomy, and a microsurgical reconstruction with fibular flap. Pathologically confirmed dignostic of ductal carcinoma with free surgical margins and high-grade of perineural and vascular invasion in both cases. Immunohistochemistry studies performed confirmed negative results for ERB-2 gene amplification.

**Discussion:** Ductal carcinoma of the salivary glands is a rare adenocarcinoma generated from the glandular excretory duct cells. Despite his aggressiveness, poor prognosis and unpredictable clinical course, wide excision with ipsilateral cervical lymph node dissection and adjuvant radiotherapy are supported as the treatment of choice for local and regional control of disease. In advanced cases with distant metastases, studies have shown favourable results after treatment with trastuzumab, a monoclonal antibody selective for ERB-2 also expressed in breast ductal carcinoma.

**Conclusions:** Salivary duct carcinoma has a low survival



rate, which despite surgery with adjuvant radiotherapy offers the best therapeutic weapon, including the possibility of new treatments emerging from the immunohistochemical studies.

#### P-2915

### INTRAORAL ADENOID CYSTIC CARCINOMA: DOES PRESENCE OF PERINEURAL INVASION CORRELATE WITH PRIMARY TUMOUR SIZE, LOCAL EXTENSION, SURGICAL MARGINS, DISTANT METASTASES AND OUTCOME?

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Adenoid cystic carcinoma (ACC) is the most common malignancy of the minor salivary glands. The biological behaviour of ACC is characterized by a slow and indolent growth rate, rare involvement of regional lymphatics, high propensity for perineural invasion (PNI), multiple and/or delayed recurrences, and a high incidence of distant metastases. Twenty-six cases of ACC of the intraoral salivary glands, initially treated surgically at the Department of Maxillofacial Surgery, University Hospital Dubrava, from January 1st 1984 to May 1st 2008, were retrospectively reviewed. The aim of this study was to determine the presence of PNI in relation to primary tumour site, local extension, histological status of surgical margins, distant metastatic spread, and outcome. Fisher's exact test was used to determine the level of significance for categorical variables. The Kaplan-Meier statistical method was used to generate a survival curve. There were 12 male and 14 female patients. The mean age was 57.5 years (range: 34 to 88 years). The most commonly affected site was the palate, present in 16 of the patients (61.5%). Follow-up information was available for all patients and varied from 7 to 276 months, the average being 117.8 months. All surviving patients had a minimum 4-year follow-up. PNI was reported in 13 of the 26 resected specimens (50%). There was no significant correlation between perineural invasion and primary tumour size. The proportion of early (T1-T2) and advanced stages (T3-T4) was equal among patients with and without PNI ( $p=1.0$ ). Eight of 26 patients (30.8%) had positive histological status of surgical margins. There seems to be no significant correlation between PNI and the status of the surgical margins ( $p=0.67$ ). PNI was present exclusively in patients with local extension; all 7 patients with local extension had PNI, compared with none without local extension, which is statistically significant ( $p$

#### P-2916

### SYNCHRONOUS MALIGNANCY OF A PAROTID SWELLING

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**Introduction:** There are a few reported cases of synchronous squamous cell carcinoma (SCC) and chronic lymphocytic leukemia (CLL) in the head and neck region but no reported cases of both SCC and CLL within the parotid gland. We report a case of unilateral synchronous malignancy

within the parotid node of a patient presenting with metastatic SCC co-existing along side CLL.

**Case report:** An 86 year old lady presented with a skin SCC of the left mandible which was excised. She then developed a swelling in the left parotid region a few months later. MRI showed a large mass in the base of the tongue, large parotid node and multiple neck nodes. CT revealed further nodes in the chest and abdomen. She had a left total Parotidectomy with biopsies of the right tongue base and left cervical nodes. Histology results were that of metastatic poorly differentiated SCC within level 2 lymph node and intra-parotid lymph node, and co-existent small lymphocytic lymphoma/chronic lymphocytic Leukaemia (SLL/CLL) in all nodes and base of tongue. The patient had further palliative radiotherapy to the left parotid and neck regions and was referred to haematology for management of chronic lymphocytic Leukaemia.

**Discussion:** It is unusual for reticuloendothelial malignancies to present synchronously with metastatic skin cancers in the head and neck region and rarer to coexist within the parotid. CLL/SLL is associated with a risk of patients developing secondary malignancies. One must be aware of the possibility for dual malignancies to present within a parotid swelling and the diagnostic and therapeutic challenges that it presents.

#### P-2917

### BASAL CELL ADENOMA OF THE PAROTID GLAND - A CASE REPORT

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**Background:** Basal cell adenoma is a rare epithelial neoplasm of the salivary gland most commonly arising in the parotid glands. These tumours frequently affect patients between their fifth and seventh decade without gender predilection. The main objective of this work is to report a case of a basal cell adenoma of the parotid gland, in a female 18 years-old patient, with a tumour recurrence eight years after the initial presentation.

**Case Report:** 18 years-old female patient presented in our Centre with a firm and mobile slow-growing mass located in the right mandibular angle. A CT scan revealed a mass in the parotid gland without cervical lymphadenopathy. The patient was submitted to superficial parotidectomy, and histopathological examination revealed a basal cell adenoma. No facial nerve paresis was observed. Eight years after the initial presentation the patient presented with a recurrent mass in the parotid region, with cutaneous involvement. The cytological analysis of the fine-needle aspiration was compatible with disease recurrence. The patient was submitted to total parotidectomy.

**Conclusion:** Most of parotid tumours (70-80%) are benign and, within this group, pleomorphic adenoma is the most frequent. Within the adenomas group, monomorphic tumours are very uncommon. Within this group, basal cell adenoma must be identified. Differential diagnosis must be compared with some unfavourable entities, such as the basal cell adenocarcinoma, adenoid cystic carcinoma and

basaloid squamous cell carcinoma and it is important to consider other benign lesions such as pleomorphic adenoma, mucocoele, sebaceous cyst, lipoma and nasolabial cyst. Primary treatment of BCA is surgical excision by means of a superficial parotidectomy. Despite this benign behaviour, it is important to perform a long-term follow-up, in order to detect recurrences in a prompt time.

**P-2918****CERVICAL TUMOUR MARSUPIALIZATION OF INTRAPAROTID SEBACEOUS CYST**

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In the territory of head and neck is not uncommon to use this technique when dentigerous cysts in the jaw, nasal or sinus are present and in cases of ranula and / or mucocoeles and even others such as ameloblastomas. We could not find any intraparotid tumour cases solved by marsupialization therapy in the literature.

We report a case of a 50 year old male patient who consults us for mass at left parotid gland several months ago with history of painless, fixed mass, and that the study of CT, ultrasound and scintigraphy revealed a tumour like lesion in the superficial glandular lobe. Histopathological PAAF findings indicates intraparotid sebaceous cyst.

Rather than perform a formal parotidectomy we externalized the lesion under general anaesthesia, maintaining the fistula created and allowing localized drainage for 35 days.

After follow up there was complete disappearance of the lesion with a slight scar on the skin of approximately 1 cm approx remaining.

This therapy has allowed us to maintain the glandular structure, preserve the facial nerve and resolve the pathology in this patient.

**P-2919****EPITHELIAL MYOEPITHELIAL CARCINOMA OF THE SUBMANDIBULAR SALIVARY GLAND. A CASE REPORT**

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**Introduction:** Epithelial-Myoepithelial Carcinoma (EMC) is a rare salivary gland tumour, comprising 1 % of all salivary glands neoplasms. This tumour occurs in older persons, and has a female predominance. It is a low-grade malignancy tumour, with high tendency to recur and metastasize. It is located in the parotid gland as the most common site, followed by the submandibular and minor salivary glands, and other possible anatomical locations such as kidney or lung.

**Case report:** We present the case of an 83 year-old woman, who was referred to our department for a left subman-

dibular tumour. Clinical examination revealed a hard submandibular mass, attached to deep structures. An ultrasonography (USG) neck with high resolution revealed an irregular echogenicity (solid) mass below the mandibular body. An Ultrasound-Guided Fine needle aspiration (FNA) was done with a cytology of an epithelial myoepithelial carcinoma. MR showed a heterogeneous submandibular mass, with an irregular contrast enhancement and internal necrosis area, probably originated in the left submandibular gland, prominent in the floor of the mouth, in close contact with mylohyoid and digastric muscle.

A functional neck dissection and a left submaxillectomy were performed, with postoperative radiotherapy treatment. The patient currently has no clinical or radiological signs of tumoural recurrence.

Our aim is to analyze clinical and histological features of that type of tumour, as well as diagnose and treatment approach.

**Discussion:** EMC is considered a rare malignant salivary gland neoplasm accounting for less than 1% of all salivary gland neoplasms. A detailed differential diagnosis must be achieved, due to the different types of benign and malignant neoplasm settled in this anatomic region.

The pathological differential diagnosis includes myoepithelial carcinoma, clear cell carcinoma, and pleomorphic adenoma.

Medical imaging, such as ultrasonography, MR and FNA can orient the diagnosis.

EMC is classified as a low-grade malignancy tumour, but has a high percentage of recurrence, especially during the first five years following surgery and can lead to distant metastases.

**Conclusion:** Optimal treatment is surgical excision except in advanced stages. The surgical treatment depends on the tumour stage, the affected anatomical region, the presence of metastases. Radiotherapy or other adjuvant therapy can be proposed too.

**P-2920****MINOR SALIVARY GLAND TUMOURS IN PALATE. REVIEW OF 30 CASES**

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Differential diagnosis of a palate mass is a challenge. There are a lot of disorders with similar signs and symptoms. It is especially important to consider malignant tumours in the differential diagnosis of minor salivary gland neoplasms. Between January 2001 and December 2011 there were 30 cases of palatal minor salivary gland tumours in our institution, a third level hospital. The results show that benign tumours are more frequent than malignant tumours (80% vs 13,33%), Pleomorphic adenoma being most frequent (66%). Instead of high incidence of malignant minor salivary gland tumours reported in literature, the main diagnosis in our institution was a benign neoplasm.

**P-2921****A RARE CASE OF A PATIENT WITH POLYMORPHOUS LOW-GRADE ADENOCARCINOMA IN A MAJOR SALIVARY GLAND***Stanislav Andrejko<sup>1,\*</sup>, Marian Benicky<sup>2</sup>**<sup>1</sup>Louis Pasteur University Hospital, Dept. of Stomatology and Maxillo-Facial Surgery, <sup>2</sup>Louis Pasteur University Hospital, Dept. of Pathology*

**Objectives:** Presentation of a patient with polymorphous low-grade adenocarcinoma (PLGA) in an uncommon location such as the major salivary gland. The curiosity was that the patient had atypically two independent solid tumours of the same histological type in the same gland.

**Case report:** A 45-year-old male patient with had bilateral swelling of a parotid region that was present over a period of several years. Physical examination revealed a firm, palpable mass below the left auricle. Ultrasound and CT investigation showed two masses in the left parotid gland, one of them being located in the superficial and another one in the deep part of the parotid gland.

**Results:** Total conservative parotidectomy with preservation of the facial nerve was performed. Frozen section showed glandular tumour with the postponement of the diagnosis to paraffin sections. The lesion was diagnosed as PLGA in definitive histology. The neoplastic cells were immunoreactive with antibodies to cytokeratin AE1-AE3, EMA, S100 and CEA. Surrounding non-neoplastic tissue of the parotid demonstrated microscopic signs of chronic sialoadenitis accounting for the swelling of the gland. After surgery, the patient did not undergo radiation therapy.

**Summary:** We present our experience with the rarely occurring PLGA in the parotid gland and suggest that total conservative parotidectomy is a sufficient mode of a treatment for patients with this diagnosis. In our opinion, radiation therapy may be employed in patients with tumour recurrence.

**P-2922****UNCOMMON OR UNDER-RECOGNISED? A CASE OF KUTTNER'S TUMOUR***Ana Bernic<sup>1,\*</sup>, Niko Krakar<sup>1</sup>, Milorad Galic<sup>1</sup>, Vladimir Bernic<sup>1</sup>, Irena Novosel<sup>1</sup>, Stela Bulimbasic<sup>2</sup>**<sup>1</sup>General Hospital "Dr. Ivo Pedišić", <sup>2</sup>Dubrava University Hospital*

In 1896 H. Kuttner, a German physician, described a series of patients with a unilateral, hard tumour-like mass of submandibular gland, which histologically showed features of chronic sclerosing sialadenitis (CSS). CSS is benign lesion of an uncertain aetiology also known as Kuttner's tumour. It usually affects submandibular gland, but may equally involve other salivary glands. Although recognized as a distinct clinicopathologic entity in the World Health Organization classification of salivary gland tumours, CSS is still widely underdiagnosed. Surgery is the standard therapy, however in patients with painless and nonprogressive CSS in whom the preoperative diagnosis is unequivocal, the observation can also suffice.

A 58-year-old man presented in our clinic with a firm mass in the right submandibular area which interfered with his swallowing. He reported a sporadic swelling in the

same region over the last five years, apparently more so during the winter months when it could sometimes grow to the size of child's fist. The patient was heavy smoker but apart from the idiopathic hypertension he was otherwise physically healthy with no other pertinent medical history. On examination, a firm, tender, tumour-like lesion was found in the right submandibular area. Facial and hypoglossal nerve function was intact, no other masses or adenopathy were noted in the head or neck. Panoramic radiography was performed and it confirmed sizeable calculus (24x17 mm) in the submandibular region. In consultation with the patient, the decision was made to perform sialoadenectomy and to remove the calculus intraorally. Subsequent pathohistological analysis of glandular and periglandular soft tissue confirmed the diagnosis of CSS, Kuttner's tumour.

Pathological involvement of the submandibular salivary gland is commonly encountered in the ENT and maxillo-facial surgery practice. Differentiation between neoplastic or non-neoplastic lesion may be taxing, even for the experienced clinician. Although history, physical findings and radiological investigations may suggest the diagnosis, a persistent or recurrent enlargement of a submandibular salivary gland must be surgically removed for definitive diagnosis. We suggest here that Kuttner's tumour should be considered in the differential diagnosis of the salivary gland tumours in patients presenting with firm to hard swelling of the salivary gland.

**P-2923****HYBRID TUMOUR OF THE SUBLINGUAL GLAND: CASE REPORT AND REVIEW OF THE LITERATURE***Wolfgang Eichhorn<sup>1,\*</sup>, Clarissa Precht<sup>1</sup>, Ralf Smeets<sup>1</sup>, Manfred Wehrmann<sup>2</sup>, Jürgen Zeuch<sup>3</sup>, Marc Eichhorn<sup>3</sup>, Jürgen Hoffmann<sup>4</sup>, Max Heiland<sup>1</sup>**<sup>1</sup>Department of Oral and Maxillofacial Surgery, University Medical Center Hamburg Eppendorf, Germany, <sup>2</sup>Department of Pathology, General Hospital Nuertingen, Germany, <sup>3</sup>Department of Oral and Maxillofacial Surgery, General Hospital Balingen, Germany, <sup>4</sup>Department of Oral and Maxillofacial Surgery, University Medical Center Heidelberg, Germany*

**Objective:** Hybrid tumours of the salivary glands are rare but diverse neoplasms. In 1996 Seifert and Donath described a series of 5 cases with salivary gland tumours, which consisted of two different types of neoplasms and defined them as hybrid tumours. Nowadays, the general definition of a hybrid tumour is a tumour consisting of at least two different tumour entities which are located in the same topographic area. They account for 0.1% of all salivary gland tumours.

**Study design:** We report of a 59-year-old female presenting with a lesion at the orifice of the left salivary gland. In the biopsy an adenoid cystic carcinoma in combination with a salivary duct carcinoma was detected.

**Results:** The treatment consisted of tumour resection, selective neck dissection (Level 1-3) and adjuvant radiotherapy. 30% of the tumour mass was composed of salivary duct carcinoma and 70% of adenoid cystic carcinoma. The patient is currently 36 months without recurrence.

**Conclusion:** The presented case is according to our knowledge the first description of a hybrid tumour located in the sublingual gland. Furthermore, the post-therapeutic course is satisfying as hybrid tumours of the salivary glands generally have a poor prognosis.

**P-2924****PLEOMORPHIC ADENOMA IN THE MOUTH AND FACE. CASE REPORT***Juraj Zajko<sup>1,\*</sup>*<sup>1</sup>*Department of Maxillofacial surgery, Ružinov, Bratislava, Slovakia*

This article is devoted pleomorphic adenomas seen in the clinic of the Department of maxillofacial surgery in Bratislava, Slovakia. We explain the nature and essence of the processes of pleomorphic adenoma.

We present a case report is of a large pleomorphic adenoma in the oral cavity at the interface of hard and soft palate.

We made a statistical evaluation of pleomorphic adenomas seen in our clinic from patient records to clarify whether these presentations in the oral cavity are the usual or unusual.

**Key words:** pleomorphic adenoma - PLA, small salivary glands, MRI diagnosis of PLA.

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**P-2925****EXPERIENCE WITH SIALOENDOSCOPIC APPROACH IN SIALOLITHIASIS TREATMENT***Kaspars Stammers<sup>1,\*</sup>, Andrejs Skagers<sup>1</sup>*<sup>1</sup>*Institute of Stomatology Riga Stradins University*

**Introduction** – Sialolithiasis is the most common salivary gland disease. Sialolithiasis can occur in any of the salivary glands but appear most frequently in the submandibular gland and its duct. It is a frequent cause of salivary gland inflammation. Treatment methods varied from symptomatic to radical salivary gland removal, and was dependent on stone location, size, and disease symptoms. Therefore, endoscopic treatment of sialolithiasis is regarded as a minimally invasive treatment.

**Aim** - to describe the first sialoendoscopic surgery for sialolithiasis treatment in Latvia.

**Materials and methods** - a 46 y. old male patient with an occasional complaints increased size, pain and tightness of the left sub-mandibular salivary gland. The surgery was done in the RSU Institute of Stomatology Clinic of Oral and Maxillofacial Surgery. KARL-STORZ semirigid endoscope with a total outer diameter of 1.3mm was used. Mandibular salivary gland calculus was visualized in the X-ray examinations. Sialoendoscopy was carried out in an outpatient department under local anaesthetic with intravenous sedation. After salivary gland calculus visualization, it was fixed with a mini spotting wire basket and removed through the salivary gland duct.

**Results** - The patient complaints within 6 months has not been repeated and symptoms subside. US was done 6 months postoperatively and revealed no pathological changes.

**Conclusions.** Endoscopic removal of salivary gland calculi is an effective and minimally invasive method for sialolithiasis treatment.

**P-2926****REPEATED LIVER METASTASECTOMIES AFTER RESECTION AND RECONSTRUCTION FOR RECURRENT ADENOID CYSTIC CARCINOMA OF THE PAROTID***Priya Lankathilake<sup>1,\*</sup>, Robert Hutchins<sup>2</sup>, Leo Cheng<sup>1,2</sup>, Iain Hutchison<sup>2</sup>*<sup>1</sup>*Homerton University Hospital, London, UK, <sup>2</sup>St Bartholomew's and The Royal London Hospitals, London, UK*

**Introduction:** Adenoid cystic carcinoma (ACC) of the parotid is characterized by its slow biological behaviour, multiple loco-regional recurrences and late distant metastasis. Lung and bone are the most frequent sites of metastases followed by liver. We report a case of recurrent loco-regional and liver metastases which required five hepatic metastasectomies.

**Case report:** A 58-year-old female had recurrent ACC of right base of skull, lateral orbit, and parietal scalp, and liver metastases after undergoing a total parotidectomy and adjuvant radiotherapy 17 years previously. Extensive resection of cranio-orbito-facial recurrence and reconstruction with antero-lateral thigh free flap was followed by left partial hepatectomy with radioablation and right total hepatectomy in separate occasions. Few months later, a further wedge excision of the left liver and radioablation was performed. Cyberknife therapy was given for the infratemporal and base of skull recurrences. Despite two further combined liver resection and radioablation, the patient showed remarkable recovery with near normal liver function.

**Discussion:** Hepatic metastasis after excision of parotid ACC is not unusual, but the usefulness of liver metastasectomy is controversial. Repeated hepatic metastasectomy was made possible by the unique and rapid regeneration of the residual normal liver within the pre-existing portal field after major hepatectomy. Liver function is restored within 2-3 weeks after major hepatectomy in patients with normal livers.

**Conclusion:** This is the first report of repeated liver resection for metachronous metastases of parotid ACC. As ACC has an unpredictable long-term behaviour, close follow-up for life and aggressive treatment can be justified to enhance survival.

**P-2927****PLEOMORPHIC ADENOMA IN ORAL CAVITY AND FACE. CASE REPORT.***Juraj Zajko<sup>1,\*</sup>, Miloš Jurík<sup>1</sup>, Michal Beňo<sup>1</sup>*<sup>1</sup>*Department of Maxillofacial surgery, Ružinov, Bratislava, Slovakia*

**Summary:** In the poster authors describe pleomorphic adenoma problems in the materials Department of maxillofacial surgery in Bratislava. Explain basic problems of pleomorphic adenoma. Example of big pleomorphic adenoma is shown in the hard and soft palate. In the final report authors tell about statistic data of clinic materials and explain if this process in oral cavity are usual or unusual.

**Key words:** pleomorphic adenoma – PLA, minor salivary glands of palate, MRI diagnostic pleomorphic adenoma

P-2928

**MUCOCOELE IN THE BUCCAL VESTIBULE***Soo-Hyung Han<sup>1,\*</sup>, Sung-No Jung<sup>1</sup>, Won-Il Sohn<sup>1</sup>, Ho Kwon<sup>1</sup>**<sup>1</sup>Department of Plastic and Reconstructive Surgery, College of Medicine, Catholic University of Korea*

Mucocoele is a common benign lesion that mainly occurs in the minor salivary gland. It mainly occurs in the lower lip and more frequently occurs in women than in men.<sup>1,2</sup>In many cases, it is clinically associated with trauma, and appears to have a single or multiple, round, fluctuant nodules. It is asymptomatic in most cases.

We experienced a rare case of mucocoele in the buccal vestibule. A 20-year-old male patient visited the authors' hospital due to mass that has been gradually growing in the left cheek for approximately one year. The patient had no previous trauma or contributory medical history. In a physical examination, soft circular submucosal mass with a size of 2 x 2 cm<sup>2</sup>, which was not fixed to the nearby

tissues involving the left buccal vestibule, was detected. No cervical lymphadenopathy was observed. Furthermore, no particular finding was shown in hematologic test.

Computed tomography showed a 2 x 1.5 cm<sup>2</sup> cystic mass in the lateral to the body of the left mandible, the inner portion of which was not contrast enhanced, but slight rim enhancement was found.

The left oral mucosa was incised under systemic anaesthesia, and submucosal dissection was then conducted to expose the mass with definite margin. Then, the mass was completely removed while minimizing the injuries of the nearby tissues. Histopathological findings showed the cystic lesion with lined by columnar epithelium.

The patient underwent a 10-month follow-up study after the surgery, and showed no complication such as hematoma, seroma, and recurrence.

According to the literature review, this is the first case report of mucocoele that developed in the buccal vestibule.

### 30. SKIN TUMOURS OF THE HEAD AND NECK

#### P-3001

#### IS THERE A ROLE FOR ULTRASOUND SCANNING OF THE NECK IN THE PRE-OPERATIVE STAGING OF CUTANEOUS SQUAMOUS CELL CARINOMA OF THE HEAD AND NECK?

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**Background:** The increased average age of the population coupled with long-term sun exposure has led to an increase in the incidence of cutaneous squamous cell carcinoma (SCC). The department of Oral & Maxillofacial Surgery at Prince Charles Hospital serves a population of 500,000, and treats the majority of cutaneous SCCs affecting the head and neck. Such cases are treated under the umbrella of the Skin Cancer Multidisciplinary Team. The incidence of nodal metastasis in such patients is thought to range from less than 5% to up to 20% in some reports. It is the authors' current protocol to scan all patients with cutaneous SCC originating from the head and neck. A review of these USS results will be presented in this paper to ascertain if the pick up rate from this routine investigation is contributing to the early detection of nodal metastasis and whether or not this has an impact on loco-regional disease control and long-term survival.

**Patients & Method:** A 3-year retrospective analysis was carried out (January 2009 to December 2011) involving all patients with cutaneous SCC treated by the Oral & Maxillofacial Department. There were a total number of 138 cases. The following criteria were used in the data collection process:

1. Anatomical characteristics (site, clinical margins)
2. Pathological characteristics (size, depth, margins, degree of differentiation, perineural and lymphovascular invasion)
3. Ultrasound Scan findings and how they correlate to the clinical situation

**Discussion:** Current UK practice is not to scan patients with clinically negative necks unless the case is deemed high risk or when clinically indicated. Work is currently underway to ascertain whether or not scanning patients routinely would improve our pick up rate of cervical lymph node metastasis in patients with cutaneous SCC. Preliminary results have demonstrated that the pick up rate from routine USSs of all cutaneous SCCs is not high enough to warrant the application of this investigation to all patients. It should therefore be reserved for high-risk cases where it is felt that a scan is justified on clinical grounds. The detailed outcomes of our audit together with our recommendations will be presented.

#### P-3002

#### A REVIEW OF ADEQUACY OF RESECTION MARGINS, METHOD OF RECONSTRUCTION AND POST-OPERATIVE COMPLICATIONS OF CUTANEOUS SQUAMOUS CELL CARCINOMA OF HEAD AND NECK

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**Background:** Cutaneous Squamous Cell Carcinoma(SCC) is the second most common type of skin cancer. The department of Oral and Maxillofacial Surgery (OMFS) based at Prince Charles Hospital serves a population of 500,000 and treats the majority of Cutaneous SCC affecting the head and neck. Such cases are treated surgically where resection and reconstruction is carried out under the umbrella of skin cancer multi-disciplinary team. A review of resection margins, method of reconstruction and post-operative complications of cutaneous SCC of head and neck will be presented in this paper.

The aim is to assess our clinical outcomes for the management of cutaneous SCC compared with national guidelines. We also hope to determine whether our histopathology reporting fulfils the nationally agreed minimal datasets.

**Patients and Method:** Retrospective data analysis was carried out looking at period of three years (January 2009 to December 2011). This included all patients with head and neck cutaneous SCC treated by OMFS department at CWM Taf Health Board. There were 138 cases in this tenure. Each case was analysed in following categories

1. Anatomical Characteristics (site, clinical margins)
2. Pathological Characteristics (size, depth, margins, degree of differentiation, perineural or lymphovascular invasion)
3. Treatment modality and Reconstruction method (primary closure, healing by secondary intention, flap, graft)
4. Complications

**Discussion:** Cutaneous SCC is a common and important skin malignancy occurring most frequently in head and neck. Increased average age coupled with long term sun exposure has led to increased incidence of cutaneous SCC. Multi-Professional guidelines for the management of patients with Primary cutaneous SCC were published by British Association of Dermatology in 2006 and revised in 2009.

The Royal College of Pathologist guidelines for cutaneous SCC (currently under review) also exist and we have chosen to use two set of guidelines highlighted above as the gold standard for our audit. Work is currently underway and outcome of our audit together with our recommendations will be presented at the conference.

#### P-3003

#### SURGICAL RECONSTRUCTIONS FOR ADVANCED HEAD AND NECK SKIN TUMOUR EXCISIONS

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Surgical excision of extensive cutaneous head and neck malignancy requires thorough surgical reconstruction in

order to minimise facial disfigurements. There is a wide range of skin and fasciocutaneous flaps that we can use today in reconstruction of even huge skin defects. Beside a local and pedicle flaps, we use microvascular flaps as well. Among them, radial forearm flap is the most frequently used because of his reliability and pliability.

The aim of this study is to evaluate results of reconstructions of extensive head and neck defects after excision of cutaneous malignancies.

During the period from 2001 to 2011, in the Clinic for Maxillofacial Surgery 79 patients with extensive cutaneous malignancy were treated by wide tumor excision and reconstruction.

In 26 patients we used local flaps in 14 patients combinations of two or more local flaps, in 27 patients we have used microvascular flaps and in 12 cases supraclavicular flaps.

The results were evaluated according to recurrence rate, flap survival, aesthetic considerations, operating time, cost of treatment.

#### P-3004

### SKIN CANCER PATIENT SATISFACTION AUDIT IN THE ORAL AND MAXILLOFACIAL DEPARTMENT AT PRINCE CHARLES HOSPITAL AND THE ROYAL GLAMORGAN HOSPITAL, MERTHYR TYDFIL, WALES, UK

*Divya Priya Ramkumar<sup>1,\*</sup>, James Ban<sup>1</sup>, Mariam Tariq<sup>1</sup>, Richard Evans<sup>1</sup>, Shakir Mustafa<sup>1</sup>*

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**Background:** Patient satisfaction which encompasses patient centered care is one of the key pillars of clinical governance; "The framework through which the NHS is accountable to the public" (1). However as it had not been systematically assessed after treatment of patients with skin cancer, we proposed to establish an ongoing annual audit in 2008 which has been continued to present day.

**Aims and Objectives:** The aim of the audit was to assess the satisfaction of patients attending the oral and maxillofacial surgery department in Prince Charles Hospital (PCH) and the Royal Glamorgan Hospital (RGH) for treatment of skin cancer, as an in or an out patient and the key aspects of their journey.

This allows the department to evaluate patients perception on the care provided and remedy any weaknesses, so that standards are met and maintained at a high level.

**Method:** Postal Questionnaires were sent at random, retrospectively on an annual basis from 2008-2012 to a 100 patients (50 in RGH and 50 in PCH) who have had treatment of skin cancer either as an in or out patient.

We measured patient satisfaction of, waiting room times, professionalism of staff, explanation of condition, explanation of treatment required, waiting time between initial appointment and time of treatment, care at time of procedure, post operative advice, results of the procedure, information on self check, advice on UV protection and overall quality of care.

**Results:** A total of 447 (2008:100, 2009:100, 2010:73, 2011:74 and 2012:100) questionnaires were sent over five years with a response rate of 82%, 75%, 71%, 77% and 72% respectively, giving an average of 75.4%.

**Discussion:** The audit has shown that across the board we are maintaining high standards of care over the past five years, for example we had four times the amount of positive comments in comparison to negative comments .

As we are striving to improve our department, we took the negative comments on board and have implemented solutions that have shown to be affective, for example we have improved on and will continue to improve on;

- giving advice on UV protection and self examination
- clinic waiting times, as we have funding for employing two more clinicians

- better utilization of space in the waiting room for patients with children or patients in wheelchairs, as the layout for the department will be refurbished in the near future.

#### P-3005

### THE IDEAL RHOMBOID FLAP: A RELIABLE METHOD FOR THE (INEXPERIENCED) SURGEON

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The rhomboid flap was first described by Limberg in 1946. It is used to cover defects which have been excised as a rhombus with optimal angles of 120° and 60° at the apices. Falling outside of the optimal angles can result in discrepancies between the flap and the recipient site, and a suboptimal outcome.

This study aimed to assess whether the ideal flap was being achieved by using the current and accepted method at Sunderland Royal Hospital of drawing the flap free-hand.

A variety of differing grades of staff with a large range of clinical experience in OMFS were recruited to draw a rhomboid flap using a 5mm margin using the freehand technique.

**Results** indicated that the optimal angles were not being achieved as an average. Angles could differ by up to 40° from the optimal proposed angle. The lengths of the flap required to repair the defect were often of an incorrect size in relation to the excised portion of the defect. The excision margin in 46% cases was not sufficient. In 40% cases, the design of the rhomboid flap was incorrect.

A technical note using formulae was explained to staff and a second cycle was conducted of the exercise on paper with the use of a ruler.

The results of the second cycle indicated that the optimal angles were being achieved within 3° of the optimal angles proposed and that the excision margins were being completely excised without gratuitous loss of sound tissue.

The use of the technical note was put into practice on a number of suitable patients requiring a rhomboid rotational flap after soft tissue excision. It was found that the flaps were more predictable in outcome. There were no discrepancies in placing the flap and no 'dog-ears' of tissue had to be trimmed. Aesthetically, the results were good.

The authors propose that the technical note be used where the operator has limited experience in drawing rhomboid rotational flaps in order that a more predictable outcome in terms of handling and aesthetics is achieved.

**P-3006****A 2 YEAR PROSPECTIVE AUDIT OF BASAL CELL AND SQUAMOUS CARCINOMA EXCISION**Mark Turner<sup>1,\*</sup>, Valmiki Sharma<sup>1</sup><sup>1</sup>Peterborough City Hospital

We present 2 years of continuous prospective data (over 400 excised tumours) on the excision rate of basal and squamous cell carcinomas collected from a single Oral and Maxillofacial Surgery Department. We use a standard operating note sticker to make the data capture as reliable as possible and then enter this data into a custom Microsoft Access™ database for analysis. We have compared our excision rate to the gold standard derived from the current literature. We have also analysed our data to compare individual surgeons, grade of surgeon, tumour subtype and region of head and neck excision rates. We also assess our other complications. Our overall excision rate in excess of 95% compares favourably with the published literature. We identify the tumours commonly incompletely excised and a strategy for highlighting these potentially difficult excisions. By having robust and reliable data capture methods and collecting continuous prospective data we are able to monitor and maintain the highest standards always striving to improve our outcomes.

**P-3007****CAN WE DIAGNOSE SKIN CANCERS EARLIER? AN UPDATE BASED ON A SYSTEMATIC REVIEW OF THE LITERATURE**Navin Vig<sup>1,\*</sup>, Leo Cheng<sup>2</sup>, Mohammed Shorafa<sup>1</sup><sup>1</sup>North West London Hospitals NHS Trust, <sup>2</sup>Barts and the London, NHS Trust

**Introduction and Aim:** The diagnosis and treatment of head and neck skin cancer is already a large component of the clinical remit of OMFS as a whole, and is likely to increase in the future. Early diagnosis and treatment of these cancers leads to lower morbidity and mortality rates. The aim of the paper is review novel non-invasive diagnostic techniques, describing and evaluating their performance, and outlining potential developments in order to inform the oral and maxillofacial surgeon.

**Methods:** A review of the literature using MEDLINE, Pubmed and other online and paper resources, was performed using relevant keywords. Additional web-based and reference searches were carried out. Of 85 informative abstracts, only 3 were RCTs.

**Results:** Where compared, there is a significant advantage in using additional methods over the naked eye. These techniques are discussed with their advantages and disadvantages, and future developments envisaged.

Dermoscopy was the most frequently described technique. This can use either polarized- or non-polarised to magnify skin lesions at least 10x. It can reveal subsurface structures; although cost and skill required to use it may be a drawback.

Of interest may be high-frequency ultrasound with or without laser. Skin layers are clearly visible at between 20 and 50Hz, and lesion depth and structure can be determined. It may have significant advantages over dermoscopy,

in this regard, but has a lower sensitivity in detecting very thin lesions.

Newer techniques include confocal microscopy that uses a laser to produce near-histopathological images, electrical bio-impedance devices and multiphoton microscopy. Advantages and disadvantages, and future technologies are discussed.

**Conclusions:** Newer non-invasive techniques lead to earlier diagnosis of skin cancer which may be associated with better morbidity and mortality outcomes. Dermoscopy may be the place to start.

**P-3008****ANGIOSARCOMA OF THE CHEEK: A CASE OF SURGICAL EXCISION**Alena Kulyapina<sup>1,\*</sup>, José Ignacio Salmerón Escobar<sup>1</sup>, Alejandro Thomas Santamaria<sup>1</sup>, Carlos Navarro Cuéllar<sup>1</sup>, Cristina Maza Muela<sup>1</sup>, Carlos Navarro Vila<sup>1</sup><sup>1</sup>Gregorio Marañón General Hospital

**Introduction:** Cutaneous angiosarcoma is a rare malignant mesenchymal vasoformative neoplasm that accounts for 1% of all soft tissue sarcomas. Approximately 50% of angiosarcomas occur in the head and neck, but they account for less than 0.1% of head and neck malignancies as it tends to be aggressive and multicentric and has a reported 5-year survival rate around 20%. The surgical excision combined with radiotherapy is to be the best treatment option. Nevertheless most of the patients doesn't undergo surgical treatment due to their poor general condition and delay in diagnosis. We present a clinical case of surgical excision and reconstruction of angiosarcoma of the cheek.

**Clinical Case:** The patient 67 year old man was referred to our department for evaluation of lesion of skin of the cheek. The lesion was primarily diagnosed and treated for three months as rosacea. In spite of this treatment rapid growth was observed. On examination the lesion was presented as a violaceous nodule of 3 centimetres in diameter that occupied all the malar region. Inferior eyelid edema was observed. Magnetic resonance did not demonstrate invasion of underlying malar bone by tumour. Urgent biopsy was performed with result of angiosarcoma. The cutaneous angiosarcoma of the cheek was surgically excised. The defect of 7 centimetres in upper malar region was reconstructed with cervicofacial skin advancement flap. The anchorage system in external canthal region and in frontonasal pillar was applied in order to reattach soft tissues to the bone.

The excision margin was clear of tumour and aesthetic result was satisfactory.

**Discussion:** The differential diagnosis of cutaneous angiosarcoma is difficult due to its resemblance with other benign and malignant diseases and its low incidence. In our case the wrong initial diagnosis of rosacea led to significant delay in treatment.

The cervicofacial advancement flap in combination with anchorage system provides good aesthetic result for cheek reconstruction.



**P-3009****PATIENT REPORTED OUTCOMES FOLLOWING SKIN CANCER SURGERY TO THE HEAD AND NECK***Christopher Fowell<sup>1, \*</sup>, Grigore Mihalache<sup>1</sup>*<sup>1</sup>*Shrewsbury & Telford Hospitals NHS Trust*

**Introduction & Aims:** Patient reported outcomes are an important tool in modern healthcare provision, affecting care quality control and commissioning. We aimed to evaluate the quality of care provided by our department using a nationally recognised and validated Patient Experience Questionnaire. Comparison with both patient demographics and surgical outcomes allows particular concerns of patient groups to be highlighted.

**Materials & Methods:** A modified version of the 2010 National Health Service (NHS) national cancer patient experience survey was distributed by post to 298 patients treated for skin cancer of the head and neck between August 2009 and October 2011. This established questionnaire allows standards of care provision between hospitals to be directly compared by recording positive and negative responses.

Targets were established for the number of positive responses received for individual questions. Gold standards were those scores that would have ranked in the top 20% of all NHS hospitals in the 2010 survey.

**Results:** The response rate was 68.3% (n = 190). Targets were achieved in 11 of 21 criteria. Criteria in which standards were not achieved included failure to provide appropriate written information and areas surrounding consent. Most notable of these was patients reporting they were inadequately warned of post-operative discomfort and scarring.

Positive achievements included communication skills, team-working and confidence in doctors' knowledge and expertise.

**Conclusions:** Patient reported feedback has an increasing role in healthcare provision, allowing improvements to be made to care both locally and nationally. Following our audit, staff development programmes and a review of written patient information have been introduced with re-audit scheduled in 12 months time.

**P-3010****SOCIAL DEPRIVATION AND RURAL / URBAN VARIATIONS IN NON-MELANOMA SKIN CANCER INCIDENCE IN OUR REGION***Christopher Fowell<sup>1, \*</sup>, Emma Sandbach<sup>2</sup>*<sup>1</sup>*Shrewsbury & Telford Hospitals NHS Trust, <sup>2</sup>Shropshire County PCT*

The Index of Multiple Deprivation (IMD) is an index calculated from 38 indicators, which include income, employment, health, education and training, crime and living environment. The United Kingdom is divided into 149 Counties and ranked. Sub-areas within a given county are scored and divided into quintiles. These are subsequently ranked from Least Deprived to Most Deprived.

Studies across Europe have demonstrated Non-Melanoma Skin Cancers (NMSC) changing from a disease of the poor, to a disease of the rich. To date, there has been no similar data available for our region. The study aimed to

identify associations between the incidence of skin cancer and social deprivation in our region. Rural and urban factors would also be studied.

**Methods:** A retrospective study of patients diagnosed with NMSC by our National Health Service Hospital Trust between April 2010 and September 2011. The trust provides care for patients covered by 2 Primary Care Trusts (PCT). Shropshire PCT serves a relatively affluent county (130th of 149). Telford & the Wrekin PCT serves a more deprived area (63rd of 149).

The IMD (2010) for our region was used as a marker of deprivation. The National Statistics Rural / Urban Classification (2004) was used for analysis of rurality.

**Results:** Statistical analysis was completed using 95% confidence intervals to determine statistical significance. 2149 patients (male = 1246, 58.0%) were included in the study. 58.5% of the population lived in the area served by Shropshire PCT.

NMSC rates were significantly higher in patients living in least deprived areas in both areas. Crude rates of 2.0 per 1,000 population in the least deprived areas were observed, compared to 1.4 per 1,000 population in the most deprived areas. Overall there was no significant difference in the rates of diagnosis for NMSC between rural and urban areas.

**Clinical Relevance:** People living in the least deprived fifth of areas of our region were more likely to be diagnosed with NMSC than in the most deprived fifth of areas. Our data supports previous studies. Differences in deprivation category in our region may reflect access to treatment, as well as differences in risk factor exposure.

**P-3011****SURGERY OF MELANOMA IN SPECIFIC ANATOMIC REGIONS***Ljubomir Panajotović<sup>1, \*</sup>, Marko Panajotović<sup>2</sup>, Rade Panajotović<sup>3</sup>*<sup>1</sup>*American School of Medicine at Belgrade, <sup>2</sup>School of Medicine, University of Belgrade, <sup>3</sup>School of Medicine, University of Belgrade*

Surgery is still the most effective treatment modality of melanoma. Prompt and radical excision gives the best chance to cure. Biologic characteristics of primary tumor, its malignancy and diameter determine extensivity of excision. Regions of the face are specific in view of localisation, and complexity of structure. All of them have great functional and cosmetic importance.

In 83 newly detected cases with melanoma of the face we treated resection margins of 1 cm which we prefer in melanoma of various regions of the face, give a big defect in consideration of reconstruction. Cosmetic reason command us to close those defects primary with various types of flaps. In the cheek we made rotation, bilobar or transposition flaps, and for temporal defects transposition bilobar flaps. For defects of medial canthal region our choice is supraorbital island flap. Defect of the lower lid we closed with transposition flap, and in upper lid with bipedicular flap. We had two similar cases with melanoma of the eyebrow. Closure of postexcision defect and eyebrow reconstruction were our imperative. Reconstruction of the nose integrity was versatile. In one case we made frontal

flap, and in the rest, various sorts of local flaps. Melanomas of the ear's helix we excised including cartilage and reconstructed with composite chondrocutaneous flaps. Oncologic safety was our first goal in radicality decision, and functional, esthetic and economic criteriums in reconstructive decision. Our tendency is to close the defect directly or by local flap.

**P-3012****GIANT HEAD AND FACE TUMOURS - SERBIAN SPECIALITY?**

*Ljubomir Panajotović<sup>1,\*</sup>, Rade Panajotović<sup>2</sup>, Marko Panajotović<sup>3</sup>*

<sup>1</sup>American School of Medicine at Belgrade, <sup>2</sup>School of medicine, University of Belgrade, <sup>3</sup>School of medicine, University of Belgrade

Identification of early and thin skin melanoma has a significant impact on overall survival. Unfortunately, a great number of our patients, at initial operation, have primary tumor thicker than 4 mm.

After a giant scalp melanoma we operated nearly 8 years ago, that grew on the skin of parietal scalp to the dimensions of 120 mm in width, 100 mm in height and 453 grams in weight, which is still considered the largest described in the world literature, we report a case of gigantic primary melanoma of the face. The patient was 70 years old countrywoman. The tumor began to rise to the skin of left zygomatic part of the face three years ago. Its growth was progressive to the dimensions of 80 mm in width and 75 mm in height. At operation it was cauliflower like, sanguinant, partly necrotic tumor. True nature of the tumor was not known, but it was clear that it was malignant. Radical excision was made with margin of 2 cm from the tumor base and to the muscle in depth. The specimen was 375 grams hard. The defect was covered immediately with transposition flap. Histopathological examination reported that it was nodular melanoma, spindle cell type, Clark V, Breslow III. A careful preoperative and immediate postoperative physical examination, laboratory studies and extensive radiologic examinations did not indicate any sign of metastatic disease. After operation she had high performance status and he leaved hospital at seventh postoperative day. The patient will be under our further control and regular monitoring.

**P-3013****HATS, WIGS AND TURBAN TUMOURS**

*Syedda Abbas<sup>1</sup>, Sheire Glick<sup>1</sup>, Peter McDermott<sup>1,\*</sup>*

<sup>1</sup>Barnet and Chase Farm Hospitals NHS Trust

**Introduction**

The Turban tumour aka dermal cylindroma is a benign adnexal tumour occurring on the scalp and forehead. Cylindromas are uncommon; the exact incidence is unknown. They often present in childhood/young adulthood and continue to grow throughout life; occurring singly or as multiple lesions. The former sporadically and the latter inherited in an autosomal dominant pattern; known as familial cylindromatosis; Brooke-Spiegler syndrome. Mutations in the oncosuppressor CYLD gene (location:16q12-13;9p21) have been implicated. Multiple cylindromata may grow together in a "hat-like" configuration and may occur with other adnexal

tumours; spiradenomata and trichoepitheliomas. Malignant transformation has been reported.

**Methods:**

A 78year-old widow, attended A&E; thereafter referred to OMFS, regarding multiple bleeding scalp lumps. A white-coat phobia had prevented medical attention being sought and so the condition was self-managed for 48years. Concern had arisen recently due to haemorrhagic episodes and one lump "dropping off".

A strong family history was noted; her father, sister, 2 nieces and nephew, all suffering the same condition.

Clinical examination revealed extensive, multiple, reddish, fungating, rubbery nodules virtually spanning her entire scalp.

Multiple biopsies revealed benign cylindromas and spiradenomas with a minor degree of cytological atypia. After skin MDT discussion, a CT head was performed showing no bony invasion and multiple sequential surgeries undertaken to resect the tumours. The extensive defect was reconstructed essentially with split skin grafts.

The well-healed defect now sports a natural-looking wig and the patient reports a vastly improved quality of life.

The authors illustrate this disfiguring condition with dramatic clinical photographs, imaging and histopathology.

**P-3014****MALIGNANT MELANOMA FOLLOWING RADIOTHERAPY FOR PAROTID TUMOUR**

*Tun Wildan<sup>1,\*</sup>, Arti Chauhan<sup>1</sup>, Phillip Ameerally<sup>1</sup>*

<sup>1</sup>Northampton General Hospital

**Introduction:**

The incidence of melanoma is on the increase and it has a slow early growth rate and can take many years before it becomes clinically apparent. Radiation therapy had been implicated as a causative factor for second primary malignancies of the skin. Basal cell carcinoma (BCC) and squamous cell carcinoma (SCC) arising post-radiation therapy have been well documented, whilst malignant melanoma arising within a radiotherapy field remains a rarity.

**Case report:** An 86-year-old Caucasian gentleman presented with a brown/black pigmented patch in the left preauricular region. The lesion started 5 years previously and in the last 6-12 months had become darker in colour and had increased in size. He had a history of a left parotidectomy for a parotid tumour 59 years previously, followed by local radiotherapy to the parotid bed. Histology revealed pleomorphic cells/tumour of salivary tissue with a good deal of metaplastic squamous epithelium suspicious of malignancy.

Upon clinical examination, the patient had an irregularly shaped pigmented lesion measuring 15 x 12 mm in size in the left pre-auricular region. An area of post radiotherapy scarring was evident adjacent to the inferior margin of the pigmented lesion. The pigmented lesion showed clinical and dermoscopic features that were suspicious for malignant melanoma. Treatment comprised of excision of the lesion with a margin followed by primary closure.

*Discussion:* Melanomas developing in radiotherapy fields may indicate that these sites are vulnerable points ('locus minoris resistentiae'). These metachronous cancers are usually associated with a significantly higher risk of mortality. However, the number reported remains small and the risk of administering radiation therapy is largely outweighed by the benefit of treating the primary neoplasm. Irradiation has been identified as a causative factor for cutaneous malignant melanoma by Conley in 1970. Radiation therapy may enhance mutations in melanocytic cells and subsequently lead to the occurrence of skin melanoma.

In conclusion, the risk of malignant melanoma arising in the field of radiotherapy remains small. However, long term surveillance of skin changes in the irradiation field is necessary, in order to diagnose and treat second primaries in their early stages.

#### P-3015

### LEFT RETROAURICULAR POLIMETASTATIC MELANOMA THERAPEUTICALLY "CHRONIFIED"

*Francisco Hernández Altemir*<sup>1,2,\*</sup>, *Sofía Hernández Montero*<sup>1,3,4</sup>, *Susana Hernández Montero*<sup>1,4</sup>, *Elena Hernández Montero*<sup>1,5,6</sup>, *Blanca Homet Moreno*<sup>7</sup>, *Jose Antonio López Martín*<sup>7</sup>

<sup>1</sup>*Clinica Doctores Hernández Altemir-Hernández Montero Zaragoza Spain*, <sup>2</sup>*Red Cross Zaragoza Spain*, <sup>3</sup>*Alfonso X University Madrid Spain*, <sup>4</sup>*Zaragoza University Spain*, <sup>5</sup>*Villadecans Hospital Barcelona Spain*, <sup>6</sup>*Otoneurosurgery Institut García Ibáñez Barcelona Spain*, <sup>7</sup>*Oncology Department, University Hospital 12 de Octubre Madrid Spain*

Melanoma evolution is one of the most unpredictable ones and not infrequently it may disappear spontaneously which rarely can occur in classic tumors always with a more defined behavior.

We presented a case dated April 2010 of a male patient, 73yo, 103 kg, hypertension, diabetes, pulmonary tuberculosis, smoker, with left auricular malignant melanoma, locally operated on two times in 2006, that extended in an apparently independent retroauricular area. New surgery was performed after negative study extension. Histological result: parotidocervical complete resection without nodal metastases, and under oncologist advice he was supplemented with left cervical radiotherapy.

Few months later, he manifested a gradual growth of "new sessile tumor" in the initial area, with positive cytology for melanoma. Also universal metastatic syndrome confirmed by CT (05/2011). Great overall deterioration.

With our suggested modification of the classic TNM formula "T (a) (i) N (a) (i) M (a) (i)" and / or "G (n): TNM (\*)" the present case T4 (i) N4 (i) M (i) was according to the same, inaccessible even to medical "ordinary" oncology.

On June 2011, following guidelines BRF 113683 Clinical Trial, he starts phase of screening and treatment protocol with BRAF inhibitor, so its actual history reveals clinically good general condition associated with fatigue, active life without pain or distermias, minimum papular lesion in the tumor first location. No lymphadenopathy.

We are now, following our TNM proposal in a "T0 N (x) M (i)" that allow us continue with BRAF inhibitor therapy because of the improvement of the patient.

While good tolerance and stable disease are present the treatment should be continued as there is no limit or fixed number of months of treatment with BRAF inhibitor. In our extensive experience in oncology, we have never seen before a clinical and radiologic involution of a case as virulent as the one we present. The surprise for unprecedented regression of "primitive" and metastatic lesions make us to question about how much this chronic involution could be maintained.

#### P-3016

### TRIGEMINAL TROPHIC SYNDROME - AN UNSUSPECTING DIAGNOSIS FOR THE UNWARY

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<sup>1</sup>*Northampton General Hospital*

*Introduction:* Trigeminal Trophic Syndrome (TTS) is a rare disorder, usually of adults, in which trophic ulceration follows minor, repetitive trauma to anaesthetic skin within the trigeminal distribution unilaterally. Causes of this disorder include central sensory neuronal damage or injury to the trigeminal ganglion or its nerve branch and repeated trauma to the area, akin to diabetic foot ulcers. It is characterised by anaesthesia, paraesthesia, and crescent-shaped ala nasi ulceration and can be confused with the presentation of a basal cell carcinoma (BCC) of the skin along with other disease entities.

*Case report:* We present a case of a 78 year old lady with a history of trigeminal neuralgia and stroke who presented with crusty, ulcerated lesion of the right inner nostril, along with lesions of the right medial canthus and chin over a number of years. Although its clinical appearance resembled a BCC, wide local excision of the lesions did not show any histological features of a skin malignancy. These lesions were misdiagnosed as BCCs by a number of clinicians from different specialties.

*Discussion:* Diagnosis of TSS is clinical and treatment of this disorder is difficult with the main focus being on prevention of further self-induced trauma. Pharmacological interventions are only met with a limited success. Our report aims to highlight the need for consideration of this rare disorder in the diagnosis of such lesions with a view to direct treatment of the underlying neurological condition rather than unnecessary surgery.

#### P-3017

### OSTEOMA CUTIS WITH CALCIFICATION OF THE BILATERALLY CHEEKS

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<sup>1</sup>*Tokai University Hachioji Hospital*, <sup>2</sup>*Tokai University, School of Medicine*

Osteoma cutis is a rare condition involving the formation of bone in skin or subcutaneous tissue.

This may be a primary event or, more often, secondary to an inflammatory, traumatic, or neoplastic process.

We report a case of osteoma cutis with intermingled calci-

fication of the bilaterally cheeks.

A 23-year-old Japanese female was referred by secondary infection of the right mandible cyst.

Her presented with two cutaneous lesions involving the cheeks of both sides, separately from the right mandible cyst.

In a CT scan of the face revealed calcified irregular mass restricted the skin and subcutaneous soft tissues bilaterally.

Histological examination of an excised lesion showed a fragment of lamellar bone with intermingled calcification lined by osteoblasts in the subcutaneous adipose tissue.

The findings were consistent with osteoma cutis, a primary cutaneous ossification.

There was not the report that calcified structure was intermingled in the report of the osteoma cutis so far, and it was thought with a very rare case.

## 31. SKULL BASE SURGERY

**P-3101**

### SUBFRONTAL APPROACH FOR ESTHESIONEUROBLASTOMA TREATMENT: CASE REPORT

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<sup>1</sup>H.Universitario Vall Hebron

Esthesioneuroblastoma is an uncommon malignant tumor of the olfactory mucosa located in the sinonasal tract with controversial management due to its low incidence and unknown origin. This poster reports a case of a 44-year-old female treated at our institution with a subfrontal approach and review the relevant literature regarding this tumor and the advantages of this surgical approach.

reconstruct it immediately with a nerve graft. The nerve graft does not contraindicate postoperative radiotherapy and did not affect nerve regeneration. The temporoparietal fascial flap fills the volume of the parotidectomy, prevents Frey's Syndrome, and covers the nerve graft.

*Conclusions:* To obtain adequate functional and aesthetic results after a parotidectomy with partial or total facial nerve resection, immediate nerve reconstruction and filling of the defect volume is valuable.

## 32. SURGERY FOR FACIAL PARALYSIS

**P-3201**

### SURAL NERVE GRAFT AND TEMPOROPARIETAL FASCIAL FLAP IN THE MANAGEMENT OF ADENOID CYSTIC CARCINOMA IN THE PAROTID GLAND

*Raquel Villar<sup>1,\*</sup>, Benito Ramos<sup>1</sup>, Juan Jose Haro<sup>1</sup>, Manuel Acosta<sup>1</sup>, Antonio Gómez<sup>1</sup>*

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*Background:* Adenoid cystic carcinomas constitute 10-30% of all malignant tumours of the parotid gland. These are slow-growing, apparently indolent tumours, with frequent local recurrence and distant metastasis, even years after treatment, making control of the disease challenging.

*Objectives:* We report a case to present the management of the functional and aesthetic sequelae arising from treatment.

*Case Report:* Following a fine-needle aspiration biopsy, a 43-year-old woman was diagnosed with basal cell adenoma in the deep parotid lobe. In the Otolaryngology Department, she underwent a partial parotidectomy with preservation of the facial nerve. The histology revealed an adenoid cystic carcinoma with positive margins. In our Department, we completed the parotidectomy, sacrificing the facial branches with tumour involvement. We reconstructed the facial nerve with a sural nerve graft and the post-parotidectomy defect with a temporoparietal fascial flap. Postoperative radiotherapy was given. At one year, there was good facial symmetry at rest, good eye closure, and a smile was achieved. Electroneurophysiology studies revealed facial nerve regeneration quasi ad integrum.

*Discussion:* The treatment of an adenoid cyst carcinoma in the parotid gland is a parotidectomy that includes the tumour with adequate margins. Postoperative radiotherapy in high-grade cases improves the loco-regional control rate. When the facial nerve is affected clinically or involved by the tumour, it necessary to resection it and

### 33. SURGERY OF THE NASAL CAVITY AND PARANASAL SINUSES

**P-3301**

#### **A MODIFIED CALDWELL-LUC TECHNIQUE FOR TREATMENT OF AN OROANTRAL FISTULA. HISTOLOGICAL EVALUATION OF THE NEW FORMED BONE.**

*Paulo Coelho<sup>1,\*</sup>, André Chen<sup>1</sup>, João Caramês<sup>1</sup>*  
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*Aim:* To evaluate the viability of a modified Caldwell-Luc approach technique for an oroantral fistula closure through the histological vital bone analysis.

*Material and Method:* Two clinical cases of well established oroantral fistulas secondary to the extraction of an upper molar. The closure of the fistula via a lateral wall approach of the maxillary sinus, retraction of Schneider's membrane and placement of a collagen resorbable membrane (Geistlich Bio-Gide®) separating the Schneider's membrane from the xenograft bone substitute (BiossÒ - Geistlich). Lateral wall window closure with another collagen resorbable membrane (Geistlich Bio-Gide®) and suture with poliglalin 911 (Vicryl-EthiconÒ). At third month after, an implant (Biomet 3I – Certain - 5mm \*13 mm) was placed and a 4 mm diameter sinus trephine core was removed for histological evaluation. At sixth month a metal-ceramic crown was placed.

*Results:* Both implants survived. Histomorphometric analysis of ground sections from the bone biopsies pre-

pared according to the standard method of Donath & Breuner (1982) produced an average percentage of vital bone of 14.7% and a proportion of bone substitute material of 27.9%.

*Conclusion:* Within the limitation of being a study of only two cases, the modified Caldwell-Luc approach seems to be a viable technique for oroantral fistula closure and providing bone regeneration for the subsequent implant rehabilitation. The viability of this technique was demonstrated by the formation of vital bone at the same percentage as described in the literature for a typical sinus lift.

**P-3302**

#### **OUR OWN METHOD OF THE SELF-INDUCED ORO-NASAL FISTULA. A RARE OCCURRENCE.**

*Bogna Zielinska-Kazmierska<sup>1,\*</sup>, Adam Szyszkowski<sup>1</sup>, Joanna Grodecka<sup>1</sup>*  
<sup>1</sup>Medical University of Lodz, Poland- Cranio-maxillo-facial Surgery Clinic

Oro-nasal fistulas can occur as a result of various diseases and surgical procedure in the oral cavity and maxillo-facial areas. At present, the literature describes cases of oro-nasal fistulas caused by either: injuries to maxillofacial region, oncological surgeries, cleft palate or removal supranumerary and retained teeth in maxilla. Occurrence of the oro-nasal fistulas is sometimes attributed to chronic cocaine abuse, which leads to the bone destruction and palatine mucosa perforation.

Occurrence of the self-induced oro-nasal fistula without a tangible cause has yet to be described. Consequently, introduction of our patient and our method of treatment seems interesting.

## 34. SURGERY OF THE ORAL CAVITY

### P-3401

#### EFFECTIVENESS OF POSTOPERATIVE USE OF AMOXICILLIN IN THIRD MOLAR SURGERY

Alberto Garcia Perla Garcia<sup>1,\*</sup>, Daniel Torres Lagares<sup>2</sup>, Rodolfo Belmonte Caro<sup>1</sup>, Fernando Iglesias Martin<sup>1</sup>, Elena Aced<sup>2</sup>, Pedro Infante Cossio<sup>1</sup>, Jose Luis Gutierrez Perez<sup>1,2</sup>

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**Introduction:** Removal of third molars usually requires antibiotic treatment post operatively. The most commonly used are broad-spectrum antimicrobials, Amoxicillin, but there is controversy as to whether it is necessary to add Clavulanic acid.

**Objectives:** To compare the effectiveness of antibiotics used after third molar surgery: Amoxicillin 1g and amoxicillin 875mg with Clavulanic Acid 125mg.

**Methods:** We conducted a prospective randomized controlled study in patients requiring extraction of third molars in our Unit. These patients were divided into two groups randomly. After the operation antibiotic regimens were implemented. We had a total of 670 patients.

- Group I: patients who were given Amoxicillin 875mg/Clavulanic Acid 125mg (1/8h/7 days).

- Group II: patients who were given Amoxicillin 1g (1/8h/7 days)

At Day 6 post op we assessed patients using a VAS questionnaire. It assessed five main criteria of infection according to recommendations in the literature. It also evaluated the presence of gastrointestinal upset. The next day we reviewed patients who demonstrated infection according to the criteria.

**Results:** We present preliminary results of the study involving 670 patients of which 546 met all inclusion criteria. 52.9% in group I, and 47.1% in Group II. We found significant differences between the two protocols when analysing a single criterion of infection; 15 patients in group I, and 54 in group II. But when more than one criterion was included, which further defined a true infection, there was no significant difference between the two groups. With two criteria there were 2 patients in group I and 9 patients in group II, and the difference becomes statistically significant. With three criteria there were two cases in group I and 4 patients in group II, no statistically significant difference. We found a greater number of gastrointestinal complications in group I with 30 cases versus 3 in group II, with differences statistically significant.

**Conclusions:** Clinically, Amoxicillin 1g and Amoxicillin with Clavulanic acid 875/125mg are equally effective in preventing infection after removal of impacted third molars, since there was no statistically significant difference between the two drugs when considering several criteria of infection. Amoxicillin/Clavulanic Acid has more gastrointestinal complications and a higher cost.

### P-3402

#### DIFFERENTIAL THERAPY OF PRIMARY FAILURE OF ERUPTION

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**Introduction:** The primary failure of eruption (PFE) is defined by a complete or partial failure of eruption of mostly first or second molars, not affected by ankylosis. Local or systemic causes are not involved.

A familial clustering is observed in 50% of the cases, loss of function mutations of PTHR1 are related to the non-syndromic form.

**Material and methods:** 15 patients suffering from PFE were examined clinically and radiologically. Special attention was paid to the contour of the posterior occlusion plane. The results of orthodontic treatment were examined concerning any possible tooth mobilisation. On the basis of this data a therapeutic concept was developed.

**Results:** The patients were classified according to the contour of the posterior dental arch following a straight, a convex or a concave line. In none of the examined cases was tooth mobilization via orthodontic treatment observed.

The applied therapeutic strategies were single tooth or segmental distraction, orthognathic surgery or prosthetic build up.

Finally every patient was orally rehabilitated and the affected teeth reached the occlusion plane.

**Conclusion:** PFE is a malfunction of the eruption mechanism (eruption disorder). The problem is caused by the local peri-dental tissues showing abnormal reaction to orthodontic forces.

There is only limited experience with treatment concepts: the impact of orthodontic treatment is limited, therefore distraction concepts are preferred because of the combined bone and soft tissue regeneration. The final occlusion is often reached by prosthetic coronal build-up.

### P-3403

#### RESULTS AFTER INTENTIONAL AUTO-ALLOPLASTIC REIMPLANTATION OF INJURED PERMANENT TEETH

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**Introduction:** The treatment and the preservation of severely traumatized teeth are known to pose a challenge in oral surgery. In particular, severe tooth trauma of children and adolescents is difficult to treat, mainly due to the growing jaw of these patients.

**Material and Method:** In this clinical study, teeth with severe trauma were treated using an extraoral endodontic method. This method, the so called auto-alloplastic reimplantation, uses a titanium post as endodontic filling prior to replantation. The aim of this study was to determine the survival rate of such reimplanted permanent front teeth using a number of defined parameters. In total, 44 patients with 58 reimplanted teeth were re-evaluated within this

study. Collected data originated from patients who were treated between 2000 – 2005 (mean age of the patients:  $15.39 \pm 10.99$  StdDev years of age).

**Results:** The average observation time was 58 ( $\pm 30.7$ ) months for 41 out of 58 teeth until 2009 or the respective tooth lost. In total four teeth were removed as a result of the trauma. Furthermore five teeth were removed due to other reasons. 24 teeth healed with a functional periodontal ligament (functional healing), eight teeth healed with ankylosis and a further eight showed replacement resorption. Infection related resorption affected two teeth and these were removed after two months. The 5-year survival rate according to Kaplan-Meier analysis was 83.9 %, the estimated time of survival was 88.5 months. There was no difference between avulsed and not avulsed reimplanted teeth or storage and tooth loss ( $p=0.178$ ). Mature teeth showed a significantly higher 5-year survival rate (92.2%) than immature teeth (72.4%,  $p = 0.041$ , log rank test). Auto-alloplastic reimplanted teeth showed a higher survival rate than conventional reimplanted teeth.

**Conclusion:** In summary it can be stated that auto-alloplastic reimplantation reveals a new method in the management of dental trauma. Some expertise in using specialized new instruments is needed to achieve results which are superior to present standard treatment. The auto-alloplastic reimplantation method is a successful treatment modality in the preservation of avulsed or severely traumatised teeth.

#### P-3404

### CRYOSURGERY AS A METHOD IN MAXILLOFACIAL AND ORAL SURGERY

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**Introduction:** Cryosurgery is a method of treatment involving the local, controlled destruction of pathological tissue using low temperatures. The term "cryosurgery" was used for the first time by the German dermatologist, Juliusburg in 1905.

**Aim of the study:** Description of the use of cryosurgery in the treatment of head and neck region pathologies and presentation of our experience.

**Material and methods:** Between 2010-2012 cryosurgery was performed in 29 patients. There were 14 male and 15 female patients aged from 22 to 88 years (mean age  $x=52,2$  years). Compressed nitrous oxide was used (Metrum Cryoflex). Location of treated lesions were: the oral mucosa (22 patients), the lower lip (2 patients) and the skin (5 patients).

**Result:** 20 out of 29 patients achieved complete recovery after the first procedure. It was necessary to perform more than one session in the remaining 9 patients. There were no early or late complications observed.

**Conclusions:** Cryosurgery is a safe, bloodless, painless and non-toxic method. It can be used in children and adults. It is possible to use this method even in patients with poor general health. Complications during and after

cryosurgery are rare.

#### P-3405

### PROPOSED TREATMENT REGIMEN OF INFLAMMATORY-HYPERPLASTIC GINGIVAL TUMOURS, WITH PARTICULAR FOCUS ON CAUSAL TREATMENT

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**Introduction:** Patients with inflammatory-hyperplastic gingival tumours constitute a large group among patients of Oral Surgery Departments. Aetiology of these lesions indicates the important role of chronic trauma and poor dental hygiene.

**Aim:** The aim of the study is to develop a treatment regimen for inflammatory-hyperplastic gingival tumours, with particular focus on causal treatment and prevention of recurrence and to evaluate the clinical outcomes.

**Material and methods:** 104 patients with 106 inflammatory-hyperplastic gingival tumours were treated at the Department of Oral Surgery of the Medical College at the Jagiellonian University between 2009 and 2011. There were 55 female (52,88%), 37 male (35,58%) and 12 children under 15 (11,54%). The average age was 44,45 (SD 20,97).

Poor oral hygiene and calculus deposits were observed in 62 patients (59,61%), subgingival carious defects in adjacent teeth in 8 patients (7,69%), filling overhang or fixed prosthetic work in 6 patients (5,66%), malocclusion in 18 patients (17%).

Based on the analysis of potential reasons for the tumours and methods of treatment used at the Department of Oral Surgery at the Medical College of the Jagiellonian University a regimen of extensive treatment for patients with inflammatory-hyperplastic gingival tumours was proposed. The treatment was divided into three phases:

1. Full mouth disinfection – in the case of extensive lesions or with quick progression preceded by the collection of a specimen for histological examination.
2. Surgical treatment including restorative treatment of soft tissue defect and histological examination of the whole lesion.
3. Maintenance therapy

**Results:** Recurrences were observed in 4 cases (3,77% of all tumours). Poor dental hygiene was observed in two cases of recurrence and in one case malocclusion of the adjacent tooth was detected.

**Conclusions:**

1. In the aetiology of these lesions chronic trauma and poor oral hygiene are important factors.
2. Achieving and preserving excellent hygiene before the surgery and during the follow-up period is essential to achieve a good surgical effect and prevent recurrence.
3. Appropriate evaluation of the regenerative ability of periodontal tissue and adequate planning of restorative treatment in the case of excessive soft tissue defect, allows a good functional and aesthetic result of treatment with proper marginal gingival contour.



**P-3406****STANDARDISATION OF CONSENT FOR THIRD MOLAR SURGERY**Louise Ormondroyd<sup>1,\*</sup>, Robert Banks<sup>1</sup><sup>1</sup>Sunderland Royal Hospital

**Objective:** Removal of mandibular third molars is associated with both general surgical risks as well as those specific to the procedure. According to the General Medical Council (GMC) and Department of Health (DoH), a patient must be made aware of both common and serious complications in order to give informed consent. The National Institute for Clinical Excellence (NICE) defines the indications for third molar removal but does not list common and serious risks that should be disclosed in order for consent to be valid.

Unless risks are standardised they are likely to vary between clinicians. This study looked at the most frequently quoted risks relating to third molar removal in an outpatient setting.

**Method:** A literature review showed that prior to mandibular third molar removal patients should be aware of; pain, trismus, swelling, bleeding, infection, damage to other teeth, use of sutures, temporary and permanent lingual and inferior alveolar nerve paraesthesia.

A retrospective analysis of 100 consent forms of patients undergoing third molar removal in an out patient setting were reviewed for content and consistency against literature identified risks.

**Results:** Consent forms included as few as 2 potential complications set out in the literature review, therefore not meeting our gold standard. Pain (n=93) and permanent nerve paraesthesia (n=93) were risks most commonly discussed, however the percentage risk value for these injuries was only given in 52% of cases. The least common risk discussed was damage to other teeth (n=2).

**Conclusion:** The warnings given to patients prior to third molar removal markedly vary between clinicians. Given the frequency of the procedure, there is no reason why consent could not be standardised locally, regionally or nationally to ensure all patients are consented to the same standard. The use of a pre-printed consent form including frequent and serious risks would facilitate this.

**P-3407****THE MEDICO-LEGAL VIEW OF THE LEVEL OF INFORMATION REQUIRED WHEN TAKING CONSENT FOR THE SURGICAL REMOVAL OF THIRD MOLARS.**Danielle Britten<sup>1</sup>, Andy Burns<sup>1</sup>, Robert Banks<sup>1,\*</sup>, Matthew Kennedy<sup>1</sup>, Micheal Nugent<sup>1</sup>, Louise Ormondroyd<sup>1</sup><sup>1</sup>Sunderland Royal Hospital

**Introduction.** It is standard practice to seek written consent from patients prior to carrying out surgical procedures. However there is no accepted standard for the level of information that should be given to patients prior to carrying out surgery. In an attempt to reach an informed consensus we surveyed maxillofacial surgeons with regards to how much information they place on the consent form with regards to the possible complications of third molar surgery. We then surveyed a cross section of medico legal solicitors asking them how much information they felt

patients should be given prior to their procedure.

**Method:** A questionnaire was designed and posted to a random selection of medico legal practitioners from the Legal 500. A covering letter explained the purpose of the study, some details about surgical removal of third molars and the questionnaire explored how much information they felt should be given to patients and in what form prior to carrying out the procedure. A second questionnaire was designed and mailed to a random selection of consultant OMFS surgeons in the UK establishing how much information they gave to patients prior to carrying out third molar surgery and in what form this information was offered.

**Results:** We present the results of our surveys and highlight the differences in opinions between the legal profession and the maxillofacial community.

**Conclusion:** We suggest a minimum standard of information that should be given to patients prior to removing their third molar teeth.

**P-3408****COMBINED ORTHODONTIC-SURGICAL REMOVAL OF AN IMPACTED WISDOM TOOTH FROM THE CANAL OF THE INFERIOR ALVEOLAR NERVE**Zoltán Nyárady<sup>1,2,3,\*</sup>, Zoltán Altay<sup>1</sup>, Lajos Olasz<sup>2</sup>, Katalin Nagy<sup>3</sup><sup>1</sup>Private Praxis, Hungary, <sup>2</sup>Department of Oral and Maxillofacial Surgery, University of Pécs, Hungary, <sup>3</sup>Department of Oral Surgery, University of Szeged, Hungary

The authors present a case of a combined orthodontic-surgical removal of an impacted wisdom tooth from the canal of the inferior alveolar nerve.

**P-3409****REGENERATION PROCESS OF PERIODONTIUM AFTER THE APICETOMY**Janka Jencova<sup>1,\*</sup>, Adriana Petrasova<sup>1</sup>, Andrej Jenca,jr.<sup>1</sup>, Jan Danko<sup>1</sup><sup>1</sup>Department of Stomatology and Maxillofacial Surgery, Medical Faculty, University of P. J. Safarik and University Hospital, Kosice,

**Introduction:** Apical periodontitis is inflammation of the periodontium at the portals of entry of the root canal system, typically located at the root apex and lesions may develop at lateral and furcation locations (1).The radiographic diagnosis (2) of apical periodontitis is based on deviations from the normal periapical anatomy.

**Materials and methods:** In the period 2006 – 2007, 100 patients were treated at our clinic. In 63 cases we used only root canal treatment. In 37 cases we used a combination of endodontic and surgical treatment and utilization of regenerative material (application of mesenchymal stem cells from the Tissue Bank).

**Results:** Healing may be due to chemical irritation resulting from the root canal treatment and will usually revert to normal (2).Clinical practice and follow-up studies have shown that a large proportion of treated cases of chronic apical periodontitis show signs of healing within 1 year of

treatment, and in many instances as early as 2 – 4 months. However, arguments have been presented to review root filled teeth until complete healing is seen on radiograph, sometimes up to 7 or more years, and 4 years has been proposed as a standard (3).

**Conclusion:** Healing was successful in 73% of cases, but in combination with surgery was more than 91% successful and the period of active healing decreased by 23%.

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#### P-3410

#### MEASUREMENTS OF BONE DENSITY AFTER APICOTOMY AND IMPLANTATION OF BIO-OSS

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Bony defects of the mandibular and maxillary ridge are usually of iatrogenic origin. This comparative study was designed to distinguish differences in the healing process with and without Bio-Oss, trends of healing after 1, 6 and 12 months, using radiographic analysis of densitometry. 30 patients (17 male and 13 female), diagnosed with periradicular bone defects, were included.

Surgery was based on Peter's protocol, and as indicated the retrograde amalgam obturation of root canal was carried out. Follow ups were done 1, 6 and 12 months after initial surgery. 30 patients were divided in to two groups consisting of 15 cases. In the first group (study group), bone defect was filled with Bio-Oss after apicectomy, and in the second group (control group) bone defect was left without Bio-Oss after apicectomy. Periapical radiographs with Kodak 2100 generator and RVG 5100 digital x-ray sensor were done before, immediately after and 1, 6 and 12 months after surgery. Each radiograph was evaluated for densitometric values, using "Densitometric Analysis" software of Kodak Dental Imaging Software 6.11.7.0. Level of Brightness in radiography is measured with scales between 0 to 255.

Based on clinical parameters, successful healing was found in 26 patients (14 patients in study group and 12 patients in control group), and slow healing in 4 patients (1 in study group and 3 in control group). Increase of bone density was evident in 24 patients and slow increase of bone density in 6 patients.

#### P-3411

#### NITRIC OXIDE LEVELS IN INFLAMMATION AFFECTING DENTAL FOLLICLES OF THE IMPACTED THIRD MOLARS

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**Purpose:** The term oxidative stress is used to designate any condition that results in an accumulation of free radicals in tissue. Oxidative stress is considered to play a key role in tissue damage and promotion of various pathological processes. Nitric Oxide (NO) is an indicator showing oxidative stress. The aim of this study is to compare the differences of the levels of NO between inflammation affecting the dental follicle (DF) and non-inflamed DF.

**Materials Metods:** This study involved 59 inflamed and 59 non-inflamed dental follicles from 118 patients for clinically and radiologically symptomatic and asymptomatic impacted third molars. A hundred and eighteen dental follicles were obtained during surgical removal of teeth. All tissues samples were analyzed for NO as an indicator of oxidative stress.

**Results:** Levels of NO were significantly higher in inflamed DF of impacted third molars than non-inflamed DF of impacted third molars (p

**Conclusion:** The results of presented study showed that important oxidative stress has occurred in inflamed DF of the impacted third molars. The findings suggest that increased NO may play an important role in oxidative stress in the inflamed DF.

#### P-3412

#### ANTIBIOTIC PROPHYLAXIS IN INTRAORAL BONE GRAFT PROCEDURES

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**Introduction:** Procedures for regenerating of the tissue of alveolar bones are commonly performed by oral and maxillofacial surgeons. The tissue for these treatments is usually taken intraorally. As is clear from the literature the obtaining of the intraoral bone material carries the risk of contamination by the oral bacterial flora which, in favourable conditions, may be the cause of infection of the transplant- recipient region. For this reason it is necessary to use prophylactic antibacterial agents. Antibiotics can be administered systemically and/or topically. Systemic administration of antibiotics allows for high drug concentrations in all tissues of the body but on the other hand carries the risk of toxic effects on distant tissues and organs, allergic reactions, alteration or elimination of bacteria normally present in the body and the development of multiple drug resistance. In addition some authors question the effectiveness of this method of medication as insufficient in protecting the transplant and recipient region due to poor blood supply to the transplant in the early stages of healing. The effect is too low saturation of an antibiotic to prevent the infection. Topical administration

of chemotherapeutic agents allows for a high concentration of drug in the implant site with no toxic effects on tissues while reducing the risk of systemic side effects of antibiotic therapy. This method, however carries out one difficulty - the possibility of giving the drug only during surgery (powders, rinses, supplements to bone replacement materials).

**Aim:** The aim of this study was to determine the pattern of antibiotic prophylaxis during the treatment of intraoral bone grafting on the basis of available literature.

**Material & Method:** The online database of scientific papers MEDLINE/PubMed was searched using the keywords "bone graft", "antibiotic prophylaxis", "surgical prophylaxis" and "infection" in various combinations, and paying attention to their interrelations. Thirty six papers on this subject in English were found.

**Results:** At bone grafting procedure the antibacterial treatment is necessary. The antibiotic of choice is Amoxicillin. In the case of contraindications to its administration Clindamycin or Erythromycin can be used. It is used as a single dose orally one hour before surgery under local anesthesia or intravenously administered during induction of general anesthesia. Topical antibiotic use is the supplementation of the above application schema.

**Conclusions:** Antibiotic prophylaxis does not function as substitute to the proper surgical technique but during the treatment consisting of intraoral bone grafting it is necessary.

#### P-3413

##### BUCCAL FLEXIBLE FILMS AS THE ORAL LESION DRESSINGS

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Buccal flexible films in the form of solid, thin, mucoadhesive patches are dressings which enable separation of the lesion from the environment of the oral cavity. Moreover, a suitable medicinal product in the form of commonly used oral gels, pastes or powders could be applied under the film. This cover can limit elution of applied preparation by saliva and prolong its effect from several minutes to several hours. Extended contact period between active substance and mucosal defect can significantly improve the therapy effectiveness and can increase patient compliance compared to recently used, several times a day applied conventional dosage forms such as oral semi-solid products (gels, pastes), solutions for irrigation, or pastilles.

The aim of the experiment was the formulation, development, preparation and in vitro and in vivo evaluation of mucoadhesive films intended to cover oral mucosal defects. Various flexible dressing films were prepared by solvent casting method and based on innovative mucoadhesive polymers. Liquid dispersions of mucoadhesive polymers and suitable plasticizer were cast into plastic form and after drying the backing layer was applied on

one surface of the film. Differences in the properties of mucoadhesive films (mechanical resistance, residence time, soreness after application, taste and etc.) were evaluated on the oral mucosa of the group of 12 healthy volunteers.

The results showed that all tested films had good mechanical resistance, residence time on the mucosa more than 2 hours and do not cause any side effects (soreness, irritation, salivation, etc.). Overall, prepared mucoadhesive films could be beneficial in therapy of mucosal surface lesions.

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#### P-3414

##### THE COMPARATION OF EFFICIENCY OF LOCAL ANAESTHETIC LIDOCAINE 2% VS ARTICAIN 4% DURING SURGICAL EXTRACTION OF WISDOM TEETH BY DEFINING THE SERUM CORTISOL LEVEL

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The reaction to the adrenal stress joined by the tooth extraction is much larger than the stress caused during any other dental routine intervention. The patients that are subjects to wisdom tooth removal, produce large amounts of steroids in comparison with healthy patients which undergo other dental intervention.

The objective of the research is to determine the efficiency of local anaesthetic lidocaine 2% with adrenaline vs articaine 4% with adrenaline during surgical extraction of wisdom tooth by defining the serum level of hormone cortisol by RIA method, arterial blood pressure arterial puls., SO<sub>2</sub>, and VAS; before, during and after the intervention .

The study is inducted in Dep.of Oral Surgery of CUSCK where 35 patients with indication of extraction of both wisdom tooth of the lower jaw, underwent surgical removal of the tooth. Lidocaine 2% was used for the extraction of wisdom tooth in one side while the tooth of the other side , at the same patients, was extracted one month later where articaine 4% was used. Before application of the anaesthetics for the extraction of teeth, during extraction and upon completion of the extraction, the blood samples are obtained with the aim of defining the level of cortisol in the serum, and blood pressure, arterial puls, and SO<sub>2</sub> were measured. A visual analog scale was used to assess pain during surgery, and subjectively evaluate the anesthetic efficacy of the two solutions.

**Results:** Although, with single cases where lidocaine and articaine are used the mean value of cortisol based on the ANOVA variance analyze , shows the significant statistical value for the blood cortisol levels before, during and after intervention, when we compared mean values of the blood cortisol in between anaesthetics, before(T-test=1.136,p>0.05) during( T-test=1.22, p>0.05) and after(T-test=1.27,p>0.05) intervention, we didn't find important significant statistical distinction. The similar

results are found for blood pressure, puls and SO2.

*Conclusion:* The results obtained suggest that there is similar anesthetic efficacy with both solutions therefore they are equally safe to be used during surgical extraction of wisdom tooth.

Key words: Stress, Lidocaine Articaine, , anesthetic efficacy, wisdom tooth.

#### P-3415

### CONSENTING FOR THIRD MOLAR REMOVAL - HOW ARE WE DOING? A PROSPECTIVE AUDIT WITHIN A TEACHING HOSPITAL

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*Introduction:* The extraction of mandibular third molars is one of the commonest procedures carried out in maxillofacial departments and is frequently performed by different grades of operators with varying levels of experience. There are a number of associated risks of which the patient must be informed therefore a standardised comprehensive and well documented consent procedure is essential.

*Aims:* We aimed to compare the quality of the consent process for third molar removal within our maxillofacial department with a predefined standard. As there is no universally recognised gold standard we devised an ideal set of standards based on a literature review and expert opinion.

*Methods:* Data were collected prospectively for patients undergoing third molar removal under general anaesthetic at the University Hospital of Wales. An observer (a dental student who was allocated to the clinics as part of her course) assessed the verbal consent process and written documentation without informing the operator about the audit; this was in order to eliminate the Hawthorne effect. 100% compliance was set as the desired standard. *Results* were analysed using the SPSS package.

*Results:* Data were collected for 47 cases over a period of two months. Compliance was generally good, with warnings for pain, swelling and nerve damage disclosed in 100% of cases. However, compliance was poorer with warnings for infection, trismus and damage to other teeth. Less than 50% of patients received a written copy of the consent form and only 40% of operators documented the consent process in the patient's casenotes. Only 4% of patients were told about other treatment options including no treatment. Staff grades consented for a greater number (i.e. wider range) of sequelae and complications compared to consultants and SHOs.

*Conclusion:* Although compliance with the desired standard for third molar extraction was good overall, there are certain areas which require improvement. We aim to implement changes prior to the second audit cycle by providing a consent checklist as an aide-memoire along with the written consent form. The extraction of third molars is a common procedure and audit is an important tool in ensuring a consistently high standard of consent.

#### P-3416

### A PROSPECTIVE, RANDOMIZED, SINGLE-BLIND COMPARISON OF ROPIVACAINE 1% AND LIDOCAINE + ADRENALINE 1% (1:100,000) FOR THIRD MOLAR SURGERY

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*Introduction:* Ropivacain is a long-acting local anesthetic, presenting less toxicity in comparison to the other anesthetics of its category. The purpose of this prospective, randomized, single-blind study is to compare the use of Ropivacain 0,75 % and Lidocaine + Adrenaline 1 % (1:100,000) during extraction of 4 included third molars under general anesthesia.

*Method:* 115 patients were randomized in 2 groups receiving one of the 2 different anesthetics. An intra-mucous injection of 2 ml of the anesthetic is realized on each site of the extraction. During the post-operative period, the consumption of analgesics and the arisen of side effects were noted, and the patients filled in a questionnaire estimating on a visual analog scale pain, tumefaction, bruising, bleeding and the consumption of analgesics during a period of 10 days.

*Results:* The analysis of 82 filled in questionnaires (response rate 71,3%) brings to light a decrease of the average score of the pain during the first post-operative 9 hours for the group of patients who received an injection of Ropivacain (P=0,03). The post-operative consumption in non-steroidal anti-inflammatory drugs is also decreased (P < 0,001). Other post-operative consequences are equivalent except the higher level of bruising (P < 0,001) for the patients who received an injection of Ropivacain 0,75 %.

*Conclusion:* During the first 9 post-operative hours, this prospective randomized single-blind study clearly demonstrates that the injection of Ropivacain 0,75 % offers a better analgesic potential than Lidocaine + Adrenaline 1 %, which was commonly used in our institutions. However, the search should continue to find other ways to improve the control of the pain of patients undergoing third molar surgery.

#### P-3417

### MORPHOLOGICAL CHANGES OF THE INFERIOR ALVEOLAR NERVE IN TOXIC INJURY IN LATE TERMS OF EXAMINATION

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*Introduction.* Toxic injury of the inferior alveolar nerve develops during the filling of the root canals of teeth of the mandible by removing excess material beyond the root of the tooth and enters it into the mandibular canal. No information on the dynamics of morphological changes of the inferior alveolar nerve found. When it's exists, it should be possible to provide a therapeutic effect on the main chains of pathogenesis of this pathologic process.

*Aim* was to determine the dynamics of morphological

changes in the inferior alveolar nerve in late terms of examination after the toxic injury in experiment.

**Objects and methods.** The model of toxic injury of the inferior alveolar nerve was made on rabbits experimentally. Dynamics of morphological changes was evaluated during the earlier terms of examination on 2, 3, 4, 5 days and 6 months. Micropreparations of the inferior alveolar nerve were stained with hematoxylin-eosin for myelin by Kluwer-Barrera method and with martius scarlet blue to identify collagen fibers.

**Results.** Moderate round cells infiltration was found in microspecimens of the inferior alveolar nerve 2 months after the toxic injury. Proliferation of Schwann cells was observed along the nerves. When myelin saved, the nerve with sponge area was swollen due to the axon loss.

Along the myelin tunics we found small and big vacuoles in the micropreparations stained with hematoxylin-eosin during 3 months examination. An irregular edema was fixed along the nerve, axons were thinned, fragmented.

Myelin tunic vacuolization with axial disintegration of axons was discovered in the micropreparations of the inferior alveolar nerve 4 months later but myelin was saved.

We saw a few of collagen fibers along the nerve by 5 months, calcifications of irregular or elongated forms. Axons were fragmented and had signs of destruction. Myelin fibers were pale, demineralized, with varicose swellings.

We found the myelin pallor, vacuoles along the fibers by 6 months. The nerve fibers were loose peripherally, perineurium sclerosis with round cell infiltration.

**Conclusion.** Taking into consideration the irreversible changes of the inferior alveolar nerve in late terms, the surgical treatment is advisable in earlier terms when complications identified.

#### **P-3418** **PROPHYLAXIS OF INFLAMMATORY COMPLICATIONS** **IN SURGICAL STOMATOLOGY**

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**Relevance.** Last years studies demonstrate necessity to apply the new drugs into the clinic practice for inflammatory postoperative complications prophylaxis and to study their effectiveness in patients treatment before oral cavity surgery.

**Aim** was studying «Septolete D» drug effectiveness and to compare it with other antiseptic drugs widely used in treatment of the postoperative complications.

**Objects and methods.** During 2010 we examined 158 patients underwent outpatient treatment. We had 2 random groups. Group I (76 persons - 48,1%) was the group of control and had standard treatment. Group II (82 persons 51,9%) was the main group.

All patients received prophylactic oral antiseptic treatment before surgery with antiseptic drugs: group 1 had oral rinsing with 120 ml 0,02-0,1% solution of potassium permanganate, group 2 - a drug «Septolete D» («KRKA»

production) 1 pastille.

**Results.** According to the results, 5,26% of group I had complications, 2,44% – of group II.

The pain stopped in subgroups 1A, 1B the first day post-operatively. **Results** of the subgroups 2A, 3A, 2B, 3B confirmed the pain stopping on the 2nd day. **Results** of pain quantitative evaluation were different in subgroups 2A, 2B (p

Soft tissue swelling in the area of surgical wound in subgroups 1A, 1B decreased on the 2nd day and was significantly different from initial data (p

**Conclusion.** The results provide basis to recommend the drug «Septolete D» as the drug of choice for prevention of postoperative inflammatory complications during outpatient surgical procedures in the oral cavity.

#### **P-3419** **INVESTIGATION OF POSSIBLE COMMON** **COMPLICATIONS AFTER THE NEXT INJECTION OF** **2% LIDOKAINE IN EXPERIMENT**

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**Relevance.** Local anesthesia is an integral part of the dentist daily work, but the problem of safe choice of local anesthetic remains relevant. The probability of side effects of local anesthetics depends on the patient's common state: age, functional status of cardiovascular system, liver, kidney, allergological status of patient, as well as a local anesthetic, its dose, frequency of injection, development of tolerance, idiosyncrasy, type of anesthesia, presence of vasoconstrictor in anesthetic.

**Aim** was to study changes in general condition of body during frequent repeated injections of local anesthetic 2% lidocaine hydrochloride in maxillofacial area in experiment.

**Objects and methods.** A series of white mice was used for the experiment, sexually mature male 22-35 g, in accordance with requirements governing the work with experimental animals. Every 3-4 days animals received 2% lidocaine hydrochloride injections at dose of 50 mg / kg of body weight in submaxillary region (mandibular anesthesia with extraoral access).

We studied behavioral responses of animals after the next injections of anesthetic; we observed the toxic manifestations in the central nervous system (CNS): convulsive effects, flabbiness, hemiparesis phenomena, paraparesis; shortness of breath and mortality cases.

Sampling of parenchymal organs for pathomorphological examination was made for died and extracted from experimental animals at each stage of experiment.

**Results.** We fixed lethality in 37,5% after 5 injections. Animals died 5 minutes after injection with expressed symptoms of hemiparesis on the side of injection without convulsions, sometimes during injection. All animals had breathlessness, auxiliary muscles helped for breathing.

During postmortem examination of liver, we revealed focuses of hepatocytes necrosis of different sizes with

perifocal inflammatory reaction, phenomenon of perivascular infiltration, intraduct cholestasis, kidney has no significant changes.

During the morphometry examination of serial sections, it should be noted that the most of animals had inflammatory changes in portal tracts, cholestasis at places where no necrosis were found; lymphoid cells dominated among cells of inflammatory infiltrate, number of neutrophils and eosinophils was low.

*Conclusion.* Analysis of experimental results allows to conclude that there are common complications when lidocaine application is frequent and repeated. It requires the new methods of prophylaxis treatment development.

#### P-3420

### APPLICATION OF ERBIUM LASER AFTER TOOTH EXTRACTION IN PATIENTS WITH HEMOSTATIC DISORDERS

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*Introduction.* Hemostatic disorders can be a serious problem when surgical treatment is anticipated. These patients have such problems as prolonged bleeding after tooth extractions and during other surgical manipulations. It is patients with failures of platelets' functions such as thrombocytopenia, trombocytomia, patients who received anti-coagulants and antiagregants.

The laser surgery offers some critical advantages and the most important for patients with hemostatic disorders is less bleeding tendency during the procedure.

*Aim.* Analyzing the erbium laser effects in oral surgery in patients with hemostatic disorders.

*Methods and materials.* There were selected 2 groups of patients with chronic periodontitis. All them were determined for tooth extractions. The first group included 13 patients with hemostatic disorders. In this group erbium laser radiation was used for the tooth socket conditioning after tooth extraction. The second (control) group included 14 patients without concomitant pathology was determined for conventional surgical treatment.

*Results:* As a result, in the first group reduced postoperative bleeding, post-surgical pain and infection were prevented with no need for analgesics or antibiotics, and the socket epithelization took 11-12 days. The second group patients complained of pain and discomfort for several days after tooth extraction; socket epithelization took 13-14 days. Application of erbium laser is an up-to-date method which can be successfully used in surgical treatment of patients with hemostatic disorders.

#### P-3421

### EFFICACY OF THE HARMONIC SYNERGY® SCALPEL INTO THE SURGICAL REMOVAL OF INFLAMMATORY FIBROUS HYPERPLASIA: PRELIMINARY RESULTS

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With the advent of the harmonic scalpel, the inflammatory fibrous hyperplasia (IFH), a very common clinical condi-

tion in dental practice, can become faster and less traumatic for the patient due to its intrinsic properties. Episodes of pain, swelling and bleeding in the post-operative surgery with regular excision can lead to dysphonia and dysphagia and is still a challenge to the surgeon. The aim of this preliminary research was to study the efficacy of the use of the Harmonic Synergy® scalpel (HSS) (Johnson & Johnson, Suprimed - Brazil) in the surgical removal of IFH. Eleven patients had a HFI removal with HSS. Post-operative examination was done after 3, 7 and 30 days of the surgery. In all instances, the surgeon could control consistently the tissue volume and maintain adequate surgical margins. The preliminary results showed that the use of the HSS provided better hemostasis, absence of infections and principally more post operative comfort with an immediately condition to reestablish the aesthetic and functional conditions when compared with a conventional scalpel.

#### P-3422

### MULTIDISCIPLINARY MANAGEMENT OF UNERUPTED CENTRAL INCISORS DUE TO SUPERNUMERARY TEETH IN A YOUNG PATIENT: A CASE REPORT

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*Aim:* The aim of this paper is to report our experience in the surgical treatment of radiological confirmed supernumerary teeth obstructing path of eruption of central incisors and the orthodontic treatment of the central incisor for eruption after surgical treatment in an 9-year -old girl with retained primary maxillary central incisors.

*Case Report:* A 9-year-old female patient referred to Pediatric Dentistry Department with a complaint of delayed eruption of maxillary left and right permanent central incisors. Examination revealed a healthy looking young girl who was in mixed dentition stage and had skeletal pattern class I and class I molar relationships. Radiological investigations revealed the presence of impacted bilateral supernumerary teeth and impacted permanent incisors. After that the patient referred to Oral and Maxillofacial Surgery Department and Department of Orthodontics. The primary maxillary central incisors and these supernumerary teeth were surgically removed and were diagnosed as tuberculate type. Orthodontic treatment involving removal of the supernumerary tooth, attaching a gold chain to the central incisors and treatment with fixed orthodontic appliances failed to bring the tooth down. The patient is on clinical and radiological follow up for eruption of the permanent teeth.

*Conclusion:* Impacted permanent incisors due to supernumerary tooth are a rare entity and often encountered with psychological problems in children. In the present case report cumulative surgical and orthodontic treatment resulted in esthetically pleasant and balanced occlusion. Thus timely recognition of these entities and early multidisciplinary treatment are required for greater hard and soft tissue preservation.

**P-3423****MANAGEMENT OF UNERUPTED PERMANENT MAXILLAR INCISOR TOOTH DUE TO ODONTOMA: A CASE REPORT**

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**Aim:** This case report describes the treatment of 10-year-old girl with impacted maxillary left central incisor because of odontoma. The treatment protocol involved surgical treatment and orthodontic traction of the impacted tooth resulted in proper incisor position in the dental arch.

**Case report:** 10-year-old girl was referred to the Pediatric Dentistry Department complaining of unerupted left maxillary permanent central incisor. Her medical history was clear. There was no family history of unerupted teeth or hypodontia. Clinical examination revealed unerupted left permanent central incisor and inadequate space for the central incisor to erupt in the maxillary arch. Radiographic examination revealed the presence of the left central incisor with a radiopaque mass present incisally, thereby obstructing its eruption. On the basis of clinical and radiographic findings, it was provisionally diagnosed as an odontoma.

After obtaining the adequate space for alignment of impacted central incisor, surgical removal of odontoma and orthodontic traction of the impacted tooth was performed. The patient was followed up regularly to see eruption status of the tooth.

**Conclusion:** Early removal of the cause of eruption disturbances is important in the developing dental arch. Sometimes, an interdisciplinary approach may be necessary for eruption of the unerupted or impacted teeth. Early diagnosis and treatment of odontoma ensures better prognosis, as we observed in our case.

**P-3424****MANAGEMENT AND FOUR YEARS FOLLOW-UP OF MULTIPLE IMPACTED UNERUPTED SUPERNUMERARY TEETH**

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**Aim:** Supernumerary teeth may be defined as any teeth or tooth substance in excess of the usual configuration of 20 deciduous and 32 permanent teeth. The term mesiodens is used to refer to a supernumerary tooth in the central region of the premaxilla between the two central incisors. The complications associated with supernumerary teeth include: lack of eruption of permanent teeth, the deviation of the eruption path, diastema, resorption of adjacent teeth and development of dentigerous cysts. This case report assessed to present radiographic findings and oral treatment of 11 year-old boy with multiple impacted unerupted supernumerary teeth and delayed eruption of permanent central incisor due to a mesiodens. **Case Report:** An 11 year-old male patient presented to the

department of Pediatric Dentistry complaining of delayed eruption of his permanent maxillary left central incisor. The family and medical histories were non-contributory. Radiographic examination showed there was a mesiodens which located on the palatal side of the maxillary arch. This mesiodens obstructed eruption of maxillary left central incisor. Furthermore panoramic survey of the teeth showed unerupted supernumerary tooth which were located on the left and right side of the mandibular arch and right side of maxillary arch. Patient canalized to oral and maxillofacial surgery clinic. Supernumerary teeth were extracted and the patient was examined by pediatric dentist and orthodontist every six months and then every year. After four years, the central tooth has fully erupted spontaneously without orthodontic intervention.

**Conclusion:**

The clinical complications of supernumeraries include lack of eruption of permanent teeth, root anomaly, cyst formation, diastema, rotations, and pulp necrosis with loss of vitality. Immediate surgical removal is indicated after diagnosis of supernumeraries because complications are less likely to occur younger patients.

**P-3425****IMPACTED OF MAXILLARY INCISOR ASSOCIATED WITH ODONTOMA IMPACTED OF MAXILLARY INCISOR ASSOCIATED WITH ODONTOMA**

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**Aim:** Odontoma is the most common type of benign odontogenic tumor, and often causes disturbances in the eruption of its associated tooth. This a case report of a 10-year-old girl with an unerupted maxillary central incisors due to a odontoma a rare occurrence in anterior maxilla.

**Case Report:** A 10-year-old, healthy female patient reported to our clinic, with the chief complaint of unerupted upper front tooth. Extraoral examination showed a concave profile with good facial symmetry. Intraoral examination showed the patient to be in a stage of mixed dentition with a Class III molar relationship. Panoramic radiograph revealed the presence of central incisors with a odontoma present incisally, thereby obstructing its eruption. On the basis of clinical and radiographic findings, a provisional diagnosis of odontoma was established. The odontoma was surgically removed. However, as the maxillary incisors did not erupt spontaneously, after a suitable period of observation, an orthodontic treatment approach was adopted. This was to obtain an adequate space for the unerupted tooth and to move it to its normal position. In our case where a good clinical result was achieved within 2.5 years. The patient is still scheduled for long-term follow-up.

**Conclusion:** Early diagnosis and surgical intervention of odontoma is therefore necessary and treatment of an impacted tooth may require an orthodontic appliance.

## 35. SURGICAL HEAD AND NECK ONCOLOGY

### P-3501

#### ODONTOGENIC BENIGN TUMOURS VERSUS ODONTOGENIC CARCINOMAS: A DIAGNOSTIC CHALLENGE FOR PATHOLOGISTS. REPORT OF 2 CLINICAL CASES WITH ADAPTATIVE SURGICAL BEHAVIOUR

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Odontogenic tumours can lead to significant diagnostic challenge for pathologists, in one hand because of their similar histology and in the other because of transformations of a benign tumour into a malignant one.

The choice of the treatment is dramatically different whether we deal with a benign lesion or a malignant one. Therefore accurate histological analysis is critical. Radiological features and clinical examination and follow-up could help diagnosis as some lesions have an uncommon presentation and/or evolution.

The authors report the cases of two different therapeutic attitudes based on these topics.

One case of maxillary squamous cell carcinoma (SCC) which was probably an ameloblastoma. An extensive overtreatment (cervical curage / chemotherapy / radiotherapy) has been avoided thanks to extemporaneous biopsy based on the strange and non aggressive topography of the tumour. The tumour was removed with minimal side effects.

The other case is a squamous odontogenic tumour (SOT) affecting a young boy, which became aggressive after first removal. Secondary an extended en-bloc removal was performed followed by radiotherapy and the diagnostic of SCC was definitely confirmed.

These both cases emphasize the importance of the challenge for pathologists and also the priority of to adapt the treatment strategies regarding such cases of controversial diagnosis.

### P-3502

#### SQUAMOUS ODONTOGENIC TUMOUR AND SQUAMOUS CELL CARCINOMA IN A 15 YEARS OLD BOY: A CASE REPORT

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Squamous odontogenic tumour (SOT) is known as a rare,

locally infiltrative and benign tumour affecting both jaws and usually remaining in bone. To date, less than 50 cases have been reported in the literature. Most cases have been managed by conservative surgical removal. We report the case of a fifteen year old boy with a painful swelling of the left mandible evolving over the past five months. The first biopsy taken from the mandible bone led to a squamous cell carcinoma (SCC). This diagnosis did not match with the slow progressing course, the patient's age and a bone's origin. A new curettage of the mandible was performed, and histological process revealed rather a SOT. Unfortunately 1 year after removal a more aggressive recurrence appeared in the pterygoid fossa and a wide excision with a free peroneal flap was performed. The histological analysis leads this time to the diagnosis of SCC.

Histopathological features and our treatment strategy in this very uncommon case are discussed.

### P-3503

#### SQUAMOUS CELL CARCINOMA ARISING FROM AN EPIDERMAL INCLUSION CYST - A RARE ENTITY

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Epidermal inclusion cysts of the skin are common lesions; however malignant transformation of the cyst lining is extremely rare.

Reported rates of malignant conversion of an epidermal cyst lining into squamous cell carcinoma range from 0.011 to 0.045%. A review of the literature suggests that transformation is more frequent in males (68.4%).

We report a case of a 55 year old female, presenting with a 4 year history of a left sided neck lump, which had undergone a sudden increase in size. A provisional diagnosis of an infected epidermal inclusion cyst was made, and antibiotic therapy was commenced. Imaging of the lesion confirmed the presence of a subcutaneous lesion, consistent with the clinical suspicion of an epidermal inclusion cyst. The cyst demonstrated little response to antibiotic therapy and incision & drainage. Subsequently the patient underwent excision of the lesion.

Histopathological assessment confirmed the presence of an epidermal inclusion cyst within the dermis. In areas the cyst lining showed acanthosis and cytological atypia with budding into the surrounding dermis. Isolated islands of dysplastic squamous cells were also seen within the vicinity of the cyst. The histopathology report concluded the presence of a well differentiated squamous cell carcinoma arising from an epidermal inclusion cyst.

At the multi-disciplinary team meeting, further wide excision was recommended to ensure adequate resection margins; the latter revealed no evidence of residual malignancy.

This case emphasises the importance of recognising rare maxillofacial entities, and highlights the fact that malignant transformation should be suspected in cases with large epidermal inclusion cysts, particularly those presenting with rapid growth; persistent discharge or fistulas, and those that are resistant to medical treatment.



**P-3504****THE WORLD'S YOUNGEST FANCONI ANAEMIA CHILD WITH A TONGUE SQUAMOUS CELL CARCINOMA: A CASE REPORT AND REVIEW OF LITERATURE**

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**Keywords:** Fanconi Anaemia, oral squamous cell carcinoma

Fanconi Anaemia (FA) is a rare autosomal recessive disorder causing a defect in the proteins responsible for DNA repair occurring in 1:350,000 births(1). Typically is associated with variety of congenital malformations, childhood cancers and progressive bone marrow failure at a very young age with a median age of death at 30 years. Patients with FA are more susceptible to develop Head and Neck Squamous cell carcinomas (HNSCC) and they account for 3% of all cancers in FA patients. A Literature search of Ovid MEDLINE/Embase/PubMed suggested that the youngest FA child to develop oral SCC is 10years old with a mean age of oral carcinoma developed at the age of 27years.(1,2)

The authors present an exceptionally rare case of a squamous cell carcinoma (T4N0M0) of the tongue in an 8 year-old child who suffers with Fanconi Anaemia and discuss its management. The child had subtotal glossectomy, selective neck dissection and microvascular reconstruction with antero-lateral thigh (ALT) free flap. There were no indications for any adjuvant therapy as the surgical resection was complete without any cervical metastasis. Post operatively he has achieved normal function of speech and deglutition. So far he has been followed up for 8 years without any recurrent disease and he has good quality of life. The atypical clinical manifestation rendered this to be a uniquely challenging case to manage.

On reviewing the literature, it is extremely rare for FA patients under the age of 10years to have oral carcinoma requiring free flap reconstruction(3). Our case appears to be the youngest FA patient and we feel it may be possible to achieve good outcome after an aggressive resection and reconstruction.

Therefore we conclude that a high index of suspicion for any epithelial lesion in FA is appropriate even in their first decade, so that early diagnosis and management may lead to improved prognosis.

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**P-3505****MELANOMA OF THE MAXILLARY SINUS. REPORT OF A CASE**

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The authors present a case of a 50 year old female with a melanoma of the right maxillary sinus. The patient was submitted to a radical resection (hemimaxillectomy) with reconstruction of the orbital floor using a titanium plate, followed by chemotherapy. The dental rehabilitation was made with an acrylic prosthesis. After a period of 18 months the patient remains free of disease.

The melanoma of the maxillary sinus has a poor prognosis and needs a radical approach.

**P-3506****CORRELATION BETWEEN RECURRENCE AND DISTRIBUTION OF MALIGNANT CELLS IN THE TUMOUR TISSUE**

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Squamous cell carcinoma is the most common form of cancer in the maxillofacial region. It has a poor prognosis and consists of malignant change of epithelial cells. It is known that squamous cell carcinoma is characterized by a high percentage of metastasis and recurrence of disease. In the treatment of patients with squamous cell carcinoma (SCC) of head and neck region, we noticed a high percentage of recurrence. In some patients, recurrence of disease, regardless of similar size and localization of tumours was significantly faster than the other. Histological diagnosis is the method of choice in making the right diagnosis. Clinical monitoring of treated patients, we tried to make correlation between recurrence of disease and distribution of malignant cells and tumour stroma. **Material and methods:** The study included 50 patients of both sexes, all younger than 65 years, who underwent surgery at the Clinic for Maxillofacial Surgery in Sarajevo. Control examinations of treated patients were carried out on the third, sixth, twelfth and eighteenth month postoperatively. The Institute of Pathology, Clinical Centre, Sarajevo University carried out histological examinations and immunohistochemistry was performed with markers CD10 and Ki67. The results demonstrate that there is a correlation between relapse and distribution of malignant cells and stromal tumour material, and that there is significant correlation between the dispersed cells distributed in the tumour and increased recurrence. There is also a significant relationship between tumour stroma thicker and higher recurrence.

**KEY WORDS:** squamous cell carcinoma, the distribution of malignant cells, recurrence.

**P-3507****NECK ABSCESS AS THE INITIAL PRESENTATION OF PRIMARY TONSILLAR CANCER**

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**Objectives:** The most commonly identified causes of deep neck infection are dental infection or necrotizing lymphadenitis followed by acute tonsillo-pharyngitis, but occasionally congenital neck cysts can be infected. Malignant tumours in the head and neck region metastasizing into the local lymph nodes frequently present with neck mass. However, it is very rare, that these cervical nodes become infected and manifest as the main initial symptom of a primary tumour.

**Material and method:** In this study, we report a patient with primary head and neck cancer whose main initial manifestation was neck infection.

**Results:** A 44-year-old man was admitted with deep neck infection and pyrexia. Urgent incision and drainage was carried out. Endoscopic examination of the upper aerodigestive tract did not show any infection. Three months later he presented with a hard and tender neck swelling underneath of the scar, with a fistula formation. Bacteriology was negative. Histology revealed inflammatory granulation tissue. Oral antibiotic was started and he underwent regular local treatment. Two weeks later, the fistula closed, the swelling subsided. CT scan of the neck with contrast showed an enlarged, hypoechoic lymphnode. Endoscopy and excisional biopsy was suggested, but he refused surgery. One month later on examination of the oral cavity palpation of the palatine tonsils revealed a tonsillar mass. Biopsy was taken and histology reported anaplastic squamous cell carcinoma.

**Summary:** Primary malignant head and neck tumours presenting as deep neck infection is uncommon and in case of these patients the risk of potential misdiagnosis is high. Our aim was to present such a rare case with its all diagnostic pitfalls. We suggest when dealing with this pathology, particularly in case of patients over 40 years of age, a detailed history review, careful head and neck examination, thorough upper aerodigestive tract endoscopy and imaging studies are critical in order to detect the hidden primary lesion.

#### P-3508

### FEASIBILITY STUDY ON INTRAOPERATIVE INSTANTANEOUS SECTION OF MANDIBULAR MALIGNANCIES BY MEANS OF FLAT PANEL VOLUME CT

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**Introduction:** The surgery of craniomaxillofacial malignancies sometimes requires composite resection of soft and hard tissue including bone of the mandible or maxilla. As a routine procedure rapid fresh frozen pathologic evaluation of the soft tissue margins is performed. An adequate method for intraoperative rapid histopathological evaluation of bony margins is not yet available.

After assessment of viability in visualization of craniomaxillofacial pathologies using flat panel volume Computer tomography (fpvCT), the evaluation concerning the

precision and its clinical application for rapid intraoperative instantaneous section is required.

**Materials and methods:**

In the study 47 patients diagnosed with different bone pathologies of the jaw could be included. Tumour resection and segmental maxilla- or mandibulectomy were indicated due to tumourous invasion into the bone. The specimens were transferred immediately to the fpvCT and after the scanning process to the department for pathology for further preparation.

The bony resection margins were then examined in the fpvCT using Advantage Workstation (AW), Version 4.1 (GE Medical Systems) and compared later to the result of the histopathological examination after decalcification process.

**Results:** Infiltrative structures and tumour spread could be visualized by fpvCT. The study included 47 patients with several tumour diseases. The most numerous part (n=38) were squamous cell carcinomas. Of these 38 patients three were diagnosed with infiltrated resection margins (non-continuity). This finding was verified in the fpvCT as well as in the histologic section.

The remaining included pathologies were 5 ameloblastomas, two mucoepidermoid-carcinomas, one Pindborg-tumour and one ossifying fibroma. Here all resection margins were free in fpvCT and in the histologic examination.

**Discussion:** The clinical appliance can be seen in the advantages of a bony instantaneous section during operation procedure. Using the described radiologic procedures the intraoperative diagnostic gap could be closed because the fpvCT has the potential to detect bone structures and tumour infiltration borders. Ablative surgical procedures in head and neck cancer and postoperative outcome can get more reliable.

**Conclusion:** The fpvCT has a definite potential for intraoperative tumour diagnostics and allows reliable valuation of the osseous resection border.

#### P-3509

### THIS INTERMITTENT BUCCAL SWELLING COULD BE SOMETHING SINISTER... PRIMARY DIFFUSE LARGE B-CELL LYMPHOMA OF THE MAXILLA - AN UNUSUAL PRESENTATION

Latoni Gilbert<sup>1, \*</sup>, Syedda Abbas<sup>1</sup>, Michael Gaukroger<sup>1</sup>

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Primary extranodal lymphomas of the maxillofacial region are relatively uncommon. Involvement of the oral cavity is particularly rare and constitutes only 2% of all extranodal Non-Hodgkin Lymphoma (NHL) cases. The authors present a case of primary Diffuse Large B-cell Lymphoma (DLBCL) of the left maxilla; with diagnostic problems encountered and subsequent management.

DLBCL is a NHL subtype characterised by diffuse proliferation of large neoplastic B lymphoid cells. Literature reports that NHL patients commonly exhibit painless lymphadenopathy, and/or 'B symptoms' such as fatigue, night sweats, and weight loss.

A 59 year old caucasian lady presented with an 11 month history of asymptomatic, intermittent swelling of the

edentulous upper left premolar region. Radiographic examination of the area revealed a radiopacity consistent with a retained root, surrounded by an area of diffuse radiolucency. Subsequent surgical exploration revealed a pus-like liquid and a spongy mass of tissue with no specific lining. Histopathological investigation uncovered a diagnosis of DLBCL, displaying a proliferation index of approximately 80% of germinal centre type. Following urgent referral to the haematology department, the lymphoma was staged at 1AE, as per Ann Arbor classification, and the patient commenced on intrathecal chemotherapy, with planned delivery of subsequent radiotherapy.

Primary intraosseous lymphomas of the maxillofacial region may often be misdiagnosed as their paucity generates a low index of suspicion. Their non-specific symptoms may mimic common oral/dental pathology, and they may arise in the absence of systemic 'B' symptoms, as seen with this case.

This case emphasises the importance of recognising rare maxillofacial entities.

#### P-3510

### ACCURACY OF IMAGING IN PREDICTING BONY INVASION FROM ORAL CARCINOMAS -THE BLACK COUNTRY EXPERIENCE

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**Introduction:** Oral Squamous Cell Carcinoma (OSCC) invading underlying jaw bones is considered advanced stage disease and requires composite resection and reconstruction. The decision to perform this type of surgery is based on careful clinical and radiographic assessment. We present our experience of composite tumour management with emphasis on the accuracy of staging imaging in predicting bone invasion.

**Materials and Methods:** Surgical, radiological and histological data was collected retrospectively for composite resection cases from 2003 to 2011. Any patient who underwent only mandibular rim resection was excluded. 40 patients that were treated with a wide range of composite free flap reconstructions were included. Staging imaging included Orthopantomogram, CT scan and MRI. The accuracy of the imaging was confirmed by histopathology.

**Results.** The overall accuracy was satisfactory but there was significant variation between the sensitivity and specificity of the different techniques.

**Conclusions:** Current imaging provides a satisfactory preoperative assessment of bone invasion by OSCC but a combination of techniques is required to maximize accuracy.

#### P-3511

### EXPRESSION STATUS AND REGULATORY MECHANISM OF THE TUMOUR SUPPRESSOR GENE FHL1 IN HUMAN ORAL CANCER

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**Objectives:** Four and a half LIM domains 1 (FHL1), which is located on the chromosome Xq26, was downregulated in various types of malignancies such as lung cancer, breast cancer, and bladder cancer. However, the expression status of FHL1 in human oral squamous cell carcinoma (OSCC) remains unclear and the detailed mechanism of gene silencing is poorly understood. The aim of this study was to examine FHL1 expression level and its regulatory mechanism in OSCC patients.

**Materials and Methods:** FHL1 mRNA and protein expression in eight OSCC-derived cell lines (Sa3, HSC-2, HSC-3, HSC-4, HO-1-u-1, HO-1-N-1, KON, and Ca9-22) and primary OSCCs (n=63) were analyzed by real-time quantitative reverse transcriptase-polymerase chain reaction (qRT-PCR), Western blot, and immunohistochemistry (IHC). Epigenetic alterations, such as DNA methylation and histone modifications, play an important role in silencing of tumour suppressor genes. To assess the epigenetic regulation of FHL1, we treated OSCC-derived cell lines with DNA methyltransferase inhibitor, 5-aza-2'-deoxycytidine (5-aza-dC), and a histone deacetylase inhibitor, sodium butyrate (NaB). We also examined the status of promoter methylation using methylation specific PCR (MSP) and conducted chromatin immunoprecipitation (ChIP) of monomethylated histone 3 at lysine 9 (H3K9me) and acetylated histone 3 at lysine 9 (H3K9ac).

**Results:** qRT-PCR and Western blot analyses showed downregulation of FHL1 in OSCC-derived cell lines compared to human normal oral keratinocytes (HNOKs). FHL1 mRNA expression was significantly downregulated (p

Summary: Our data suggested that downregulation of FHL1 is a characteristic in OSCCs and that FHL1 expression is regulated by DNA methylation of the promoter region rather than histone deacetylation.

#### P-3512

### A HIGHLY AGGRESSIVE, UNUSUAL PAEDIATRIC SARCOMA CASE REPORT AND A REVIEW OF THE LITERATURE

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Paediatric soft tissue sarcomas are rare, being the 5th most common solid tumour in children, 5-6% of childhood malignancies. About half of these are rhabdomyosarcomas (RMS), a malignant neoplasm of mesenchymal origin arising from cells of skeletal origin. They are difficult to study given their small numbers and variable nature.

We present the case of an 11-year-old female presenting

with a short history of pain and swelling of the upper right quadrant. Managed initially conservatively in the dental practice setting, the soft tissue lesion seen was highly aggressive, leading to referral to OMFS. Photography and radiography will highlight the rapid growth and underlying bone destruction.

Classification of these tumours can be difficult, as demonstrated in our patient. A sarcoma, it has features of RMS of which there are three distinct histological groups, embryonal (55%), alveolar (20%) and undifferentiated (20%). However, a cartilaginous component is not typically seen, which raises the possibility of a malignant peripheral nerve sheath tumour (malignant Triton tumour) and neurofibromatosis. Other differential diagnoses are discussed as well as clinical implications.

Based on a literature review, we explore the pathophysiology of the sarcoma and the RMS, outline its management and prognosis, and in so doing seek to increase awareness of its complexity. Greater familiarity, particularly amongst junior clinicians, should serve to expedite referral and urgent treatment.

### P-3513

#### ORAL CROHNS DISEASE MASQUERADING AS MALIGNANCY

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**Background:** Crohns disease is a chronic inflammatory condition that may affect any part of the gastrointestinal tract from the mouth to the anus. Oral manifestations have been noted to precede other systemic signs in up to 60% of cases and have been reported to occur in about 70% of patients with Crohns disease. Oral localization of Crohns disease is characterized by a marked male predominance and a young age at onset.

**Case report:** A 17-year old male was referred urgently by his General Practitioner to our Maxillofacial Surgery Department with an ulcerated lesion of the left buccal mucosa extending onto the palate. This had been present for four months and was painful. The patient also reported weight loss of 3kg over 4 months.

On examination the patient appeared generally well. He was noted to have an exophytic lesion of the left buccal mucosa with widespread erythema and ulceration of the left hard palate. There was also some exophytic change in the left retromolar region and mild trismus. A firm level II lymph node was palpable on the left. Clinical photographs are presented.

Urgent biopsies of the oral lesions were performed. These revealed a lympho-histocytic inflammatory infiltrate with microgranuloma formation. No mycobacteria were identified and there were no malignant changes. Blood tests for haemoglobin, B12 and folate were normal.

The provisional diagnosis was Crohns disease. The patient was given topical steroids and metronidazole tablets and referred to the Gastroenterology Team. He subsequently had an episode of bloody diarrhoea and felt unwell. Barium follow-through study of the gastrointestinal tract did not reveal any abnormalities, however the gastroenterologists concur with the diagnosis of Crohns disease. He has been commenced on azathioprine and remains under review.

An important differential diagnosis of oral ulceration is malignancy and this must always be excluded. The high prevalence of associated anal and oro-oesophageal involvement suggests that Crohns lesions have a particular predilection for squamous cell epithelium. The possibility of malignant change within such mucosa should be suspected.

### P-3514

#### ANGIOMATOID FIBROUS HISTIOCYTOMA OF THE MANDIBLE - CASE REPORT

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**Introduction:** The Angiomatoid Fibrous Histiocytoma (AFH) is a rare tumour, identified as an entity since 1994. It develops in the subcutaneous soft tissues usually and usually involves the extremities of young patients. We report the first described case in the mandible with bone invasion.

**Case report:** A 19 year's old female, who had been treated for an apical cyst concerning tooth n°42 came back consulting after one year with an history of swelling of her mandible on the right side. The clinical examination was without other particularity. Radiological examination showed an osteolytique lesion that infiltrated the soft perimandibular tissues and bilateral jugulo-carotid lymph nodes. Staging was negative. The biopsy and the resection of this tumour finally concluded to an AFH. After three years follow-up, a local recurrence was detected and a complementary resection was made. The patient is still undergoing clinical and radiological checking every six months.

**Discussion.:** Even if molecular and genetic test are getting better and helps AFH to be distinguish from other malignant tumours, AFH still remains difficult to diagnose mainly because of an uncertain histogenesis. This tumour presents an intermediate malignancy, without metastasis, sometimes local recurrences. It requires a complete surgical resection. Adjuvant radiotherapy is discussed.

### P-3515

#### THE FREQUENCY OF NECK METASTASIS IN PT1 TONGUE SQUAMOUS CELL CARCINOMA IN OXFORD JOHN RADCLIFFE HOSPITAL

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**Introduction:**

The tongue is commonest part of the oral cavity that is affected by squamous cell carcinoma (SCC). Management of the neck in T1 tumours remains controversial.

**Aims:** • To determine the prevalence of pT1 SCC of oral tongue in Oxford John Radcliffe hospital over 10 year period

• To identify any correlation between depth of invasion and neck nodal micro metastasis.

**Methods:** All pT1 SCC of oral tongue during the period between 2000 and 2011 have been included. Demographic data, tumour depth of invasion and neck nodal status have been recorded.

**Results:** So far, 30 patients with pT1 SCC of the oral tongue have been identified with 57% men and an average age of 62 years (range 31 to 96 years). An average tumour depth of invasion of 6.8 mm (range 0.6 mm to 35 mm) was found.

Twenty two patients had selective level I-IV neck dissection with 5 (23%) found to have micrometastatic neck disease. Four of the 5 patients who had positive neck on histopathology had tumour depth of invasion of 10 mm.

**Conclusion:** • Preliminary data suggests that 1 out of 4 patients with pT1 SCC of the oral tongue is likely to have cervical nodal disease.

• Data analysis so far suggests that depth of invasion less than 10 mm is unlikely to be associated with neck disease.

#### P-3516

### METASTATIC CYSTIC TONSILLAR SQUAMOUS CELL CARCINOMA PRESENTED AS A BRANCHIAL CYST - A DIAGNOSTIC CHALLENGE

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**Introduction:** Metastatic cervical lymph nodes from occult primary oropharyngeal squamous cell carcinoma (SCC) are not uncommon. A distinct subset presents as a cystic mass mimicking branchial cyst. We present 2 cases of metastatic cystic tonsillar (SCC) presented as benign branchial cysts.

**Case Reports:** Two adults (< 40 years) presented with asymptomatic left anterior neck mass. Ultrasound guided fine needle aspiration cytology (FNAC) showed a single benign branchial cyst. MRI scan and nasendoscopy did not reveal any suspicious naso- and oro-pharyngeal pathology. Cystic metastatic SCC was diagnosed histologically after surgical excision. The confirmation of tonsillar SCC by PET/CT and multiple biopsies permitted bilateral tonsillectomy and radical neck dissection followed by adjuvant radiotherapy in one patient. For the other patient, no primary tumour was identified after extensive investigations, and above mentioned surgery.

**Discussion:** 24% of unsuspected SCC in cervical cysts removed for the initial diagnosis of branchial cyst had been reported. Lateral cystic cervical masses in adults can represent an occult primary cancer from the Waldeyer's ring. Is it therefore justifiable and ethical to investigate all patients presented as branchial cysts with PET/CT to exclude metastatic cystic lymph nodes and occult primary tumour?

**Conclusion:** Adult patients presented with a lateral cystic neck mass mimicking a branchial cyst should be treated with caution or presumed to have metastatic cancer until proven otherwise. Negative FNAC findings may be misleading and therefore low threshold for PET/CT, examination under anaesthesia with direct biopsies of the Wal-

deyer's ring are crucial to exclude occult primary oropharyngeal SCC.

#### P-3517

### METASTATIC PAPILLARY CARCINOMA OF THE THYROID AND ECTOPIC THYROID CANCER

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**Introduction:** Cervical lymph node metastases from the papillary thyroid carcinoma (PTC) at the time of diagnosis is well established. PTC tends to metastasize in a contiguous fashion but skip metastasis to lateral lymph nodes has been reported. We report a patient with PTC in an extensive lateral metastatic cervical lymph node without identification of primary site or ectopic thyroid.

**Case Report:** A 67-year old female with a 7-year history of an extensive asymptomatic left neck mass was found to have papillary carcinoma of the thyroid cytologically. Total thyroidectomy with selective level II to VI neck dissection was performed and no primary tumour was identified. Extensive search using thyroid nuclear medicine scan and MRI of the head, neck and chest were carried out. No thyroglossal cyst, lingual thyroid or other ectopic thyroid tissue was found. The patient underwent radioactive iodine ablation. There is no evidence of recurrence 3 years after initial surgery.

**Discussion:** Metastatic papillary carcinoma of the thyroid without identification of primary tumour is uncommon. It is paramount to search for ectopic thyroid tissue which may undergo malignant transformation. Ectopic thyroid has been reported in gall bladder, mesentery of small intestine, mediastinum, heart, ovaries and adrenal glands. Carcinoma of ectopic thyroid is even rarer but it is important to perform thyroid nuclear medicine scan and MRI to exclude this possibility.

**Conclusion:** Metastatic papillary carcinoma of the thyroid with no evidence of primary tumour within the thyroid gland requires extensive search using thyroid scan and MRI to exclude carcinoma of the ectopic thyroid tissue.

#### P-3518

### MALIGNANT RHABDOID TUMOUR OF THE STOMACH WITH METASTASES TO THE JAWS: AN UNUSUAL CLINICAL PRESENTATION AND A DIAGNOSTIC CHALLENGE

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**Introduction:** Malignant rhabdoid tumour (MRT) is a rare tumour with an extremely poor prognosis. It was first described as a distinctive highly aggressive malignant neoplasm of the kidney. Although primary MRT at extra-renal sites have been reported, primary gastric MRTs are particularly rare accounting for 0.1% to 0.2% of all gastric carcinomas, with no reported metastasis to the head and neck region.

**Aim:** A case of primary gastric MRT with extensive metastasis is described. To the best of our knowledge this is the first reported case of metastasis to the oral cavity. This disease entity is discussed.

We report the case of a 64-year-old man who presented with shortness of breath, severe anaemia, cervical lymphadenopathy and multiple rapidly growing nodular masses of the mandible and maxilla. The patient underwent an OGD, colonoscopy, intra-oral biopsy and fine needle aspiration cytology (FNAC) of the cervical lymphadenopathy.

The result of FNAC and histopathology confirmed the diagnosis of MRT of the stomach. Imaging demonstrated widespread pulmonary, mediastinal, cervical, oral and liver metastases.

MRT is a known rapidly growing tumour and due to his rapid disease progression he was commenced urgently on Vincristine, Ifosfamide, Doxorubicin and Etoposide (VIDE) as combination chemotherapy.

**Conclusion:** • this case demonstrates the challenges surrounding diagnosis and hence management of this rare pathological entity. • The report highlights the importance of the mouth as a readily accessible site for tissue biopsy for definitive diagnosis and commencement of appropriate treatment.

#### P-3519

##### OBJECTIVE EVALUATION OF PATIENT SATISFACTION AFTER THYROID SURGERY

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**Introduction:** One of the most important, yet frequently overlooked aspects of good surgical care is an assessment of patient satisfaction after surgery both functionally and aesthetically. In the era of evidence based medicine, objective evaluation of patient satisfaction post intervention is the cornerstone of good surgical practice.

Thyroid surgery is a treatment of choice for many thyroid pathologies and it can affect the aesthetic outcome of neck and functional outcome of voice. We therefore carried out a patient satisfaction survey on our thyroid patients who underwent surgery.

**Materials & Methods:** 107 consecutive patients who underwent elective thyroid surgery at the Homerton University Hospital London over a 3 year period (between 2008 and 2011) were sent a custom designed proforma to collect data pertaining to post operative patient satisfaction (in relation to appearance, phonation, eating, swallowing and singing). The team involved in data collection was independent of the operating surgeon (LC) to avoid investigator bias.

**Results:** Out of the 107 patients, 2 were deceased and 62 responded to the survey making a 60% response rate. Majority (90%) of respondents agreed that the surgery was worthwhile and 85% stated that they would still go ahead with the surgery knowing what they experienced post op. Of those 9 patients who stated that they would be less likely to go ahead with the surgery, 83% were satisfied

with their appearance and most had some functional compromises. A detailed analysis of the results and their implications will be presented and discussed.

**Discussion:** Objective assessment of patient satisfaction after surgery is an important tool not only to evaluate surgical outcomes but audit performance against agreed international standards. Achieving good functional results is pivotal in motivating patients for surgery. Patients are more likely to have functional deficits after surgery in those functions which require higher cortical input, for instance, singing as compared with swallowing.

**Conclusions:** Patient perception is often different from clinical impressions made by clinicians. Our patient satisfaction survey showed high level of satisfaction despite the inevitable suffering after surgery and complications of surgery in small number of patients.

#### P-3520

##### BILATERAL CHYLOTHORAX: A RARE COMPLICATION FOLLOWING RADICAL NECK DISSECTION.

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First described in 1907, Bilateral Chylothorax is a rare complication of a radical neck dissection. Despite only 15 documented cases in the literature to date, it can result in grave respiratory, cardiac metabolic and immunologic derangement.

Chylothorax presents with a sudden onset of dyspnoea coupled with pleural effusions evident on a chest x-ray. A large chylous pleural effusion has the capacity to compress structures within the thorax leading to hypoxia and cardiac arrhythmia. Swift diagnosis is therefore crucial.

We present a 64 year old gentleman who underwent a unilateral neck dissection for a primary floor of mouth squamous cell carcinoma. On the 6th postoperative day the patient developed progressive dyspnoea and some pedal oedema. A reduced oxygen saturation and arterial blood gases indicated a type I respiratory failure.

Following further investigations and biochemical analysis of pleural aspirates, a diagnosis of Bilateral Chylothorax was determined.

With reference to this case report, we highlight difficulties in diagnosis, the need for prompt management and furthermore provide clarification on effective treatment modalities in the literature to date.

#### P-3521

##### THYROID CANCER: DEMOGRAPHICS, SURGICAL MORBIDITY AND DEVELOPMENT OF MINIMALLY INVASIVE TECHNIQUES

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**Introduction:** Thyroid cancer has an annual incidence of 1900 in the UK. We present the demographics, histological types and surgical complications of a single designated thyroid cancer surgeon (LC) from the North East London Thyroid Cancer Network (NELTCN).

**Materials Methods:** Of 472 thyroid and parathyroid surgery carried out in a 7 year period, data of all thyroid surgery undertaken on patients with thyroid cancer were retrospectively analysed from the patient records and histology records.

**Results:** 110 oncological procedures were carried out on 46 patients. Male to female ratio was 1:3 with a mean age of 43 year (range 18-82). 54% of our patients were Caucasian. 70% was papillary carcinoma followed by follicular carcinoma (n=5) and other rare variants (n=8) including hurtle cell and thyroid squamous cell carcinoma.

5 prophylactic level VI neck dissection, 11 multiple level nodal clearance and 2 retrosternal thyroidectomy were performed.

Postoperative complications included hypertrophic scarring (7%), transient hypocalcemia (11%), temporary hoarseness (11%) and 1 permanent hoarseness due to invasive thyroid squamous cell carcinoma.

**Discussion:** The demographics of our population and complication rates are in keeping with other published data. A literature review demonstrates that conventional surgery has equivocal morbidity when compared to minimally invasive video assisted thyroidectomy (MIVAT).

**Conclusions:** LC performed surgery on 6.5 patients per year with thyroid malignancy. We believe that thyroid cancers should be managed in specialist multi-disciplinary Head and Neck Cancer centres with the capability of offering a wide range of surgery including MIVAT for appropriate selected cases.

#### P-3522

### MANDIBULAR METASTASIS OF HEPATOCELLULAR CARCINOMA SIMULATING A BENIGN LESION

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**Introduction.** Oral metastases are rare and are approximately 1% of the malignant neoplasms of this region. Primary tumours frequently metastasize into the oral cavity within the lung, kidney, bone and colon. The hepatocellular carcinoma is the liver neoplasm of higher prevalence, producing metastases in 37% of the cases in lung, regional adenopathy, muscle-skeletal tissue and gland adrenal but rare time in oral cavity.

Gingival metastases from hepatocellular carcinoma occur as masses with or without pain, and tendency to bleeding. These characteristics are also observed in benign lesions, being essential the biopsy to not infer in a misdiagnosis mucous lesions. The absence of radiographic changes does not exclude the possibility of bone micrometastasis.

**Materials And Methods.** Patient of 52 years diagnosed with hepatocellular carcinoma moderately differentiated trabecular pattern in treatment with chemotherapy and radiotherapy. It is derived to our service due to injury polipoide in 4th quadrant of 4 weeks of evolution, asymptomatic, no signs of malignancy which suggests benign lesion like pyogenic granuloma. The orthopantomography

showed no pathological radiological signs but a right mandibular body uptake was observed in the scan in addition to in Vault, in the absence of pulmonary dissemination.

**Results.** Excisional biopsy was performed. The pathology reported gingival metastasis of hepatocellular carcinoma. The patient is currently living with disease (17 months since the diagnosis of the disease) and treatment for radiation oncology.

**Discussion.** The route of dissemination to the maxillofacial area is Hematogenous through the vein porta. The spread to this area in the absence of pulmonary involvement has been explained by various authors as a result of the existence of a connection between the azygous. While the survival of patients with hepatocellular carcinoma has improved in recent years, the presence of distant metastases worsens their prognosis (from weeks to less than two years). Oral metastases from hepatocellular carcinoma should be included in the differential diagnosis of oral lesions in patients with Chronic Hepatitis B, C. history

#### P-3523

### HISTOPHOTOLOGICAL RESPONSE OF CONCURRENT PREOPERATIVE CHEMORADIOTHERAPY WITH DOCETAXEL AND CISPLATIN FOR ORAL SQUAMOUS CELL CARCINOMA

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**Purpose:** We conducted a regimen of concurrent preoperative chemoradiotherapy with Docetaxel and Cisplatin for oral squamous cell carcinoma (SCC) to evaluate the histopathological tumour regression.

**Patients and Methods:** Fifty two patients with previously untreated oral SCC were enrolled in this study. Patients were 40 males and 12 female of 64 years median age (range 30 to 77 years). The primary sites were the tongue (18), the lower gingiva (18), buccal mucosa (6), upper gingiva (4) and floor of the mouth (6). Four patients had clinical stages II, while 14 had stage III and 36 had stage IV. Fifteen patients were treated by radiotherapy alone (group R), while 37 patients received concurrent chemoradiotherapy (group CR) with Docetaxel (10mg/m<sup>2</sup>, weekly) and Cisplatin (4mg/m<sup>2</sup>/radiation). Radiation was delivered at 2.0 or 2.5 Gy/day to a total dose of 40 Gy. All patients underwent surgery and the efficacy of the preoperative treatment was estimated histopathologically according to the Oboshi-Shimosato classification.

**Results:** All patients in group R received full dose of radiotherapy, but 9 patients in group CR were obliged to discontinue radiotherapy or chemotherapy due to severe mucositis (Grade II in 8 cases). Neutropenia (Grade II in 5 cases, Grade III in 5 cases) was observed in group CR, but all patients underwent planned surgery. In histopathological evaluation, only 4 (26%) in group R and 23 (62%) in group CR presented more than Grade III. Overall survival rate was 40.0% in group R and 91.3% in group CR.

**Conclusion:** Concurrent chemoradiotherapy with Docet-

axel and Cisplatin can be carried out safely and is expected with a high rate of histopathological tumour regression and excellent outcome.

**P-3524**

**UNEXPECTED CONTRALATERAL CERVICAL RECURRENCE IN SMALL TONGUE EPIDERMOID CARCINOMA.**

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Contralateral lymph node metastasis is unusual in ipsilateral cN0 oral tongue squamous cell carcinoma. In pN0 cases, contralateral lymph node recurrence occurred in less than 1% patients and it is related to a worsening of the prognosis. A 43 year-old woman presented a T2 cN0 squamous cell carcinoma on the right side of the mobile tongue. The patient underwent a margin free excision of the tongue lesion and a right supra-omohioid neck dissection (level I-IV) was performed. Pathologic analysis resulted pN0 and patient was discharged without complications. Six months after initial treatment, a fast growth, painless, static and attached large contralateral mass was developed. Fine needle aspiration cytology (FNAC) was performed and infected branchial cyst was suggested. Intraoperative examination and biopsy of the neck mass revealed a squamous cell carcinoma. Extended radical neck dissection was performed and she received postoperative radiotherapy. Four months later, the patient presented a massive distant progression and died of disease one year after initial diagnosis.

**P-3525**

**CLINICOPATHOLOGICAL STUDY OF AMELOBLASTIC CARCINOMA**

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**Introduction:** Ameloblastoma is the most common clinically significant benign odontogenic tumour. It may arise from rests of dental lamina, from developing enamel organ, from the epithelial lining of the odontogenic cyst, or from the basal cell of the oral mucosa. Rarely, an ameloblastoma exhibits frank malignant behaviour with development of metastases. The frequency of the malignant behaviour in ameloblastoma probably occurs in far less than 1% of all ameloblastoma. Malignant variants of ameloblastoma include malignant ameloblastoma, which microscopically appears benign but has metastasized and ameloblastic carcinoma that exhibits malignant histopathological features. Ameloblastic carcinoma is classified into 2 types: a primary odontogenic malignancy and a secondary type resulting from malignant transformation of ameloblastoma. The objective of this study was to analyze the incidence, demographics and clinicopathological features of the ameloblastic carcinoma.

**Patients:** We identified 7 cases of histopathologically confirmed ameloblastic carcinoma at Department of Oral and Maxillofacial Surgery, Tokai University Hospital

from 2001 to 2010.

**Results:** The patients ranged in age from 33 to 86 years. There were 5 men and 2 women. One patient involved the maxilla and 6 patients were found in the mandible. Five cases arose de novo, whereas 2 cases were secondly type of ameloblastic carcinoma. Five patients were treated by surgical resection, one patient received radiotherapy and one patient received conservative palliative care only for her general condition. The most common symptom was swelling, followed by pain. Three patients had the regional lymph nodes metastases. Lung metastasis was present in two patients. Four patients are free of recurrence and metastasis.

**Conclusion:** Metastasis appeared to be the major prognostic factor for ameloblastic carcinoma.

**P-3526**

**THE SIGNIFICANCE OF MYOFIBROBLASTIC PROLIFERATION IN THE EXTRACELLULAR MATRIX OF ORAL CAVITY CARCINOMA ON INCIDENCE OF REGIONAL METASTASES**

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Neck status is the most important prognostic factor in oral cavity carcinoma. The presence of regional lymph node metastases reduces the 5-year survival rate to approximately 50%. Indications for elective neck dissection in oral cavity carcinoma which is resectable intraorally are still controversial. To date, no clinical diagnostic method used in assessing the status of neck lymph nodes has been proven to be reliable enough.

The purpose of this study is to immunohistochemically examine the expression of laminin,  $\alpha$ -smooth muscle actin, desmin, CD34, vimentin and fibronectin in order to determine the degree of proliferation of myofibroblasts within desmoplastic reaction in the extracellular matrix of the primary tumour, to compare it to the presence of regional metastases and to compare their significance to other prognostic factors.

The study included 152 consecutive patients with oral cavity carcinoma at the stage T1-3N0, 124 (81.6%) men and 28 (18.4%) women, with average age of 59 years. Thirty-six indicators depending on the type of operation, the appearance of regional metastases and survival rate were followed.

A direct univariate correlation with the appearance of regional metastases was proven for the degree of differentiation, mode of invasion, presence of desmoplasia, perineural and perivascular infiltration, and immunohistochemical expression of laminin,  $\alpha$ -smooth muscle actin, desmin, CD34, vimentin, and fibronectin. Only the presence of desmoplasia and immunohistochemical expression of fibronectin were found to be statistically significant and independent factors.

Indicators among which a univariate correlation with survival rate was proven, statistically significant and mutually independent were the tumour volume, resection margins and immunohistochemical expression of fibronectin and vimentin.

Abundant desmoplasia and immunohistochemically pro-



nounced expression of fibronectin in the primary tumour are, to a high degree of certainty, predictive of the appearance of regional metastases in squamous cell carcinoma of the oral cavity and can contribute to a more precise determination of indications for elective neck dissection.

**P-3527****MANDIBULAR SARCOMAS: SURGICAL EXPERIENCE OVER THE PAST 10 YEARS**

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**Introduction:** Sarcomas located in the mandible are difficult to study due to their relatively rare appearance and histology.

**Patients and Methods:** We present the experience of the Oral and Maxillofacial Surgery Department of the Vall d'Hebron Hospital in Barcelona over the last 10 years (2001-2010) in the management of jaw sarcomas, performing a retrospective review of 12 cases of patients affected by this type of tumour.

**Results:** The technique mostly used for the reconstruction was the microvascularised bone graft (fibula: 8/12), with 82% of the patients receiving adjuvant therapy (chemotherapy and radiotherapy). Five of the patients died (42%), two were found with disease progression (16%), and 5 survived free of disease (42%) until the end of follow-up.

**Conclusions:** The cases described are a unique series due to the mandibular location. Prognostic factors and survival rates are similar to those described for head and neck sarcomas. Free margin during surgery must be the goal of treatment, additional chemotherapy or radiotherapy or both being required to improve the survival rates.

**P-3528****ALVEOLAR RHABDOMYOSARCOMA OF THE UPPER LIP IN A CHILD. DIAGNOSTIC APPROACH AND THERAPEUTIC MANAGEMENT.**

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Rhabdomyosarcoma is the most common soft tissue sarcoma in the pediatric population. It comprises at about 5% of all childhood cancers and nearly 50% of soft tissue sarcomas arising in children till the age of fourteen. Alveolar rhabdomyosarcoma (ARMS) is one of the major categories of rhabdomyosarcomas; it encompasses malignant tumours of striated muscle and occurs more frequently in the extremities. It is uncommonly reported in the head and neck region.

We report a case of a 12 year old girl with alveolar rhabdomyosarcoma of the upper lip that has been considered primary as an accessory salivary gland tumour. The first histologic report was a salivary carcinoma and a doubt remained about the tumour diagnosis which is unusual in infants. Revision of the specimens with immunohistochemical staining allowed diagnosis upright. Treatment modality included complete resection of the tumour and the surrounding premaxillary muscles with postoperative

chemotherapy. The girl is disease free since 3 years. Radiotherapy was not applied according to the characteristic favourable prognosis of alveolar rhabdomyosarcoma.

**P-3529****LIGASURE FOR NECK DISSECTION. HOW WE DO IT**

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**Aim:** The aim of this paper is to present our experience with the use of the Ligasure Scalpel in neck dissection.

**Material and methods:** We present 20 patients who underwent a neck dissection in our Oral and Maxillofacial Surgery Department between January 2011 and March 2012. There were 14 men and 6 women with a mean age of 63 years (range, 45-85 years).

A total of 25 neck dissections were performed: supraomohyoid dissection in 14 cases, modified radical dissection in 6 cases and radical dissection in 5 cases.

15 patients were diagnosed on squamous cell carcinoma of the oro-pharyngeal cavity, one patient on facial melanoma, two patients on facial sarcoma and two patients were not diagnosed on any primary tumour. Three patients underwent radiotherapy previously to the surgery. The surgical procedures were performed by the same surgeon. Operative time, drainage volume and complications were measured.

**Results:** Operative time was 120 minutes (range, 90 – 240 minutes). Intraoperative bleeding ranged between 30 cc and 50 cc, even in the patients previously radiated. The fluid collection in the vacuum at 24 and 48 hours ranged between 50 – 100 cc and 20 – 40 cc respectively. A minimal bleeding and a better feeling when cutting large amounts of tissue that usually bleeds, like level IIB and V were noticed when compared with standard electrocautery. The scalpel allows closing less than 3-4 mm vessels safely, for larger vessels, a ligature or clip are recommended. There were no complications described. There were no patients reoperated on due to bleeding.

**Summary:** Neck dissection with Ligasure scalpel is a safe procedure and represents, for us, the gold standard technique, if available, even better than electrocautery.

It allows closing less than 3-4 mm vessels without placing any ligature or clip.

Both operating time and bleeding are significantly reduced. Potential complications, as accidental nerve section, are possible, although minimal.

We noticed that Ligasure scalpel produces lesser heat than Harmonic scalpel or monopolar scalpel, improving the safety of the procedure, avoiding damage to healthy structures, such as jugular vein or carotid artery.

**P-3530****ROLE OF INTRAOPERATIVE MARKING AND DIVISION OF CERVICAL LYMPH NODE LEVELS DURING NECK DISSECTION**

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**Introduction:** Lymphatic node metastasis is the most important prognostic factor in Head and Neck tumours. In order to stage correctly these patients and to plan an accurate adjuvant therapy, it is necessary to establish a surgical protocol for marking and/or dividing of each lymphatic cervical level at the time of the surgery.

**Material & Methods:** There are several methods for marking operative specimens nowadays, especially in tertiary referral hospitals. In this prospective study we aimed to determine the utility and efficacy of an intraoperative method of cervical dissection specimens marking.

52 patients with Head and Neck tumours (47 squamous carcinoma oral cavity, 2 parotid gland tumours, 3 unknown primary) underwent 66 cervical dissections for high risk or positive neck metastasis, between September 2010 and March 2012. 62 of the specimens were marked in-vivo between the level limits (I-V) based on the classification of Memorial Sloan Kettering Cancer Centre. Neck dissections were divided ex-vivo in the operation room by the surgeons, in a table distant from the operating field. Each level was labelled in separated containers.

Preoperative cervical staging CT +/- PET-TC was compared with pathological findings.

**Results:** 93,9% of the cervical dissections were correctly marked and divided following the previously mentioned criteria. 3% were incorrectly divided. 37% (n 23) of the labelled neck specimens presented nodal metastasis. Main levels affected were I (60%) y IIA (70%), in conformity with lymphatic dissemination of oral cavity squamous cell carcinoma (90% of the patients). The incidence of skip metastasis to level III was 15 %.

45% (n 11) of the positive neck specimens were not reported as affected lymphatic nodes in the preoperative image studies.

Complementary Radiotherapy treatment was done selectively, according the distribution of node metastasis.

**Conclusions:** This protocol of marking and dividing neck dissection specimens is simple, quick and accurate, because is performed by the surgeon in the same moment of the surgery. Following this protocol systematically does not increase the surgical time and it improves the study of lymphatic patrons of dissemination, providing basic information for further studies.

**P-3531****AGE PATTERNS OVER TEN YEARS OF MAJOR HEAD AND NECK FREE FLAP RECONSTRUCTION IN A DISTRICT GENERAL HOSPITAL FROM THE UK.**

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<sup>1</sup>Worcester Royal Hospital, UK

**Introduction:** Surgical free flap reconstruction in head and neck cancer is associated with people between 50-60 years

of age. It has been noted that increasingly younger patients are appearing for major reconstructive surgery. We believed we were also operating on increasingly older and sicker patients.

**Methods:** We examined our database over the period of January 2002 and December 2011 to examine age and sex distribution of patients that we have been treating with free flap reconstruction.

**Results:** 169 free flaps were performed over the ten years period with a male: female ratio of 1.2:1. Data showed a negatively-skewed age distribution with median 65 years (range 22-95) and mode 54 years. 39% of patients from our catchment area were over 70 years of age (compared with 26% reported from Scotland). Ages of the oldest and youngest patients treated each year showed a divergent trend.

**Conclusion:** The gradual divergence in extremes of age treated with the median age staying constant suggests the existence of two populations. A younger cohort of patients may reflect HPV infection. An increasingly elderly population (above 70 years of age) may reflect prolonged alcohol and tobacco use and generally increased cancer risk in an ageing population. Due to increasing comorbidities, the elderly cohort will require meticulous risk assessment and perioperative management. On the other hand, the younger population might be fitter for major surgery but may require skilled counselling to cope with potentially disfiguring procedures and long-term follow-up.

**P-3532****CASE REPORT OF ORAL CARCINOMA IN A PATIENT PRESENTING MAXILLARY OSTEONECROSIS RELATED TO BISPHOSPHONATES.**

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**Introduction:** Many external factors have been related to the development of oral squamous cell cancer, being tobacco and alcohol the factors most widely and longest studied. Recently some studies have focused their attention studying the influence of infections by human papilloma virus (HPV) in the development of these tumours, especially in non drinkers non smoker patients. Other factors such as dietary habits, oral hygiene or chronic injuries in oral mucosa have been less studied, but also involved in their aetiology. Therefore all these external factors must be taken into account in the study of patients with head and neck cancer.

**Patient and methods:** We report a female 81 years old patient, non-smoker non drinker. The patient had been treated in our department of oral and maxillofacial surgery of the Universitary Hospital La Fe in Valencia for osteonecrosis related to intravenous bisphosphonates (ONRB) in maxillary region and had been followed for 4 years. After that time, the patient developed a squamous cell carcinoma in the same region affected by the osteonecrosis before. We describe the performed treatment and the case development.

**Discussion:** After an extensive review of the literature we haven't found evidence of direct relationship between

ONRB and aetiology of oral squamous cell carcinoma. We haven't found similar cases of patients affected of ONRB who developed oral squamous cell carcinoma in the same region. Because of the recent description of the ONRB as a clinical entity, may arise in future more cases associating ONRB with the development of squamous cell carcinoma in the oral region. Scientific studies are needed to test this hypothetic association.

**P-3533****DECISION ANALYSIS AND TREATMENT THRESHOLD IN MANAGEMENT OF TONGUE CANCER WITH NO NECK STATUS**

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**Introduction:**

The relationship between primary lesions and lymph node (LN) metastases in tongue cancer, among oral tumours, has been analyzed most frequently. It has frequently been reported that tumour thickness in tongue cancer correlates with LN metastasis. The 2011 NCCN guidelines state that tumour thickness is a risk factor and that thicker tumours require elective neck dissection (END), but the guidelines provide no definite criteria. In the present study, we analyzed the usefulness of END in patients with T1-2N0 tongue cancer in order to establish a treatment algorithm for tongue cancer because the NCCN guidelines remain vague.

**Methods:**

We analyzed 75 preoperative patients with T1-2 tongue cancer whose thickness (distance from the surface of a tumour to its deepest part) measured by ultrasound was more than 4 mm among 156 tongue cancer patients, with N0 neck metastasis status, treated between 1996 and 2006 at our department. The patients consisted of 49 men (65%) and 26 women (35%), 29 to 86 (median, 62) years of age. The TNM classification by the International Union Against Cancer was T1 in 34 patients (45%) and T2 in 41 (55%). These 75 patients were analyzed according to the decision tree created by Weiss et al.

**Results:**

twenty-one (28%) of the 75 patients with T1-2 N0 tongue cancer underwent END, and 54 (2%) were observed. Five (23.8%) of the 21 patients with END had pathological LN metastases. Subsequent LN metastasis was found in 16 of the 54 under observation. Therefore, occult metastasis was seen in a total of 21 (28%) of the 75 patients. Analysis with the decision tree created by Weiss et al. showed that END should be recommended for patients with a probability of occult metastasis exceeding 15.2%.

**Discussion:**

The present results support the application of END for the treatment of T1-2N0 tongue cancer exceeding 4 mm in thickness.

**P-3534****T1/T2 SCC TONGUE AND THE NO NECK - TO DISSECT OR NOT TO DISSECT?**

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**Introduction:** The management of T1/2 SCC tongue and N0 neck remains controversial, with expectations for an elective neck dissection to occur once a tumour dept of 4mm or more is encountered.

**Methods:** We reviewed 105 patients at St George's Hospital who underwent treatment for T1/2 SCC of the tongue between 2003 and 2007. Basic demographics were recorded. Notes were reviewed and the tumour site and depth, histological grade and presence of an invasive front recorded. We reviewed previous head and neck dysplasia history, previous radiotherapy use, whether a neck dissection was performed, the nodal yield and their five year follow up. We also reviewed results from their radiological imaging.

**Results:** Results from 105 patients were collated. 4 patients were lost to follow up. 21 patients had no neck dissection. This management was based on mainly patient choice or presence of co-existing medical pathology. Of the remainder who underwent a neck dissection (n=80), 60 had no positive nodal yield. Of those with a positive neck dissection, average tumour depth was 7mm (range 4 - 15mm).

**Conclusions:** The management of T1/2N0 SCC of the tongue remains controversial but we suggest from our data series that an elective neck dissection can be deferred until a tumour dept of 7mm is encountered. Neck dissections are time intensive procedures, with increased morbidity. This case series suggest that we are over treating this cohort of patients and a deferred approach to treatment should be considered.

**P-3535****TWELVE-YEARS SURVIVAL OF A PATIENT WITH THE SECONDARY ADVANCED CARCINOMA OF THE ORBIT**

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**Background:** A secondary advanced squamous cell carcinoma of the orbit belongs to relatively rare tumors, with variable, often poor clinical symptomatology. Usually it is manifested by complications when tumor has expanded into surrounding organs. Often it is diagnosed late and prognosis is poor despite the multimodal therapy.

**Case report:** Authors present a 52-year-old male patient with a late diagnosed advanced squamous cell carcinoma of the orbit primarily involving the antrum of Highmore. Since he suffered approximately one year from an increased left eye lacrimation and conjunctivitis he had been frequently examined by ophthalmologist. Later followed limited left eye mobility, tenderness on touch and a mild

protrusion of the bulb. Our suspicion of a tumor was confirmed by a computer tomography. The tumor filled the whole sinus maxillaris, infiltrated an orbit, eye-moving muscles, the left cavum nasi and infiltrated the septum nasi.

We performed a total maxillectomy, an orbitectomy and a partial dissection of a left cavum nasi and ethmoid bone. The defect was secondarily reconstructed with the help of The Chinese Flap from the forearm. Then the patient was treated by a chemoradiotherapy in the dose of 53 Grey. Over twelve years he has been regularly followed up and till now with no need of a further intervention.

*Conclusion:* twelve years survival of the patient despite a poor prognosis is the reason why individual approach to extensive tumors is required. We emphasize a necessity to think about the possibility of a tumor when refractory conjunctivitis, mainly with bulb protrusion occurs.

#### P-3536

### BEWARE OF WHAT YOU ARE SUCTIONING! AN UNUSUAL PRESENTATION OF NASOPHARYNGEAL CARCINOMA

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*Introduction:* Nasopharyngeal carcinoma has a bimodal age distribution with a small peak observed in late childhood and a second peak in the fifth decade. It accounts for approximately 1% of all childhood malignancies. A direct relationship has been suggested between Epstein-Barr virus (EBV) infection and the malignant transformation of epithelial cells. Most patients present with advanced disease (Stage III or IV) with cervical lymphadenopathy being the most common presenting features.

*Case report:* We present a case of a 14 years old boy admitted with bilateral mandibular fractures (right parasymphysis and left angle) after a quad-bike accident. The surgical management of his maxillofacial injuries was uneventful with good inter-maxillary relationship achieved. As the intra-operative throat pack was removed, routine suctioning of naso-and oropharynx was performed. This initiated extensive haemorrhage from the posterior nasal space requiring bilateral posterior and anterior nasal packing. CT scan of the head and neck discovered a previously asymptomatic lesion in the nasopharynx along with an enlarged level III cervical lymph node. Fine needle aspiration biopsy revealed metastatic undifferentiated carcinoma with nasopharynx being the most likely primary tumour site. Tumour staging was performed and radiotherapy was commenced without delays.

*Conclusion:* The importance of post-operative suctioning cannot be stressed enough especially in our specialty. As blood may pool in the nasopharynx during procedures and acute airway obstruction secondary to a dislodged clot into the larynx ("coroner's clot") can be fatal. Although a complication arose after suctioning in this case, it can usually be performed safely without adverse consequences.

#### P-3537

### ADVANCED SURGICAL APPROACH IN THE TREATMENT OF LARGE PARAPHARYNGEAL SPACE TUMOURS.

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*Introduction:* Most of the tumours arising from the parapharyngeal space are benign and present after a long silent period. Usually they manifest as an upper neck tumour mass which may lead to the pharyngeal wall distortion. In spite of the latest developments in CT and MRI diagnosis most of the patients presented with large tumours. For these reasons surgery presents a complex procedure and should be organ preservative.

*Materials and methods:* we present our 20 year experience, which consists of 176 patients with different parapharyngeal space tumours, 113(64,2%) of them benign and 63(35,8%) malignant tumours. Surgery was performed in all of these cases.

*Results:* An external neck approach was adequate for total removal of the majority of benign tumours, especially pleomorphic adenoma. In cases of recurrent or advanced malignant tumours such as rhabdomyosarcoma this kind of approach was combined with lateral or median mandibulotomy with further miniplates osteosynthesis - 15(8,5%) cases in our study. We preferred musculo-cutaneous flap (major pectoral muscle) for simultaneous reconstruction of the lateral pharyngeal wall performed in 3(1,7%) cases. Internal carotid artery involvement was the main technical problem during this kind of operations. In our series there were 10(5,7%) cases of this situation demanded resection and simultaneous artery reconstruction.

*Conclusions:* Recurrent and advanced malignant tumours demand the application of a combined surgery approach in order for radical tumour removal and adequate plastic reconstruction of damaged structures.

#### P-3538

### PREDICTIVE FACTORS FOR DYSPHAGIA AND PERCUTANEOUS ENDOSCOPIC GASTROTOMY (PEG) IN HEAD AND NECK CANCER

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*Introduction :* A major aspect in rehabilitation after resective cancer surgery in head and neck concerns swallowing. Despite of complex reconstructions, not all patients gain sufficient swallowing function to allow adequate oral feeding. This prospective study was aimed to detect and evaluate predictive factors for postoperative dysphagia and need for percutaneous endoscopic gastrostomy (PEG).

*Material and methods :* The study collective was formed by patients suffering from squamous cell carcinoma of the oral cavity and oropharynx (all TNM-stages). Exclusion criteria were non-compliance concerning participation in this study, already existing dysphagia due to other causes (e.g. neurological), state after resective operations in the head and neck region and state after neoadjuvant irradiation.

tion and / or chemotherapy. Pre- and postoperative 27 relevant groups of parameters were assessed (influencing and prognostic factors) and a standard diagnostic evaluation of swallowing and dysphagia (leading to 5 grades of dysphagia) was performed. Besides univariate statistical procedures (correlations, ANOVA), binary logistic regression analysis was carried out (target variables : dysphagia, need for PEG).

**Results** :152 patients were included in this study (96 males, 56 females, age median 60.2 +/- 12.6 years, range 24.5 to 92.6 years). 36 patients suffered from relevant dysphagia, and 26 of them needed PEG to ensure enteral nutrition. We found highly significant (p

**Conclusion** : The evaluated prognostic factors give strong hints for clinical and therapeutical relevant causes for the development of dysphagia after oncological therapy in head and neck cancer. They can serve as basis for a prognostic model concerning nutrition after large resections. Pros and cons of preoperative PEG have to be discussed and more prospective studies including higher numbers of participants should be performed.

#### P-3539

### SENTINEL NODE BIOPSY OF CLINICALLY NEGATIVE NECK IN PATIENT WITH LOWER LIP CARCINOMA T1,T2,NC0 IN KOSOVA

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**Introduction:** Squamous cell carcinoma of lower lip is one of the most frequent malignant pathology in the maxillofacial region. Lip cancer is the second most frequent, after skin cancer. Over fifteen years in our department we have treated 789 patients with SCC of lower lip. Majority were males (89%). The patients with T1 and T2 had better prognosis. The aim of our research is to find the better method for detecting metastases in the neck in patients with squamous cell carcinoma of the lower lip and to choose the better treatment for those patients.

**Material and methods:** 31 patients with squamous cell carcinoma of lower lip T1,T2,NC0 were admitted to the Department of Maxillofacial Surgery in Pristina, from December 2010 till March-2012 have been analyzed for detection of possible metastasis in the neck.. Lymphoscintigraphy was made the day of surgery with Tc99m-Sn colloid dissolved in 0.3 ml of saline solution applied at 4 peritumoural sites. After detection the sentinel lymph node was extirpated and biopsy was done.

**Results:** Of all patients 9,2% were females and 90,7% were males. Average age of patients was 61. 71% of patients were T1 and 29% T2. Sentinel nodes were detected with Lymphoscintigraphy (LSG) in 21 patients (67,7%), positive LSG in T2 patients was 88% vs. 22% in T1. In 21 patient (67,7%) with positive lymphoscintigraphy Sentinel node biopsy resulted positive in 47,6%. Metastases were found in 32% of the total number of patients.

**Discussion:** In our study lymphoscintigraphy combined

with immediate biopsy of sentinel node shows very good results in the treatment of neck in patients with Lower lip carcinoma T1-2, Nc0.

#### P-3540

### MALIGNANT CAROTID BODY PARANGLIOMA - A RARE NECK LUMP

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**Introduction** : Marchand, in1891, described the first carotid body paraganglioma. These are rare neuroendocrine neoplasms, derived from extra-adrenal paraganglia of the autonomic nervous system and can be benign or malignant. Literature reports the malignant variety as having an incidence of 0.03%. Malignant neural crest cells may secrete catecholamines, potentially causing havoc with severe hypertension and arrhythmias.

Early aggressive resection of these highly vascular malignant tumours with accompanying neck dissection is suggested for optimum outcome. However, the authors have not found any existing formal management protocols and little is known of prognosis; thus follow-up must be life long.

**Methods:** A 64 year old lady was referred with an insidious, painless lateral neck mass with weight loss of 1 stone. There was no history of hypertension, arrhythmias or other symptoms.

Clinical examination revealed a left-sided, 3cm, level 2 mass. No other intraoral or extraoral pathology was found. An ultrasound guided FNA, PET scan and CT angiogram/duplex scan were sequentially requested. The results were consistent with a mass encasing the bifurcation of the left common carotid artery, extending to the skull base and left jugular foramen. Serum catecholamines were only mildly elevated.

A left carotid body tumour was provisionally diagnosed. After MDT discussion, surgical resection was performed by vascular and OMFS surgeons.

Histopathology revealed malignant carotid body paraganglioma.

After further MDT discussion, postoperative radiotherapy was administered. Follow-up included monitoring PETCT and urine catecholamines levels; as a marker of recurrence/metastasis.

The authors illustrate this rare case with clinical pictures, imaging and histopathology.

#### P-3541

### SURGICAL TREATMENT OF SQUAMOUS-CELL CARCINOMA OF THE TONGUE WITH HARMONIC SYNERGY® SCALPEL: A CASE REPORT

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In this case report, we proposed to observe the efficacy of the surgical treatment of the squamous-cell carcinoma of the tongue (SCCT) by Harmonic Synergy® (HS) scalpel (Johnson & Johnson, Suprimed - Brazil). A female Cauca-

sian, 66 years old, with a clinical diagnosis of STCC (T1N0M0) is indicated to removal the tumour. The suspected carcinomas were initially delimited with 10mm margins, and the HS scalpel was used to dissect and remove the entire lesion. The post operative clinical evaluations were done every day until the sutures was removed and then every seven days up to one month postoperatively. After six months of follow-up, there was no recurrence of the SCCT for the involved site. It is concluded that the use of HS scalpel can be an extremely effective surgical tool in the treatment of localized STCC in an ambulatory setting. A careful planning and utilization of this technology can result in successful removal of the tumour while maintaining a bloodless field and resulting in an acceptable time for postoperative healing. It is very important to note only a significant statistical number of surgeries can confirm that the HS scalpel can be capable of allowing for adherence to the principles of the oncological surgery, including complete removal of the tumour with techniques that reduce the risk of lymphatic spread of tumour cells due to tumour manipulation.

#### P-3542

### PROGRESS IN SURGICAL TREATMENT AND RECONSTRUCTION OF MAXILLO-ETHMOIDAL NEOPLASM DURING YEARS 1997-2010

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**Introduction** Surgery and instantaneous reconstructions is a method of choice in management of neoplasms in the maxillo-ethmoidal complex. The aim of this presentation is to assess extent of tumour removal and safety of the methods used in our team.

**Material and methods.** During years 1997-2010 248 persons with diagnosis of neoplasm staged T2 to T4 and localized in maxillo-ethmoidal complex were treated surgically. Surgical procedure performed was partial maxillectomy in 139, total maxillectomy with orbit preservation in 61, radical maxillectomy with orbital exenteration and removal of tumour in skull base in 48. Resection was performed "en bloc" or until negative surgical margins were reached. After extensive resection the reconstruction with local flap or with free tissue with microvascular anastomosis were done in one stage.

**Results.** The tumour was totally removed in all the patients. In 25, reconstructions with microvascular flap was performed. Complications occurred in 22 patients during the postoperative period and 1 patient died due to carotid artery blowout. Postoperative histopathology revealed non-radical resection in 65 patients. 126 patients were given adjuvant radiotherapy.

**Conclusion.** 1. Surgery with one-stage reconstruction allows for total removal of tumour even in patients with advanced neoplasms of the maxillo-ethmoidal complex. 2. In spite of negative surgical margins final histopathological assessment shows non radical removal in 33% of the patients operated upon. 3. Radicality and functional and aesthetic reconstruction are the problems with need analysis and new method.

#### P-3543

### A RETROSPECTIVE AUDIT ON RESTORATIVE OUTCOMES OF PATIENTS DIAGNOSED WITH HEAD AND NECK CANCER

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In 2007 5410 persons were diagnosed with oral cancer and the prevalence is increasing. Of those diagnosed cancers, 30% affect the oral cavity with 90% being squamous cell carcinomas. Current guidelines advocate the importance of multidisciplinary team management of these patients; in the UK this includes a restorative dentist, to improve outcomes and patient's experience of their journey following diagnosis. This audit assesses patients diagnosed with oral cancer between 2008-10 and their management within the multidisciplinary team and their outcome.

Patient records were accessed and data was collected using a customized proforma.

A total of 100 sets of notes were included. The M:F ratio was (65:35). 12 had carcinoma of the floor of mouth, 7 tonsillar, 5 soft palate, 5 pharyngeal wall, 2 buccal mucosa, 9 anterior tongue, 34 posterior or tongue base, 8 maxillary and 18 mandibular. A majority of the lesions were graded T4, T2 and T1 with a smaller number graded T3. 38 patients were treated with a combination of chemo-radiotherapy. 26 had surgery involving hard tissues. 36 had surgery involving soft tissues only. 28 patients undergoing surgery (19 hard and 9 soft tissue) were seen by the restorative team preoperatively, only 4 undergoing chemo/radiotherapy were seen by this team.

It was concluded that despite the availability of a large multidisciplinary team including a restorative team, a number of patients undergoing chemo/radiotherapy were not seen by this team. The possible reasons including patient related factors for this are explored and benefits of the team approach are highlighted.

#### P-3544

### LAG SCREW FIXATION FOR STRAIGHT MIDLINE MANDIBULAR SWING OSTEOTOMY: OUR EXPERIENCE

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**Introduction:** Commando operation is a major procedure for treatment of malignant carcinomas of the oral cavity which includes *en bloc* surgical removal of tumour in the oral cavity combined with resection of mandible and neck dissection. Mandibular resection is generally considered unnecessary when there is grossly normal tissue between the tumour and the bone. In that case, mandibulotomy is considered a routine approach as it provides excellent exposure of the posteriorly localized lesions, but with more agreeable esthetic and functional results in opose to mandibular resection. Mandibular osteotomy can be performed as straight, notched, or in a stepwise fashion. Depending on the osteotomy site, options are midline, paramedial or lateral mandibulotomy. Methods of fixation differ from wire, combination of wire and K – wire and

miniplate fixation. Lag screw fixation was first introduced in 1970 by Brons and Boering. It was an established method of bone fixation in maxillofacial traumatology, and it was first implemented in 1990 by Dawson et al in patients with oropharyngeal tumours as a method of fixation of the mandibulatory site.

We wanted to present our experience with fixation of straight midline mandibulotomy in a mandible swing approach to the oral cavity and orofaryngeal tumours using lag screw.

*Patients and methods:* In a period of 15 years (January 1997 to September 2012) we used lag screw fixation technique in 85 patients who underwent straight midline mandibulotomy. The site of osteotomy, between central incisors, was fixated using 2 transversally placed lag screws to ensure stability.

*Results:* The data regarding all patients was reviewed from the department's tumour database in a period of 10 years. A total of 1362 en bloc resections were performed. Block resection with a mandibular swing approach was performed in 117 patients. Lag screw fixation technique was used in 85 patients following straight midline swing mandibulotomy. Postoperative period was uneventful in 79 patients, and complications developed in 6 patients. *Conclusion:* Lag screw fixation technique proved to be a very successful and effective procedure following straight midline mandibulotomy approach for oral cavity and orofaryngeal tumours.

#### P-3545

### OCCURRENCE OF DISTANT MEASTASES AFTER THE TREATMENT OF ORAL AND OROPHARYNGEAL CANCER

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*Background:* Distant metastases have a strong impact on survival rate in patients with oral and oropharyngeal cancer. This fact is more visible today than two or three decades ago because of a prolonged period of locoregional control. Therefore, distant metastases have enough time to develop. In this study we investigated the occurrence rate of distant metastases in patients with oral and oropharyngeal carcinomas, surgically treated in our institution.

*Patients and methods:* We retrospectively analyzed 120 patients surgically treated because of oral and oropharyngeal cancer. The entire group of patients was stratified in two subgroups: group A- achieved locoregional control and group B- locoregional recurrence. CT scans were used for diagnosis of pulmonary and mediastinal metastases and the triple confirmation of metastatic spread was required (radiologist, pulmonologist, oncologist) while the scintigraphy was used for the bone metastases detection. None of the metastases have been pathohistologically confirmed.

*Results:* We found 27% T2 and T3 necks staged clinically and extremely high proportion of pT2 and pT3 necks: 55.8%. 37% of the tumours were staged as clinical stage IV, while pathohistological staging raised this number up to 53%. The distant metastatic rate for the entire group (n=120) was 27% (26/120). Expectively, metastatic rate

was more frequent in those with locoregional recurrence- 27%, comparing with those without locoregional recurrence- 19%. Patients with oropharyngeal cancer had higher distant metastatic rate than those with oral cavity cancer: 28,2 % vs 18,5%. In those with extracapsular spread of positive lymph nodes the rate of distant metastases was 53% compare to those without extracapsular spread: 6%. We have also found pStage and pN to be better predictor of distant metastases than cStage and cN. 87% patients with distant metastases in the group A and 100% patients in the group B were staged as pIV, comparing to 67% and 64% of stage IV, while staged clinically.

*Conclusion:* The distant metastatic rate in this study is higher than in other published studies because of higher proportion of pIV stage and pT2 and pT3 necks. The number of positive nodes and the extracapsular spread of positive lymph nodes have been again confirmed as a major predictors of distant metastases occurrence.

## 36. TEMPOROMANDIBULAR JOINT PATHOLOGY AND SURGERY

### P-3601

#### THE USE OF A TMJ ASSESSMENT PROFORMA

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**Introduction:** Assessment of a patient with TMJ pain and symptoms can be a difficult task for junior clinicians. Often these patients have a chronic course, are difficult to examine and elicit a comprehensive history from. We present the use of a proforma which we think will simplify this patient assessment, and allow follow up to be easier.

**Method:** A standard proforma was created and used to record the clinical presentation of all new patients with a TMJ related complaint over a 6 week period. A control group was deemed to be a matching group of patients having attended over a similar time frame prior to the introduction of the proforma. Data was analyzed using an excel spreadsheet.

**Result:** There was a 90% improvement in the recording of clinical details after the introduction of the proforma. Areas of greatest uptake were deemed to be presence of habits, pain scores and mouth opening, along with impact (if any) on diet.

**Conclusion:** As clearly can be seen from this study, the use of a TMJ assessment proforma aids the recording of clinical details of patients with a TMJ complaint, and allows subsequent clinicians who review the patient to have a good baseline upon which to judge clinical improvement. We would advocate that all departments reviewing such patients consider the use of this (or a similar) assessment proforma.

### P-3602

#### THE TMJ MDT CLINIC – THE KING'S EXPERIENCE

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**Introduction:** Management of TMJDS can be complex. At King's College Hospital, an innovative TMJ MDT clinic has been established. This clinic is attended by an oral and maxillofacial surgeon, consultant in oral medicine, liaison psychiatrist with an interest in facial pain, maxillofacial prosthetist and a physiotherapist. Each patient is concurrently assessed by all specialists and a combined approach adapted to management. The efficacy of management in this clinic is superior to that on a general maxillofacial clinic and we would propose that all patients with TMJDS refractory to initial management are assessed using this MDT approach.

**Methods:** We present the preliminary results of 25 patients who have been reviewed on the clinic over a 1 year period. Pain scores and QOL questionnaires completed by all

patients have been analyzed before and after attendance. Data was collected using a standard proforma recording basic demographic details, diagnosis, pain scores, incisal opening and outcomes following attendance.

**Results:** 94% of patients report an improvement in pain and quality of life scores as a result of attending this clinic and are successfully discharged with a combination of splint therapy, medical and physiotherapy intervention.

**Conclusions:** The management of patients with TMJDS who are refractory to non-surgical treatment is improved by input from MDT colleagues. We propose that a similar model of care be extended to other units with a special interest in the management of these patients, as this is seen to be beneficial and cost effective. The use of pain scores and quality of life questionnaires facilitates the measurement of outcome measures for both the patient and MDT clinician.

### P-3603

#### HIGH-ENERGY LASER STIMULATION IN PATIENTS WITH TEMPOROMANDIBULAR DISORDERS (TMD)

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**Introduction:** The high-energy laser biostimulation Multi-wave Locked System Therapy (MLS) and High Intensity Laser Therapy (HILT) are new tools in pain treatment using solid-state and gas lasers.

**Aim of the study:** To compare the results of MLS and HILT laser biostimulation in patients with TMD.

**Material and methods:** 91 patients with TMD were divided into 2 groups. First group included 45 patients (33 women and 12 men) who have been treated with MLS biostimulation semiconductor laser with 2cm beam diameter and the power of 1,1W. Second group included 46 patients (39 women and 7 men) who have been treated with HILT biostimulation gas laser with 5mm beam diameter and peak pulse power 3kW. In order to assess the results of treatment a visual analogue scale (VAS) and modified Laitinen questionnaire were used. T Student test was used for statistical analysis and results were considered as statistically significant when  $p \leq 0.05$ .

**Results:** It has been achieved, in both groups, statistically significant pain relief by means of VAS without significant difference between groups. Moreover, reduction of pain intensity and frequency as well as reducing of the dose of analgesic medications was observed in both groups. The frequency and intensity of pain was lower in first group as compared with the second one.

**Summary:** MLS and HILT treatment in TMD reduces the subjective symptoms and improves quality of life of patients. Better results were achieved using MLS than HILT biostimulation.



**P-3604****SYNOVIAL CHONDROMATOSIS OF THE TEMPOROMANDIBULAR JOINT – CASE REPORT**Hubert Wanyura<sup>1</sup>, Zygmunt Stopa<sup>1,\*</sup><sup>1</sup>Department of Cranio-Maxillofacial Surgery, Medical University of Warsaw, Poland

**Introduction:** Synovial chondromatosis is a disease of unknown etiology. It is a mild, chronic, progressive pathology of the cartilage inside the joint in the form of follicular hyperplasia. Ambroise Paré was first who described synovial chondromatosis of the knee in 1558. Chondromatosis of the temporomandibular joint was first described by Auhausen in 1933.

**Aim of the study:** A case report of chondromatosis of the TMJ.

**Material and Method:** Synovial chondromatosis was found in a patient treated at the Centre for Arthroscopy of the Temporomandibular Joints at the Department of Cranio-Maxillofacial Surgery MUW. The main symptoms of the patient were pain and restriction of mandibular movements. During surgical procedure six foreign bodies were removed from the left temporomandibular joint (the largest dimensions of the calculi were 15 x 10 x 8 mm).

**Results:** Good morpho-functional and aesthetic results were obtained after surgical treatment.

**Discussion:** Synovial chondromatosis usually manifests itself in men after fifty years of age and affects large joints (knee and shoulder). Temporomandibular joint synovial chondromatosis is definitely more common in women (4:1).

**Conclusion:** The only effective treatment of synovial chondromatosis of temporomandibular joint is a surgical procedure involving the removal of foreign bodies from the joint. Definitive diagnosis of this disease is determined based on histopathological examination.

**P-3605****TEMPOROMANDIBULAR JOINT SYNOVIAL CHONDROMATOSIS WITH A CLEAR TRAUMATIC ETIOLOGY**Luis Miguel Gonzalez-Perez<sup>1,\*</sup>, Santos Crespo-Torres<sup>1</sup>, Nabil Fakih<sup>1</sup><sup>1</sup>Department of Maxillofacial Surgery. "Virgen del Rocío" University Hospital. Seville. SPAIN.

**Introduction:** Synovial chondromatosis (SC) is a metaplastic disorder of the articular synovial tissue characterized by the formation of cartilaginous nodules inside the articular space. SC is uncommon in the temporomandibular joint (TMJ).

**Case-reports:** We describe our experience in diagnosis and treatment and in the follow-up of three patients with unilateral SC of TMJ in conjunction with bony resorption on mandibular condyle and a suspected traumatic etiology.

**Discussion:** Pathogenesis of SC is unknown. Infections, traumatism and parafunctions have been suggested but they do not seem to be the main cause. The cases presented here are unusual by their obvious history of trauma. In

our opinion, SC will be part of a process of osteoarthritis, secondary to trauma, which caused the loss of the shock absorption function of the intact TMJ disc. We suggest that a traumatic episode could dislodge cartilaginous or bony tissue into the articular space, where it may lodge in the synovial tissue. These fragments could then be overgrown by a layer of synovium, which would provide nourishment resulting in the distinct formation of non-calcified or calcified bodies.

**Conclusion:** Symptoms of SC are nonspecific and diagnosis is based on imaging studies and final histological analysis. In our case-reports, diagnoses were made by panoramic radiograph, computed tomography (CT) and magnetic resonance imaging (MRI). Differential diagnosis must be made with condylar tumors, osteoarthritis, rheumatoid arthritis, avascular necrosis or condylar fractures. In cases presenting with a preauricular mass, as two of our cases, SC can be misdiagnosed as other benign or malignant diseases. A long history of preauricular pain, obliteration of the articular space and extracapsular soft tissue masses should alert to the suspicion of malignant transformation. In our patients, the histopathological analysis demonstrated erosion of the condyle with a pushing margin resulting from the pressure of expansible growth and there was no penetration of trabecular bone in the microscopic examination; the findings were consistent with the pathological criteria of SC.

**P-3606****THE KNOWLEDGE OF TURKISH DENTISTS ABOUT THE SPLINT THERAPY FOR MYOFACIAL PAIN AND TEMPOROMANDIBULAR DISORDERS**Yavuz Tolga Korkmaz<sup>1,\*</sup>, Celal Candırlı<sup>1</sup>, Fatih Mehmet Korkmaz<sup>2</sup>, Turgay Peyami Hocaoglu<sup>3</sup><sup>1</sup>DDS, PhD, Assistant Professor, Department of Oral and Maxillofacial Surgery, Faculty of Dentistry, Karadeniz Technical University, Trabzon, Turkey, <sup>2</sup>DDS, PhD, Assistant Professor, Department of Prosthodontics, Faculty of Dentistry, Karadeniz Technical University, Trabzon, Turkey, <sup>3</sup>DDS, PhD, Assistant Professor, Department of Oral and Maxillofacial Surgery, Faculty of Dentistry, Cumhuriyet University, Sivas, Turkey

**Introduction:**

Occlusal splint therapies are the most commonly applied treatment modalities for myofascial pain and temporomandibular disorders (TMD) in dentistry. Therapy is generally performed for myofascial pain relates to bruxism and occlusal disharmony. Recent studies comparing the most commonly applied therapies used in the management of bruxism by general dentists and dental specialists have shown diverse differences between the groups. The aim of this study is, therefore, to investigate the approach of the dentists in Turkey about the splint therapy for myofascial pain and TMD.

**Material and Methods:** A survey that contains 12 questions to find out the knowledge of the dentists about the TMD and the splint treatments was prepared. Questions aimed to know dentists basic facilities of their education and their commitment to the patients. Authors spoke to dentists included the study one to one by going to their clinic or telephonic communication to find out the immediate knowledge of the dentists.

**Results:** Scientific knowledge of young dentists between 0-5 years of experience about TMD and occlusal splint

therapy is better than the other groups of dentists. Existing knowledge is decreasing by increasing experience. The type of occlusal splints, particularly done by young dentists, was generally hard occlusal splints. Another striking result obtained in this study was that most of participants had not performed occlusal adjustment on occlusal splints.

*Conclusion:* Although most of the dentists included to the study claimed that they had enough information about TMD, bruxism and occlusal splints, the results of this survey in the form of questions and answers by telephone showed that they strongly need education about these topics.

#### P-3607

### TUBERCULOSIS OF TEMPOROMANDIBULAR JOINT : A CASE REPORT AND LITERATURE REVIEW

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Tuberculosis(TB) is an infectious disease by Mycobacterium tuberculosis and it is a major health problem. Primary infection is mostly pulmonary, but it may also occur in the lymph node, abdomen, skin, meninges and central nervous system. In the last few years, the incidence of extrapulmonary TB infection has increased and TB of head and neck forms nearly 10% of all extrapulmonary manifestations of the disease. In the head and neck forms, the majority of appearance is in the oral cavity and the clinical occurrence of TB infection in the TMJ is very rare. Therefore TB of TMJ can be easily misdiagnosed as osteoarthritis, TMD and any kind of chronic joint disease. This case report describes a 53-year-old man with swelling on Right preauricular area and trismus that was finally diagnosed as Tuberculosis in temporomandibular joint. According to the previously reported cases, the most common symptom of tuberculosis in TMJ is a painful preauricular swelling associated with trismus. The chemotherapeutic regimen for extrapulmonary tuberculosis is the same as that for pulmonary tuberculosis. We hope this case report would give the importance of considering TB of TMJ as a possible diagnosis.

#### P-3608

### BENIGN TUMOR OF THE TMJ. CASE PRESENTATION

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<sup>1</sup>*Fundación Jiménez Díaz*

There have been few reports of tumors in the mandibular condyle. We describe a case of a young woman with a tumor located at the right mandibular condyle associated with pain and progressive malocclusion which was treated by resection of the tumor. A conservative approach was possible using a piezoelectric device. The clinical symptoms, anatomic features, histologic characteristics, and differential diagnosis of these lesions are discussed.

#### P-3609

### MODIFIED TEMPORAL EMINOPLASTY WITH TIBIAL BONE GRAFT. OUR EXPERIENCE

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The aim of this paper is to present our experience with the use of tibial cortical bone graft for temporal eminoplasty in patients with mandibular dislocation.

*Material and methods:* We present 11 patients who underwent a temporal eminoplasty, according to Norman technique, because of TMJ dislocation, in our Oral and Maxillofacial Surgery Department between January 2010 and March 2012. There were 10 women and 1 man with a mean age of 30 years (range, 16-60 years).

A total of 15 eminoplasties were performed. The technique used was as follows: preauricular approach and dissection of the anterior and posterior TMJ capsule attachments to the zygomatic arch, leaving intact the inferior one. Oblique osteotomy of the temporal eminence, obtaining a tibial cortical bone graft by means of a minimal horizontal incision on the non-dominant leg and introduction of the graft into the osteotomy in a sandwich manner.

*Results:* Operative time was 40 minutes (range, 30 – 70 minutes). Intraoperative bleeding was minimal (less than 5 cc).

Height of the temporal eminence, preoperatively, measured at the orthopantomograph from the superior border of the zygomatic arch to the lowest point of the eminence ranged from 7,21 to 13,35 mm (mean 10,82 mm). Postoperatively, the height ranged from 14,7 to 18,9 mm (mean 16,5 mm). That represents an increase of the 52 %.

There were two complications described. One tibial hematoma because of the patient stood on foot for several hours the day after the surgery and another patient with a bad fracture of the zygomatic arch, managed with a titanium microplate. No facial palsy was described.

A median of 6 months of follow-up was performed with no evidence of relapse in no one patient.

*Summary:* -Temporal eminoplasty is a safe procedure to treat TMJ dislocation

-Tibial bone graft provides a very good bone source with minimal morbidity

-Operating time is not increased

-Excellent results are achieved

-Long term follow is necessary to avoid relapse

#### P-3610

### BENIGN TUMORAL GROWTHS OF THE MANDIBULAR CONDYLE

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There have been few reports of benign tumor growths in the mandibular condyle. Osteoma is one of which is characterized by slow and asymptomatic proliferation of compact and cancellous bone. It is usually solitary and affects

mostly young adults. Although osteochondroma is one of the most common benign juxtacortical bone tumors, oral and maxillofacial regions are not common sites of it. Condylar hyperplasia is a local overgrowth of the condylar process in which etiological factors remain unclear. Occlusal dysfunction and facial asymmetry are the most common clinical findings in condylar lesions. Radiographic images show lesions as circumscribed masses similar in density to normal bone so that nuclear scans can be useful to assess the bone activity which may change the course of treatment.

The present report describes three cases of condylar lesions; an atypical case of osteochondroma, a huge osteoma and a condylar hyperplasia. In all three cases, lesions caused facial asymmetry and deviation of the mandible and condylectomies were performed using preauricular approach modified with hockey-stick incision (Al-Khayat & Bramley), for total removal of the lesions.

#### P-3611

### TEMPOROMANDIBULAR JOINT ANKYLOSIS AFTER NEONATAL SEPTICEMIA: A CASE REPORT.

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**Objectives:** Ankylosis of the temporomandibular joint (TMJ) in children is one of the most difficult and demanding disorders managed by oral and maxillofacial surgeons. It disturbs the harmonious facial growth and may have severe psychological and functional limitations such as under-development of the jaws, limited mouth opening, malocclusion, speech and feeding difficulties and poor oral hygiene. Leading etiologies are trauma and local or systemic infections. We report a case of a 5-year-old girl who attended to our consultation after the impossibility of intubating the patient when being submitted to an otorhinolaryngology surgery at private practice.

**Material and method:** We describe the clinical case of a 5-year-old girl with past history of neonatal septicemia of unknown origin. Beside the already mentioned motif of the consultation, her mother also reported progressive difficulties in eating, roncopathy and sleep apneas. During the physical examination we noticed severe retrognathia, double chin, open anterior bite with intercuspal opening of approximately 15mm and typical "bird face". The CT scan confirmed the suspected diagnosis of bilateral ankylosis of TMJ. A treatment plan with three surgical times was established: bilateral arthroplasty with release of the ankylosis blocks followed by early aggressive physical therapy; distraction osteogenesis of the mandible; future orthognathic surgery.

**Results:** Due to severely obstructed upper airway which concurred to a difficult anesthesia, and to prevent life jeopardy the child was tracheostomized. Bilateral arthroplasty was performed with an uneventful post-op. Intercuspal opening immediately after surgery was of 35 mm. Physical therapy was initiated after one week because of poor compliance of the child. Mandibular distraction is the next step and will be performed 6months after the first surgery. Close follow-up shows a sustained intercuspal

opening of 30mm.

**Summary:** Although we live in the pos-antibiotic era and trauma is recognized as the main cause of TMJ ankylosis, clinicians must also be aware of the important role of infections in the development of ankylosis of TMJ in children in order to alert the parents for any unusual findings suggestive of this condition.

#### P-3612

### THE ANKYLOSIS OF TMJ AND THEIR POSSIBILITY OF TREATMENT BY OPTIMAL TOTAL PRESTHESIS IS

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**Introduction:** Damage within one or both jaw joints can cause TMJ ankylosis and limited jaw movement. When the TMJ disc is damaged, it often slips out of place in a forward and inward direction. Jaw clicking and jaw popping are caused when this damaged and dislocated disc pops back into place. In some patients, a displaced TMJ disc stays anteriorly displaced and becomes an obstruction preventing the jaw from moving forward. If one jaw joint is involved, the whole jaw shifts to the side of the damaged joint. It is called deviation to the affected side and is a well known phenomenon in medicine. Undoubtedly, TMJ disc displacement is the starting point of TMJ ankylosis. This spitting forward of the disc is usually caused by increased joint pressure forcing the disc forward like a watermelon seed. Increased pressure across a joint is caused by muscle contraction. The muscles must relax for the disc to slip back into place. That is why we always attempt first to correct the muscle dysfunction before treating the joint problem.

**Materials and methods:** The study is presented by the group of treated patients during the period of years 1980-2007. We were treated 18 patients with ankylosis TMJ, 2 of them were treated for bilateral ankylosis. All the patients undergo osteoplastic reconstructive surgery treatment. We use total prosthesis in two cases, in one from them bilateral prosthesis was used.

**Results:** During above named period, we operated 24 TMJs, 5 times we used facial grafts, 3 times muscles grafts, 5 times cartilages, roof-shaped conisation of the total prosthesis. The other methods used for a long time, reduced to open mouth in 30-50%.

**Conclusion and discussion:** Treatment of the ankylosis is very demanding depend on good cooperation and interest of the patient. Technical and special equipment respond to professionalism and specificity of the surgeon. In classical treatment methods is the most important long-run rehabilitation. In bilateral reconstruction using total prosthesis must be present a lot of soft tissues.

The authors presents bilateral torpid ankylosis TMJ treated by bilateral total endoprosthesis in the clinical material. Before 18 years – patient had an accident – burns III. – IV. grade of the pilous part of the head, face, upper and lower limb and neck.

**P-3613****SYNOVIAL CHONDROMATOSIS OF THE TEMPOROMANDIBULAR JOINT – REPORT OF TWO CASES**

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**Objectives:** Synovial chondromatosis (SC) is an arthropathy characterized by chondrometaplasia and development of cartilaginous bodies in the synovial membrane and joint space, affecting mainly the larger joints and rarely the temporomandibular joint (TMJ).

SC of the TMJ, represents 0,3% of the temporomandibular disorders (TMD), and mainly affects female patients between the fourth and sixth decade of life, complaining of preauricular pain, crepitus and swelling.

Symptoms are often unspecific and hard to relate to SC, so delayed diagnosis is common.

More than 200 cases have been described, mostly in single case reports.

The aim of this work is to describe 2 consecutive cases of SC of the TMJ, and review recent literature, highlighting the epidemiology, pathophysiology, diagnosis, treatment and controversies around this pathology.

**Material and Method:** The two cases were female patients with unilateral SC of the TMJ, presenting with preauricular pain, swelling, crepitus and limited mouth opening. The diagnosis was confirmed radiologically and histologically.

All patients underwent open arthrotomy with removal of the loose bodies, and additional procedures such as synovectomy, discectomy and condylectomy were performed when needed.

The literature over the past decade was reviewed.

**Results:** The two patients presented resolution or significant relief of symptoms after surgery and remain in continuous clinical and imagiologic surveillance with no signs or symptoms of recurrence.

**Summary:** SC is an uncommon condition in the TMJ. Most patients are female with often nonspecific signs and symptoms. A delayed diagnosis is frequent.

There should be a high index of suspicion for SC in any patient with symptoms of preauricular pain, swelling, crepitus and limited mouth opening.

Imaging diagnostic methods include conventional radiology, computer tomography (CT), magnetic resonance imaging (MRI), and arthroscopy of the TMJ. Radiologic features include widening of the articular space, calcified loose bodies, soft-tissue swelling, irregularity, sclerosis or hyperostosis of the joint surfaces. CT and MRI could be helpful in identifying loose bodies in the joint space.

The surgical treatment should be conservative and comprise thorough removal of loose bodies and partial synovectomy. The definitive diagnosis can only be made by histopathologic examination.

**P-3614****FUNCTIONAL OUTCOME OF TOTAL ALLOPLASTIC TMJ REPLACEMENT IN THE MANAGEMENT OF TEMPOROMANDIBULAR DISORDERS**

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**Background:** the role of total alloplastic temporomandibular joint (TMJ) replacement in the management of Temporomandibular Disorders (TMD) seems to be clear about joint ankylosis. But TMJ prosthetic devices for TMD is only considered as an option of last resort after all non-surgical modalities of treatment, the arthroscopic surgery and open surgery are exhausted first.

**Objectives:** To evaluate the efficacy of total alloplastic TMJ replacement as the last treatment option for TMJ dysfunction syndrome. To compare the outcome of TMJ prosthesis used for the treatment of different TMJD etiologies that were previously managed by means of arthroscopy and/or open surgery.

**Methods:** A series of 26 patients (24 female and 2 male) underwent total alloplastic temporomandibular joint (TMJ) replacement. The mean age of the patients was 38.5 ± 14.1 years. Pain (VAS) and maximal interincisal opening (MIO) (mm) were assessed 5 times: 1 month before operation, 1 month, 6 months, 1 year and 2 years after operation. Etiology, type of prosthesis, complications data are collected.

**Results:** Forty seven joints (26 patients) were reconstructed using total alloplastic TMJ devices. 21 were bilateral and 5 unilateral. 30 devices were Biomet-Lorenz (28 stock and 2 custom made devices), 13 were TMJ Implants (11 stock and 2 custom made devices) and 4 custom made TMJ Concepts

Preoperatively Pain (VAS) was 8,7mm (std. dev 1,02) and 24 months after surgery was 4,9 mm (std dev 2,7). Preoperatively Maximal Interincisal Opening was 21,8 mm (std dev 6,8) and 24 months postoperatively was 30,8 mm (std dev 5,4).

Attending the etiology: 6 patients suffered ankylosis (4 postraumatic and 2 psoriatic arthritis) and 20 were patients with end-stage TMD.

Complications found were: 1 internal maxillary artery bleeding, 1 frontal ramus paresis and 1 patient had to be reoperated to reimplant the device due to malocclusion. After two years 4 patients had not significantly improved their function due to myofascial syndrom, and needed to be treated with botulinum toxin.

**Conclusions:** total alloplastic temporomandibular joint replacement seems to be a potential benefit for patients with TMD that previously were managed by means of arthroscopy and open surgery.

**P-3615****MANAGEMENT OF MYOFASCIAL PAIN USING BOTULINUM TOXIN (BOTOX) INJECTION IN THE MAJOR MASTICATORY MUSCLES**

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**Background:** Myofascial pain is the most commonly re-

ported type of masticatory muscle disorders as well as the most common type of temporomandibular disorders.

**Objective:** The study aimed to evaluate the ability of botulinum toxin (BOTOX), in reduced economic, doses to treat patients with myofascial pain.

**Materials and methods:** Thirteen myofascial pain patients were managed in the period from 2008-2011. The patients had muscle tenderness besides chronic headache. Patients with joint symptoms were excluded from this case series. The patients received 35 units of Botox injection in each masseter muscle. The temporalis muscles received 15 units each. The injections were done using the electromyographic needle (under electromyographic guidance). The clinical parameters were assessed pretreatment and post-treatment at 1-month intervals throughout a total study period of 6 months. The parameters included: visual analog scale (VAS) subjective pain scores, and VAS subjective functional scores for chewing hard food, chewing soft food, cleaning of teeth, yawning, and talking. Interincisal opening (range of movement, ROM) was also recorded. Statistical analysis and charts were performed.

**Results:** The analysis of the scores showed statistically significant differences between pretreatment and post-treatment values for most of the parameters. Four patients showed deterioration and return of the previous symptoms though less than the original condition. Those patients had parafunctional habits.

**Conclusion:** It was concluded that Botox proved efficacy in management of myofascial pain and that Botox dosage may be modified for selected cases such as chronic bruxers.

#### P-3616

### APPLICATION OF RADIOFREQUENCY (RF) IN ARTHROSCOPIC SURGERY OF THE TEMPOROMANDIBULAR JOINT (TMJ)

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**Introduction:** The use of radiofrequency has been a significant advance in orthopedic arthroscopic surgery. Actually RF is used in various surgical specialties such as urology, otolaryngology, traumatology and maxillofacial surgery. The radiofrequency scalpel allows cutting and coagulating tissues in an atraumatic manner, contrarily to monopolar or bipolar electric scalpel.

The scalpel creates an ionized plasma field, in which the energized particles have sufficient energy to break organic molecular bonds, excising or dissolving soft tissue at relatively low temperatures, thereby preserving the integrity of surrounding healthy tissue. For this reasons, healing times are shorter compared to traditional techniques and less post-operative inflammation and pain.

**Objectives:** To determine the utility and benefits of RF scalpel in arthroscopy of the TMJ, reviewing surgical techniques based on clinical cases.

**Material and Methods:** We present a serie of 63 patients.

In all cases a standard bilateral TMJ arthroscopy was performed. RF scalpel was used as an instrument for hemostasis of small blood vessels, adhesions lysis, synovitis coagulation, vaporization of the posterior band, capsulotomy, lateral pterygoid myotomy; using Coblator 2 device (Tarma S.A).

**Results:** The RF causes less tissue inflammation, smoothing the tissue and effective coagulation while maintaining a good safety profile, with less harmful in deep tissue. The analysis of the results obtained with RF scalpel, compared with conventional monopolar or bipolar device in arthroscopic surgery, shows that in most of them radiosurgery facilitates, accelerates and improves the surgical procedure.

#### P-3617

### UNILATERAL ANKYLOSIS OF THE JAW TREATED WITH TOTAL ALLOPLASTIC REPLACEMENT SYSTEM.

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**Purpose:** This paper presents surgical treatment of post-traumatic unilateral ankylosis of the TMJ in two patients at our department and deals with the benefits of using a total alloplastic joint replacement system (Biomet Microfixation).

**Patients, Materials and Methods:** The first case was a male patient 60 years old, with the left condyle dislocated and ankylosed in the temporal fossa, the mandibular symphysis and the whole midfacial skeleton also being severely posttraumatically deformed - the result of conservative treatment after severe facial motor vehicle trauma 30 years ago. The joint was replaced with the Biomet alloplastic total endoprosthesis and the treatment was combined with a mandibular symphysis osteotomy and maxillary Lefort I and longitudinal osteotomies, reduction and fixation. The second case was a female patient 28 years old, who suffered a non-union of a unilateral condylar fracture, which resulted in an ankylosed painful joint. This was first unsuccessfully treated by gap arthroplasty and later with total alloplastic replacement.

**Results:** After surgery, both patients had interincisal opening between 25 and 30 mm. They used the Therabite appliance for postoperative physiotherapy and were placed on non-steroid analgetics for post-operative pain relief. Both patients remain pain free 4 months after surgery. Postoperative radiograms showed the implants in the desired positions. There were minor complications related to surgery, but no significant complications related to the devices.

**Discussion:** The aims of reconstruction include the restoration of TMJ function, pain reduction, and the prevention of disease progression. Selection of the reconstructive method, however, is controversial, and numerous techniques, using both autogenous grafts and free flaps, or alloplastic materials, have been described.

**Conclusion:** In both described patients, the aims of reconstruction were met. Thus, in selected cases, alloplastic

joint reconstruction can be considered as an excellent therapeutic option, and indeed as the treatment of choice.

**P-3618**

**CEPHALOMETRIC AND CLINICAL CHARACTERISTICS OF PATIENTS WITH MASTICATORY MUSCLE TENDON-APONEUROSIS HYPERPLASIA ACCOMPANIED BY LIMITED MOUTH OPENING**

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**Objectives:** Masticatory muscle tendon-aponeurosis hyperplasia is a new disease entity characterized by chronic, severe mandibular hypomobility with a square mandible caused by contracture of the masticatory muscles resulting from hyperplasia of tendons and aponeurosis. The aim of this study was to investigate the skeletal and kinesiological features of the mandible in this disease using cephalometric analysis and mandibular kinesiography.

**Materials and Methods:** This study group comprised 19 patients (0 male, 19 female) with masticatory muscle tendon-aponeurosis hyperplasia. 8 patients (8 female) were selected for cephalometric analysis and 11 patients (0 male, 11 female) were selected for analysis of mandibular movement. The control group consisted of 9 volunteers (0 male, 9 female) without limited mouth opening or TMD symptoms showing a skeletal morphology resembling masticatory muscle tendon-aponeurosis hyperplasia.

**Results:** Cephalometric analysis showed that the gonial angle ( $p < 0.05$ ), cant of the occlusal plane ( $p < 0.01$ ), but no significant difference in the amount of left and right lateral movement between the two groups.

**Conclusion:** This study showed the skeletal and kinesiological features of the mandible in this disease using cephalometric analysis and mandibular kinesiography.

**P-3619**

**A CASE OF SYNOVIAL CHONDROMATOSIS OF THE TEMPOROMANDIBULAR JOINT FOLLOWED FOR 20 YEARS**

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**Background:** Synovial chondromatosis rarely develops in the temporomandibular joint. We followed a patient with synovial chondromatosis of the temporomandibular joint for 20 years. Herein, we report the case. [Case report] A 51-year-old female visited our hospital for a chief complaint of sounds in the left temporomandibular joint region on February 22, 1992.

On the initial examination, the mouth opening distance was 48 mm, and there was no pain in the left temporomandibular joint or muscle during opening the mouth. Crepitus was noted, but mouth opening was not disturbed.

**Results:** Non-penetrated lesions were present like dots in the left temporomandibular joint region on a panoramic X-ray radiogram taken during the initial examination, based on which synovial chondromatosis was diagnosed. Since

joint sounds were the only clinical finding, it was decided to follow the course without active treatment. Tumor enlargement was noted on panoramic radiography and CT 6 years after the initial examination, the scattered non-penetrated lesions had fused, and tendency toward further enlargement was noted.

**Conclusion:** Reportedly, this tumor grows slowly. The tumor started to grow at a certain point during the 20-year follow-up period, for which course observation by imaging was necessary even though QOL reduction or subjective symptoms were absent. Tumor enlargement was sufficiently detectable by panoramic radiography, but CT may be useful to more clearly observe changes.

**P-3620**

**TOTAL TMJ REPLACEMENT FOR OBSTRUCTIVE SLEEP APNEA SYNDROME ASSOCIATED WITH TMJ DESTRUCTION DUE TO RHEUMATOID ARTHRITIS**

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**Introduction:** Destruction of the temporomandibular joint (TMJ) is observed in many rheumatoid arthritis (RA) patients (Chalmers and Blair, 1973). As a result of this, the height of the ramus of the mandible is reduced, and the mandible moves while rotating clockwise with the TMJ as a center. Functional and morphological disorders occur as a consequence of this, and result in anterior open bite, masticatory dysfunction, difficulty in swallowing, speech defect, and facial deformation due to retrusion of the mandible.

Occasionally, the narrowing of the upper airway causes obstructive sleep apnea (OSA) and sudden death (Redlund-Johnell, 1988, making TMJ reconstruction will be necessary. Because we developed an adapted artificial TMJ to Japanese, using the 3D-finite element method was confirmed its safety. We performed total TMJ replacement in six patients with RA who had TMJ destruction to improve respiratory status and occlusion.

**Result:** Although the snoring, daytime drowsiness, and symptoms of dyspnea were improved in our study, tests using an apnea-monitor did not show significant improvement in the apnea index or apnea-hypopnea index, except for the blood oxygen levels. The reasons for the lack of improvement in the apnea index and apnea-hypopnea index despite the enlarged posterior airway space are unclear.

**Conclusion:** It is possible that the destruction of the cervical spine due to RA as well as the effects of RA on the central nervous system may play a role in the disturbances in respiratory functions. Our study partially proved that reconstruction of the TMJ destroyed by RA with an artificial TMJ is clinically valuable; however, not all problems are solved. We conclude that it is necessary to examine more cases, and to determine the optimal method to treat

the destruction of the cervical spine and the TMJ.

**P-3621**

**“ACHILLES HEEL OF THE MANDIBLE” – A VERY RARE TMJ-RELATED ENTHESOPATHY**

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Enthesopathy refers to a periarticular condition affecting entheses; sites of tendinous or ligamentous attachments to bone. Aethiology can be inflammatory or degenerative and rarely due to endocrinopathies, trauma or drugs. Two types of entheses occur, fibrous and fibrocartilagenous; the latter being primarily affected. Cardinal features are pain, seldom with swelling. Commonly documented sites are the Achilles-tendon and greater trochanter. Radiological hallmarks are ill-defined bony erosions with sclerosis and reactive new bone formation. Biopsy remains the gold standard for diagnosis and few cases of enthesopathy involving the mandible have ever been documented.

A 64-year-old Asian female was referred with a six-month history of trismus; worse on waking. There was no history of trauma or arthropathy. Past medical history revealed subclinical hypothyroidism and hypercholesterolemia treated with simvastatin.

Clinical examination revealed trismus and pain on palpation of trapezius and occipital muscles. Intraoral stigmata of parafunctional activity were noted. Imaging and haematological investigations were within normal parameters. A diagnosis of myofascial pain was made and conservative management commenced. The patient was subsequently discharged.

A year later the patient was re-referred. Examination revealed a step irregularity on the right lower mandibular border. Imaging showed significant resorption of the inferior border of the right mandibular angle and right coronoid process. Bone chemistry was normal.

Multiple biopsies taken from temporalis insertion, coronoid process and mandibular lower border, demonstrated mild-inflammation, degenerative and fibrotic changes consistent with benign enthesopathy.

The authors illustrate this rare case of enthesopathy, with histopathology, imaging and discuss current treatment methods.

## 37. TISSUE ENGINEERING AND CELL THERAPY

### P-3701

#### TNF-ALPHA INHIBITING DRUGS ON ENDOTHELIAL CELLS IN VITRO

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**Introduction:** Within the scope of therapy of autoimmune diseases, action of drug becomes more and more specific which helps to reduce adverse events. Therefore Etanercept (ETA), a TNF-alpha and TNF-beta binding fusion protein was approved in therapy of rheumatoid arthritis and psoriasis. The role of tumour necrosis factor in vascularisation remains unclear. Because of its important role in vascularisation and wound healing we measured the effect of ETA on human umbilical endothelial vein cells (HUVECs).

**Material and methods:** Endothelial cells were cultured from human umbilical vein and raised to confluent monolayer under controlled culture conditions. Cells were divided into study and control group. The study group was separately incubated with different concentrations of ETA, ranging from 1nm to 1000nm. The effect of ETA substitution was evaluated by cell count, MTT Assay and immunostaining. To evaluate the statistical differences between study and control group we performed an ANOVA and posthoc Tamhane T2 Test by the use of SPSS.

**Results:** By the use of the described methods, no statistical significant difference between study group and control group was found. Slightly inhibitory effects could be observed within the first and second 72 hours of investigation. This slightly inhibitory effect showed neither dose-dependency nor statistical significance. However a negative effect of ETA on endothelial cell proliferation or differentiation could not be observed.

**Discussion:** TNF alpha inhibitors like ETA do not seem to influence cellular metabolism of HUVECs in vitro. Neither differentiation of endothelial cell nor cell viability was significantly changed. Therefore clinical use could be less frequently affected by adverse events. The physiology and undisturbed function of endothelial cells and the endothelial environment should not be affected by TNF alpha therapy. Therefore a higher risk for oral and maxillofacial surgery could not be confirmed.

### P-3702

#### BIOPSIES FOR COLLECTING ORAL MUCOSAL TISSUE FOR TISSUE-ENGINEERED CELL SHEETS

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Tissue-engineered human oral mucosal epithelial cell sheets have been used for treating gingival, skin and oesophageal defects and limbal stem cell deficiency. The collection of oral mucosa will be a fundamental and essential surgical procedure for cell biology research and tissue engineering. However, the number of cells obtained from buccal mucosa using a punch or spindle-shaped biopsy has not been determined. Therefore, this study investigated the number of cells obtained from buccal mucosa using a punch and a spindle-shaped biopsy. Two different procedures, the punch biopsy and the spindle-shaped biopsy, were performed for the fabrication of transplantable autologous epithelial cell sheets. The mean values of the cells collected per square centimetre of tissue using the punch biopsy and the spindle-shaped biopsy were  $76.8 \pm 45 \times 10^4$  cells/cm<sup>2</sup> and  $195.7 \pm 120 \times 10^4$  cells/cm<sup>2</sup>, respectively. There was no significant difference between the punch biopsy and the spindle-shaped biopsy. The coefficient of variation of the punch biopsy and the spindle-shaped biopsy was 58.9% and 69.8%, respectively. This result indicated that both procedures had variations in the number of cells collected and that neither procedure led to the collection of a stable number of cells. This variation may have resulted from the different extensions of the individual buccal mucosa and from the different tensions on the buccal mucosa during the surgery. Moreover, this variation may have resulted from the different thickness of the individual mucosal epithelium.

### P-3703

#### ANGIOGENESIS AND DMARDS - BEHAVIOUR OF HUMAN UMBILICAL ENDOTHELIAL VEIN CELLS

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**Introduction:** Endothelial cells play an important role as part of inflammatory response, wound healing and bone formation. The influence of disease modifying anti-rheumatic drugs (DMARD) on endothelial cell differentiation and proliferation is discussed rarely but controversially. The most frequently used and still first class DMARD is Methotrexate (MTX). Therefore we aimed to evaluate the effect of MTX on viability, proliferation and differentiation of human umbilical endothelial vein cells (HUVECs).

**Material and method:** HUVECs were cultured under standard practice with and without the addition of MTX to cell culture medium. Concentration of MTX ranged from 1 nm to 1000nm. The effect of MTX addition was meas-



ured by using a java based image software to evaluate the number of cells, a MTT Assay to asses the cell viability and immunostaining to ensure endothelial differentiation by CD 31 and von Willebrand factor. Statistical analysis was performed by using the ANOVA and posthoc Tamhane T2-Test.

**Results:** After the sixth day of investigation we found a highly significant reduction of total cell number ( $p < 0,001$ ). This effect lasted till the end of experimental procedure. A reduction of cell viability and mitochondrial activity could be detected since the first day of investigation, starting with statistical significance ( $p < 0,05$ ) after 24 hours decreasing to high significance after 72 hours ( $p < 0,001$ ). More over the inhibitory effect concerning cell proliferation and viability shows a high dose dependency. However, over the whole period of our examination we did not notice any changes in differentiation of HUVECs.

**Conclusion:** Even low dose MTX, especially used in therapy of rheumatoid arthritis, shows an inhibitory effect on proliferation and viability of HUVECs in vitro. A dose dependency could be demonstrated. Therefore our findings have to be attended to oral and maxillo-facial surgeons, discussing DMARDs as potential risk factor in surgery.

#### P-3704

### INFLUENCE OF TUMOUR NECROSIS FACTOR INHIBITION ON OSTEOGENESIS

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**Introduction:** The effect of tumour necrosis factor (TNF) inhibitors, frequently used in therapy of autoimmune diseases like rheumatoid arthritis (RA), on bone metabolism is still discussed controversially. Only rare data exist that focussed on the influence of TNF inhibitors on bone building osteoblasts. Therefore we aimed to study the in vitro effect of Etanercept (ETA), one of the most frequently used TNF inhibitors in therapy of RA, on differentiation, viability and mitochondrial activity of bovine osteoblasts.

**Material and methods:** Primary osteoblasts were harvested from bone of bovine femoral legs and cultured under controlled conditions. One half of cultured cells were incubated with various concentrations of ETA (1 to 1000nm). The effect of ETA-addition was evaluated over a period of two weeks, by using a digital supported cell counting system, a MTT-assay and immunostaining of collagen I, osteocalcin and osteonectin. To asses the differences between study (etanercept) and control group statistical analysis was performed by the use of analysis for variance.

**Results:** From the beginning of experimental procedure till the sixth day of investigation no differences could be observed between study and control group. There was no alteration of proliferation, differentiation or cell viability by the addition of ETA to the culture medium. First slightly effects could be observed after this period. An inhibition of cell proliferation by ETA was recognized but did

not show any statistical significance. After two more days of incubation inhibitory effects rises up to statistically significance. This effect could only be observed on cell count. Any dose dependency was not recognized. The MTT-Assay did not show statistically significant differences between study and control group. No changes in differentiation or cell morphology were noticed.

**Conclusion:** In contrast to other anti-inflammatory drugs, ETA does not show a direct inhibitory effect on osteoblasts proliferation, differentiation or viability. Slight effects could be explained by the high sensitivity of primary culture concerning changes in environmental surrounding. –Despite these findings clinical data has to be collected to confirm the safety profile of ETA concerning maxillofacial and oral surgery.

#### P-3705

### ENDOTHELIAL CELL PROLIFERATION AND VIABILITY WHILE BISPSPHONATE THERAPY

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**Introduction:** Bisphosphonate-related osteonecrosis of the jaw (BRONJ) is a complicated and non-responding to curative treatment adverse event of intravenous and more over oral drug administration. The pathogenesis of BRONJ remains uncertain in detail. However maxillofacial and oral surgeons should be aware of BPs action on tissue, cellular, and molecular level. The role of endothelial cells as promoter on vascularization, wound healing and bone metabolism remains highly questionable and is discussed controversially. Therefore the aim of our study was to examine the influence of zoledronic acid as representative of highly potent BPs on human umbilical vein endothelial cells (HUVECs).

**Material and methods:** Endothelial cells were cultured from the umbilical cord to confluent monolayer and divided into control and study group. Cells of the study group were additionally treated with different concentrations of zoledronic acid. The drug action on proliferation, mitochondrial activity and differentiation of HUVECs was evaluated by the use of a java based cell counting system, MTT-Assay and immunostaining. Statistical analysis was performed by analysis of variance.

**Results:** Initially we observed a slight but statistically not significant reduction of cell proliferation. At day 6 the effect changed to a statistically significant increase in proliferation of HUVECs that could be observed till the end of experimental procedure. The enhancement of proliferation and cell viability finally rise up to statistically high significance. A dose dependant relation of proliferation and mitochondrial activity could be observed since day 10. No inhibitory or cytotoxic effect could be proved. Morphology of HUVECs was not altered.

**Conclusion:** Our study shows clearly that administration of zoledronic acid positively effects endothelial cell proliferation and mitochondrial activity in vitro. Initial inhibitory effects could be explained by the sensitivity of primary cell culture to changes in surrounding conditions. Nev-

ertheless under clinical conditions it is shown that vascularization of the jaw bone is declined in BRONJ Patients. Our findings reveal that the pathological mechanism of BRONJ is not associated with direct cell inhibition but rather to higher bone density, leading to worse conditions of perfusion.

**P-3706****COMBINATION OF DERMAL SUBSTITUTES AND CULTURED EPITHELIAL AUTOGRAFT IN SCALP DEFECTS**

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**Introduction:** Reconstruction of extensive defects of the scalp is an aggressive treatment; it must take into account the morbidity of the donor sites and usually involves at least two operations.

The principal aim of this work is to evaluate the combination of a dermal substitute (Integra®) and the allogeneic cultured epidermis in po stoncology scalp defects and check its stability alter radiotherapy.

**Patient and methods:**

A 82-year-old white woman was referred for treatment of a squamous cell carcinoma of the fontoparietal area. The patient underwent an excision of the tumour with full thickness scalp including the pericranium and a neck dissection. A small skin sample was taken from the neck incision. The Integra® sheet was applied to the wound after burring-out the outer bony cortex and secured in place with staples. On day 21 the silicone foil was removed and the neodermis was covered using a cultured epithelial autograft, followed by a compressive dressing. The transplantation site was monitored at regular intervals. Two months after the surgery the patient received radiotherapy.

**Results:** The combination of Integra® and cultured epithelial autograft allow the reconstruction of large scalp defects without long general anaesthetic procedures and avoid a second stage surgery. It can be used safely in post cancer defects and is unaffected by radiotherapy.

In conclusion, in our experience this procedure is safe in oncology patients, even if they had to underwent radiotherapy and it is suitable in elderly patients or with extensive comorbidities.

**P-3707****BIOLOGICAL CHARACTERIZATION OF NEW EXTRACELLULAR MATRIX SUBSTITUTE BASED ON COLLAGEN, HYALURONIC ACID AND BETA-GLUCAN**

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**Background:** Extracellular matrix (ECM) substitutes belong to fundamental pillar of tissue engineering. They should be colonized by various types of cells and utilized in regenerative medicine to restore function of damaged or lost tissues.

**Purpose:** The main goal of the present study was to evaluate biological properties of newly synthesized ECM substitute and its effect on the gingival fibroblasts under in vitro conditions. **Material and Methods:** ECM substitute was prepared from collagen, hyaluronic acid and beta-glucan. The morphological features of ECM substitutes were analyzed by light and scanning electron microscope. The potential toxicity was evaluated by direct contact assay on human gingival fibroblasts. The effect on cells was also tested by MTT and XTT proliferation test. The presence of fibroblasts in structure of ECM substitute was visualized by Hematoxylin and Eosin staining. **Results:** Prepared substitute of ECM had bubble-like microstructure. The electronograms showed porous structure. Direct contact assay proved non-toxicity of ECM substitute. The finding was also proved by MTT and XTT (the proliferation activity of gingival fibroblasts was not affected). Histological analysis gave the evidence of their presence within its structure.

**Conclusion:** According to obtained results we can state that newly prepared extracellular matrix substitute based on collagen, hyaluronic acid and beta-glucan is non-toxic and fully biocompatible with gingival fibroblasts. Therefore it may be used as scaffold for cells to prepare artificial tissues for utilization in tissue engineering and regenerative medicine, including maxillofacial surgery. **Acknowledgements:** The present work was supported by the grant of Ministry of Health of the Slovak Republic no. 2007/36-UK-07 and by grant VEGA no. 1/0706/11.

**P-3708****DENTAL PULP-DERIVED STEM CELLS DISPLAY SIMILAR CHARACTERISTICS AS STEM CELLS DERIVED FROM BONE MARROW AND ADIPOSE TISSUE**

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**Background:** Mesenchymal stem cells (MSCs) are characterized as a primitive undifferentiated cells with capacity of self-renewing and plasticity. In the organism, they play pivotal roles during embryogenesis and regenerative process. Over the past years, MSCs have been obtained from various tissues, including bone marrow, adipose tissue and dental pulp.

Purpose: The main goal of the present study was the isolation, in vitro expansion and comprehensive characterization of MSCs from dental pulp and their comparison to MSCs derived from bone marrow and adipose tissue.

Material and Methods: MSCs were isolated from fresh samples of dental pulp (DPSCs), bone marrow (BMSCs) and adipose tissue (ATSCs) obtained from healthy donors during planned surgeries or extractions. All MSCs were cultured up to third passage to reach sufficient number of cells. Fluorescence activated cells sorting (FACS), light and electron microscopy was used. Chondrogenic differentiation was induced in pellet cultures by adding TGF-beta and was analyzed by real time PCR. Results: FACS analysis showed similar phenotypes of all examined MSCs. They shared expression of CD13, CD29, CD44, CD59, CD73, CD90, CD105, CD166 and STRO-1. DPSCs and BMSCs were also positive for CD106. MSCs from all sources did not produce CD14, CD31, CD34 and CD45. TEM analysis showed ultra-structural morphology comparable to mesenchymal stem cells from other sources. Each cell contained spherical or irregularly-shaped large pale nucleus with a large amount of euchromatin. Nuclei had noticeable nucleolus (or more nucleoli). Abundant cisterns of rough endoplasmic reticulum and numerous coated matrix vesicles were present in their cytoplasm. Most of MSCs secreted vesicles; in plasma-membrane bounded amorphous electron-lucent granules and also few glycogen granules. These findings reflected their proteosynthetic and metabolic activity. Moreover, MSCs from all tissues underwent chondrogenic differentiation.

Conclusion: DPSCs display similar biological and morphological properties as stem cells derived from bone marrow and adipose tissue. Therefore, dental pulp may be used as adequate source of MSCs for regenerative medicine of oro-maxillofacial region. Acknowledgement: Study was supported by grant of Ministry of Health of the Slovak Republic No. 2007/36-UK-07 and grant VEGA No. 1/0706/11.

#### P-3709

### EFFECT OF LOCALLY ADMINISTERED BIPHOSPHONATE ON BONE REGENERATION AND MICRO-ARCHITECTURE IN SEGMENTAL DEFECT IN THE SD RAT FIBULA

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Bisphosphonate is a well known as a bone resorption inhibitors, and mechanism of action is induce programmed cell death of osteoclast, that has already been described in several papers. Recently, however, many in-vitro study report that, optimum concentration of the bisphosphonate act not only osteoclast, but also osteoblast. This action brings the anabolic effects of osteoblast. Therefore, this author postulates, bisphosphonate that is administrated topically on graft material has anabolic effect on osteoblast function. and to prove this hypothesis, we use critical segmental defect model of SD rat fibula and biphasic calcium phosphate as a drug delivery system. Rats were sacrificed 4 weeks and 8 weeks after operation and we examined changes of bone regeneration of defect site, peripheral bone mineral content, micro-architecture of surrounding bone and following results were obtained.

Locally administered BP solution dissolved from graft material and protects material from resorption, degradation. Optimum concentration of bisphosphonate solution induce osteoblastic differentiation and the positive micro-architectural modification. In the establishment of optimum concentration of bisphosphonate and development of novel drug delivery system, I am convince this system has great advantages in the maxillofacial reconstruction field. But further study must be preceded about optimum concentration, novel biomaterial to drug delivery

#### P-3710

### NANO TITANIUM - THE EVALUATION OF OSSEOINTEGRATION

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Study Objective: Implant technology is a rapidly progressing science with very frequent production of new designs and materials. One of the new materials which could play an important role in the future of implantology is the nano titanium. It is consisting of extremely small particles. This material is thought to have good biological properties and thus can be used for medical purposes. The objective of this study is to evaluate the osseointegration of screws made of nano titanium.

Materials and Methods: In total, six nano titanium screws were implanted into the distal femur and proximal tibia of a rabbit. The animal was treated with antibiotics and analgesics postoperatively. The correct position of implants was controlled by using a dental X-ray machine 14 days after the surgery. Two doses of Tetracycline were given at two different periods of time to demonstrate regions of active bone formation and to demonstrate the quantity of newly formed bone at the implant interface (due to its fluorescent property) using the confocal laser scanning microscope (CLSM). The rabbit was euthanized after 12 weeks and the femur and tibia were removed. The position of the screws and bone apposition was checked by taking series of radiographical images, using a dental X-ray machine, 3D CB CT and bone densitometry. A histological examination was performed and the quality of osseointegration of the nano titanium screws was evaluated.

Results: After bone processing and staining for final histological analysis, series of microphotographic images were taken under both the light and the CLSM showing the bone-implant interface. The extent of osseointegration and the rate of healing of dental implants was determined by using the histomorphometry. The percentage of bone implant contact (BIC) was measured by using this method.

Conclusion: The results show that the screws made of nano titanium reached a very high levels of bone implant contact (BIC). The excellent osseointegration of this material shows that it could be the material of choice for implantology in the future.

**P-3711****CLINICAL APPLICATION OF AUTOLOGOUS OSTEOBLAST IN ORAL MAXILLOFACIAL SURGERY**

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Gradually the number of patients with maxillofacial trauma due to accidents occurring in transportation and the automatic mechanization is growing and at the same time the number of patients with maxillofacial bone defects caused by various diseases has risen sharply. Reconstruction of maxillofacial bone defects is very important in the functional and aesthetic aspect because the results of treatment can have serious consequences for their normal social life. To reconstruct the bone defects, various graft materials such as autografts, allografts, synthetic grafts and several cytokines are used clinically to accelerate recovery of bone.

Recently autologous mesenchymal stem cells (MSCs) have actively been used for bone regeneration. MSCs are multipotent stem cells that are easily isolated from various body parts like bone marrow adipose tissue. MSCs have attracted attention as a therapeutic material for bone regeneration in tissue engineering because of their ability to differentiate into various tissues such as osteoblasts, adipocyte and chondrocyte. The field of dentistry especially tries to fix periodontal disease and tooth damage in a variety of ways with the MSCs.

Hence, for several years, autologous osteoblast cells have been implanted in maxillofacial patients in the department of Oral and Maxillofacial Surgery, Wonkwang University. These implantations were performed in many different clinical cases such as cysts, mandibular defects caused by tumour and osteomyelitis caused by Fosamax. For successful surgery, these attempts involved many trials and error and also needed the establishment of clinical procedure manual. Therefore, we will present a new direction for clinical techniques for bone reconstruction in oral and maxillofacial surgery.

**P-3712****A COMBINATION OF CHEMICAL AND MECHANICAL STIMULI SYNERGISTICALLY ENHANCES OSTEO- AND CHONDRO-DIFFERENTIATION ON ADIPOSE-DERIVED STEM CELLS**

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Osteogenic and chondrogenic induction of adipose-derived stem cells (ADSCs) has been regarded as an important step in bone tissue engineering. The present study aimed to assess the bone-forming ability of osteogenically induced ADSCs in vitro.

ADSCs were cultured on osteogenic differentiation medium in the absence or presence of bone morphogenetic protein (BMP) 2, BMP7, GW9662, a potent antagonist of

peroxisome proliferator-activated receptor gamma (PPAR $\gamma$ ), or all of these in the presence or absence of mechanical stimulation. After the addition of these factors for 7, 14, and 21, osteogenic and chondrogenic differentiation was analyzed using gene expression and histomorphometric assays.

The results confirmed that culture in conditioned osteogenic differentiation medium alone or supplemented with GW9662 led to significant increases in the osteogenic potential of ADSCs accompanied by matrix mineralization. Exogenous BMP2 and BMP7 significantly augmented the in vitro chondrogenic potential of ADSCs and significantly increased the transcript levels of Sox9 and aggrecan. In addition, mechanical stimulus induced the differentiation of ADSCs into osteoblasts and/or chondrocytes but did not involve cell proliferative activity. These data strongly support that BMP, PPAR $\gamma$ , and stress signalling are important during normal in vitro osteogenic and chondrogenic differentiation of ADSCs. Thus, the regulation of these signalling pathways with the application of exogenous regulators may control the osteogenic and chondrogenic induction of ADSCs for bone tissue engineering without any endogenous gene manipulation in vivo.

**P-3713****SILK FIBROIN MEMBRANE PLUS 1% 4-HEXYLRESORCINOL FOR THE PERI-IMPLANT DEFECT**

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The aim of this study was to evaluate the bone regeneration ability of silk fibroin membrane plus 1% 4-hexylresorcinol (4-HR).

Release rate of 4-HR from the silk fibroin membrane was measured in the normal saline by spectrophotometric analysis. Scanning electron microscope (SEM) image and Fourier-transform infrared (FT-IR) analyses were done to determine physical properties of silk fibroin membrane plus 1% 4-HR. Subsequently, microscopic computerized tomography (u-CT) and histomorphometric analyses were performed in rabbit peri-implant defect model after application of silk fibroin membrane plus 4-HR at 4 and 8 weeks postoperatively.

In the FT-IR analysis, 4-HR was successfully incorporated into the silk fibroin membrane. 4-HR was released slowly from the silk fibroin membrane. Silk fibroin membrane plus 1% 4-HR had significantly higher new bone formation than that in the uncovered control in both the u-CT and the histomorphometric analyses ( $P < .05$ ).

In conclusion, the silk fibroin membrane plus 1% 4-HR showed significantly higher new bone formation in the peri-implant defect.

**P-3714****TETRACYCLIN-LOADED SILK FIBROIN MEMBRANE FOR THE GUIDED BONE REGENERATION**

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*Purpose:* This study was performed to evaluate the ability

of new bone formation of 1% tetracycline (TC)-loaded silk fibroin membrane (SM) when grafted into the rabbit calvarial bone defects.

**Patients and Methods:** Ten New Zealand white rabbits were used for this study. Bilateral round shaped defects were formed on the parietal bone using a trephine bur 8 mm in diameter. 1% TC-loaded SM was grafted into the right parietal bone defect area for the experimental group. The left bone defect remained without any graft for the control group. The animals were humanely sacrificed at 4 weeks and 8 weeks after grafting. A micro-computerized tomography ( $\mu$ CT) of each specimen was taken for the analysis of bone formation.

**Results:** On  $\mu$ CT analysis, there was no significant difference of bone volume between the 1% TC-loaded SM group and the unfilled control group at 4 weeks after operation ( $P > .05$ ). However, the 1% TC-loaded SM group showed significantly higher bone volume ( $22.68 \pm 7.64$ ) than the unfilled control group ( $15.05 \pm 10.63$ ) ( $P < .05$ ).

**Conclusions:** The 1% TC-loaded silk fibroin membrane showed better bone formation than the unfilled control group on  $\mu$ CT analysis.

#### P-3715

### PLATELET-RICH PLASMA PROMOTES HEALING OF MOUSE SKIN WOUNDS AND INCREASES VASCULARIZATION.

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**Purpose:** The objective of this investigation was to establish the effectiveness of platelet-rich plasma (PRP) on mouse skin wounds.

**Methods:** PRP was prepared using a double-spin method as described below. Peripheral blood (10 ml) was collected from wild-type mice using acid citrate dextrose-A solution as an anticoagulant medium. Collected blood was centrifuged at 930 G/10 min/20°C. The supernatant, including the buffy coat and contents 0.3 ml below the buffy coat, was decanted to a new tube, and the rest of the supernatant was discarded. Secondary centrifugation was performed at 2,100 G/10 min/20°C. The supernatant was decanted until 1 ml was left, and the remaining supernatant, including the marginal layer and contents 0.5 ml below the layer, was taken as PRP. PRP was activated by calcium chloride (CaCl<sub>2</sub>). The levels of platelet-released PDGF-AB, VEGF and TGF- $\beta$ 1 were determined by ELISA. We applied PRP and saline solution, as a control, to full-thickness skin wounds in model mice ( $n = 10$ ). Wounds were evaluated 16 days after the operation.

**Results:** PRP contained large amounts of many growth factors. The area of PRP-treated wounds was significantly lower than that of control wounds. Capillary and arteriole density in PRP-treated wounds was higher than that of controls.

It is well known that blood contains many growth factors; PDGF-AB, VEGF, TGF- $\beta$ 1, and so on. By centrifuging

and activating mouse blood, we can obtain PRP with a high concentration of these factors. PRP promoted healing of mouse skin wounds and increased vascularization. Our results suggest that the vascularization promoted by PRP affects healing of mouse skin wounds.

#### P-3716

### RELATIONSHIP BETWEEN PHOSPHODIESTERASE 2 - CAMP SIGNALING AND GROWTH OR INVASION IN ORAL MALIGNANT MELANOMA CELLS

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**Aim:** Phosphodiesterases (PDEs) regulate the intracellular concentrations of cAMP by catalyzing their hydrolysis, and participate in various physiological functions. PDEs represent 11 gene families (PDE1 to PDE11). However, little is known about presence and function of PDEs in malignant tumour cells. We found previously that PDE2 was expressed in human malignant melanoma PMP cell line and the PDE2 inhibitor EHNA suppressed the cell growth and invasion. We also found that the suppression of cell growth was caused by cell cycle arrest in G2/M phase, the expression of cyclin A was inhibited and the expression of cyclin E was stimulated by EHNA. However, this PDE2-cAMP signalling pathway is unknown. In this study, we examined the relationship between the cAMP pathway and cell growth or invasion of PMP cells.

**Materials and Methods:** A human palatal melanoma PMP cell line which was established and maintained in our laboratory, were used. N<sup>6</sup>-Benzoyl-cAMP was used as PKA activator, Protein Kinase A inhibitor fragment 14-22 (PKI 14-22) as PKA inhibitor, and 8-(4-Chlorophenylthio)-2'-O-methyladenosine 3',5' -cyclic monophosphate monosodium hydrate (8-pCPT-2'-O-Me-cAMP) as exchange proteins activated by cAMP (Epac) inhibitor. Cell growth was investigated by the 3-(4,5-dimethylthiazol-2-yl)-5-(3-carboxymethoxyphenyl)-2-(4-sulfophenyl)-2H-tetrazolium (MTS) assay. Cell invasion was investigated by in vitro Matrigel invasion assay. Invaded cells were stained with Diff-Quik<sup>TM</sup> stain and counted.

**Results:** N<sup>6</sup>-Benzoyl-cAMP suppressed cell growth and invasion in a dose-dependent manner. Furthermore, the inhibitory effect of N<sup>6</sup>-Benzoyl-cAMP on cell growth was reversed by PKI 14-22. However, 8-pCPT-2'-O-Me-cAMP did not inhibit cell growth and invasion.

**Summary:** In this study, PKA activation by N<sup>6</sup>-Benzoyl-cAMP suppressed cell growth and invasion of PMP cells. Our results suggest that PDE2-cAMP signalling regulates cell growth and invasion of PMP cells by inducing downstream PKA activation. We consider PDE2-cAMP signalling as a molecular-target for melanoma treatment. Furthermore, we are planning to investigate the relationship between PKA pathway and the expression of cyclins and CDKs.

**P-3717****OSTEOGENIC DIFFERENTIATION AND GROWTH OF HUMAN PERIOSTEAL-DERIVED OSTEOBLASTS IN PRP AND PRF ENRICHED THREE-DIMENSIONAL MARINE COLLAGEN SCAFFOLD**

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We examined the osteogenic differentiation and development of human periosteal-derived osteoblasts cultured in a 2-dimensional and grown in a 3-dimensional collagen-based scaffold.

Periosteal tissue was harvested during routine dental surgery. Periosteal-derived osteoblasts were introduced into cell culture. After the third passage, the cells were cultured for 28 days and then underwent immunohistochemical and molecular investigations using ALP, collagen I and osteocalcin.

Control as well as PRP and PRF enriched marine collagen II scaffold were then prepared to be seeded with the cultured osteoblasts.

3-dimensional cultured osteoblasts were allowed to grow for 4 weeks and then processed for examination for alkaline phosphatase (ALP), the RT-PCR analysis for osteocalcin, and measurements of the calcium content by micro-CT. The results showed that periosteal-derived osteoblasts have good osteogenic differentiation in a three-dimensional collagen scaffold with slightly better growth in PRP and PRF enriched 3-D collagen II scaffolds.

**P-3718****OPTIMAL CYCLIC COMPRESSIVE LOADING PROMOTES DIFFERENTIATION OF 3D-CULTURED PRE-OSTEOBLAST**

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**Objective:** Mechanical stimuli reportedly promotes preosteoblast differentiation in a 2-D culture. However, no report has been published on the effects of compression load on the differentiation of 3-D-cultured preosteoblasts. In the present study, 3-D-cultured preosteoblasts were repeatedly compressed to examine the effects of mechanical stimuli on preosteoblast differentiation.

**Materials and Methods:** MC3T3-E1 cells were seeded onto an Atellocollagen scaffold (Mighty®, KOKEN CO., LTD.) to create a 3-D culture. After 1- or 7-day culture in the presence of BMP2, the cells were repeatedly compressed for 7 days on day 2 or 8 and later (5, 20, and 40 kPa; 0.5 Hz; 1 h/day). At 6 hours after the final compression load, mRNA was extracted to examine the gene expressions of preosteoblast differentiation markers (Dlx5, Runx2, Osterix, ALP, Col1a1, Osteopontin, and Osteocalcin) by real-time RT-PCR.

**Results:** Preosteoblasts differentiated into bone in a 14-day 3-D tissue culture in the presence of BMP2. The differentiation of 3-D-cultured preosteoblasts was suppressed

when the cells were compressed for 7 days on day 1 and later. Preosteoblasts, compressed at 5 kPa for 7 days following 7-day culture, showed significantly increased gene expressions for Dlx5, Runx2, Osterix, ALP, Col1a1, Osteopontin, and Osteocalcin. The gene expressions were slightly increased at 20 kPa and decreased at 40 kPa.

**Discussion and Conclusion:** The effects of mechanical compression loading on preosteoblast differentiation were examined in a 3-D tissue culture that simulated an in vivo system. Dlx5 gene expression was increased by optimal compression loading after bone differentiation in a stationary culture. The gene expressions of the other bone differentiation markers were increased to promote preosteoblast differentiation. However, no bone differentiation was promoted by mechanical stimuli in an undifferentiated state.

**P-3719****USE OF AUTOLOGOUS ALBUMIN-DERIVED SCAFFOLD TO INCREASE BONE FORMATION IN SEGMENTAL MANDIBULAR DEFECTS: AN EXPERIMENTAL PILOT STUDY IN SHEEP**

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**Introduction:** Repair of bone defects in the craniofacial skeleton may be improved by using tissue-engineering principles. We developed a novel albumin-derived scaffold and explored in vivo bone regeneration in mandibular defects in large mammals.

**Objective**

1. Develop a serum-derived scaffold.
2. Create unilateral critical mandibular defects in sheep and either reconstructed using novel scaffold cylinders.
3. Make a clinical and radiological evaluation of bone formation in mandibular defects after 12 and 32 weeks.

**Methods:** To prepare the scaffold, 10mL venous blood was obtained from each sheep. The serum obtained was crosslinked with glutaraldehyde. The serum-glutaraldehyde solution was frozen and lyophilized in a custom-made silicone container of standardized measures. The obtained scaffold was a cylindrical sponge of 3 cm long. Otherwise, a 30mm osteoperiosteal defect was created at the parasymphiseal region of the mandible in five adult sheep with an average weight of 60 ± 5 kg. The continuity of the mandible was maintained using a bony plate, and reconstruction was performed using plasma-derived scaffold cylinders. In order to accommodate the scaffold cylinders and avoid displacements, custom-made acrylic containers were used. Two animals were killed after 12 weeks (Group 1) and three after 32 weeks (Group 2). Bone samples were processed for histological observation and computed tomography (CT) examination.

**Results:** One animal of Group 2 presented infection two months after surgery, and bony plate was removed. Group 1 animals underwent incomplete bony incorporation representing a low and intermediate state of healing while. Group 2 animals developed high grade bone regeneration consistent with progressive healing. Two of the three animals of Group 2 achieved complete bony union demon-

strated by clinical and radiological evaluation.

*Conclusion:* Autologous serum-derived scaffold may qualify as a promising alternative to autograft bone for craniomaxillofacial reconstruction.

## **INVITED SPEAKERS**



## KEYNOTE LECTURES

### LEARNING FROM THE MASTERS

*Henri Kawamoto*

*Clinical Professor, Division of Plastic Surgery, Univ. of California at Los Angeles, Craniofacial Surgery Director Emeritus*

Buried in the mind of every trainee are lessons learned from their mentors. I had the great fortune of studying with some of the best, which left an indelible impression that profoundly influenced my career. Principles taught by my teachers Rex Ingrahm and Marsh Robinson (dental school), John Marquis Converse (plastic surgery residency), Paul Tessier (craniofacial fellowship) and Robert Ricketts (orthodontia) as well as vignette of their personalities be the main focus of the presentation.

### THE MANAGEMENT OF SQUAMOUS CELL CARCINOMA (SCC) OF THE ORAL MAXILLA AND MAXILLARY SINUS

*James S Brown*

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Having major head and neck ablative and reconstructive surgery especially when the resection involves the tissue of the face and the orbit often daunts patients. In fact I always feel that if they are cured and become long-term survivors they achieve a very reasonable quality of life as speech and swallowing are maintained to a reasonable level.

At present most tumour boards would recommend primary surgery for the management of SCC of the oral maxilla or maxillary sinus. Traditionally the defects would be obturated and if the neck was clinically N0 then a watch and wait policy would be adopted unless postoperative radiotherapy was prescribed in which case level I and II of the neck would be included in the radiation fields.

In the oral maxilla there is increasing evidence that a more interventional approach similar to other oral SCC sites should be adopted. In Liverpool we have published on the management of the neck for oral SCC and reported control rates as high as 93% for all stages(1). A recent publication in Head and Neck reported regional control rates for oral maxillary SCC as low as 74%(2) and this has prompted a change in protocol for patients even without having free tissue transfer. We still struggle to achieve clear margins of resection with an involved margin (within 1mm of the invasive front) rate of 42% converting to a local recurrence rate of 19% in the oral maxilla compared to 17% and 10% for the rest of the oral cavity.

To our knowledge we have been the first to report on the outcomes following selective neck dissection (SND) for SCC of the maxillary sinus(3), but our conclusion for this site is that there seems no advantage with SND. We reported a regional recurrence alone rate of 11%, which compares to between 0 and 26% in the literature. Controlling disease in the primary site was the main problem with a recurrence rate of 50% and involved margins reported in 56%, although this was a small cohort of 18 patients.

The lecture will include a review of the literature and some comments on the use of postoperative radiotherapy. Also included will be some comments on the best methods of rehabilitation including the use of free tissue transfer.

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### THE ROLE OF FACIAL ESTHETICS IN ORTHOGNATHIC TREATMENT PLANNING

*Edward Ellis*

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The surgical repositioning of bones of the face is the most potent form of cosmetic surgery. Dramatic changes in the outward appearance can be attained by carefully-planned and accurately-executed orthognathic surgery. It is therefore imperative to understand the concept of facial esthetics and how it affects the life of a person.

The age-old adage "Beauty is in the Eye of the Beholder" indicates that beauty is not judged objectively, but according to the beholder's estimation. It follows that different people would thus have different ideas about what is "beautiful." However, scientific research performed over the last 30 years has shown this concept to be false. In fact, there seems to be a general consensus across cultures as to what is considered beautiful. For instance, individuals in Asia, Africa, South America, North America and Europe would all consider Angelina Jolie or Cindy Crawford to be beautiful, even though there are great cultural and racial differences among the individuals from these regions. Studies have also shown that the concept of beauty is genetically and evolutionarily based. This can be considered an adaptive mechanism whereby certain attributes are used for selection of a mate and propagation of the species.

Modern society attributes positive psychological traits, including social and intellectual competence and dominance to attractive individuals. Attractive individuals receive more positive social interaction outcomes and become more popular in school. Occupational success has also been correlated to facial attractiveness. Thus, when planning orthognathic surgery, great attention must be placed on the effects that the surgery will have on the form of the face. Often, the motivation to have orthognathic surgery is based on the anticipated esthetic change it will provide than on the occlusal benefits that will be derived from the surgery.

Realizing this, there are several components to treatment planning in orthognathic surgery that should be assessed and

possibly changed. One is the position of the maxillary incisors in space. This is perhaps the most important aspect of treatment planning. Once the incisor is properly positioned in all three planes of space, the other components can be manipulated to not only provide a functional occlusion but also optimal facial esthetics.

A second concept that should be strived for is to avoid genioplasties when possible. Some genioplasties look unnatural and it is always better assess the form of the anterior mandible. If the anterior mandible has good morphology, position the mandible in such a way that the chin is placed in the most esthetic position without having to perform a genioplasty. This may necessitate performing bimaxillary surgery to permit rotation of the occlusal plane so that chin position can be optimized.

A third important concept is to always consider expanding the facial skeleton, i.e. do advancements rather than setbacks. This produces a more youthful appearance and the cosmetic effect improves with age. Another way to expand the skeleton is to widen the maxillary arch to provide more arch perimeter for the orthodontic positioning of teeth rather than to extract teeth. Wide dental arches with small buccal corridors are considered esthetically pleasing to most individuals.

#### FUNCTIONAL, MORPHOLOGICAL & AESTHETIC REHABILITATION IN ENDOCRINE ORBITOPATHY

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**Key words:** Thyroid, exophthalmos, orbital decompression, eyelid surgery, surgical rehabilitation

**Summary:** The Author describes his experience in treating exophthalmos in Endocrine Orbitopathy (Graves disease). A protocol of treatment is finalized according to the different prevalence of the orbital content.

Eyelids and adnexa are evaluated after major surgeries.

**Introduction:** Endocrine Orbitopathy (E.O.) ( Graves or Basedow disease ) is a chronic and multisystem disorder caused by an autoimmune process, characterized by the presence of antibodies that stimulate a general fibroblastic reaction (thyroid gland and lower extremities), and involves orbital fat tissue and muscles.

**Methods:** The clinical findings and therapy for the treatment of the exophthalmos, such as changes in extrinsic eye motility, diplopia, optic nerve involvement, and lid retraction, must be analyzed, and the various types of surgical treatment currently available for endocrine ophthalmopathy are evaluated. The aim is to choose the best option to treat each case. The surgical techniques can be transpalpebral decompression by removal of intraorbital fat, three-wall osseous expansion, and zygomatic osteotomy. Adjunctive procedures are lengthening of the elevator muscle of the upper eyelid, lengthening of the retractor of the lower eyelid, and surgery of the extrinsic muscles to correct diplopia. All these techniques were useful in treating the disease, which is characterized by chronic evolution and, at times, a “malignant” outcome.

**Results:** Close cooperation among a team of specialists, including an endocrinologist, ophthalmologist, neuroradiologist, surgeon, anesthesiologist, and radiotherapist, is essential

to manage and to quantify the postoperative results of this complex disorder.

**Conclusion:** The patient with endocrine orbitopathy must be considered as an “orbital cripple”.

The author presents his experience and the application of different surgical strategies based on functional, morphological, aesthetic rehabilitation.

#### SALIVA AS A DIAGNOSTIC FLUID FOR ORAL CANCER

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**Introduction** - follow-up of patients who have undergone treatment for oral cancer (oral squamous cell carcinoma (OSCC)) is done routinely and often in order to detect recurrences soon after they occur. The development of salivary diagnostic tools for these patients is of paramount importance, especially for high-risk populations (patients with pre-malignant lesions, "cured" patients, patients with previous history of cancer in general, tobacco and alcohol consumers and others). Home testing kits would further facilitate salivary testing as a diagnostic aid, enabling patients, especially those who live far from their treatment centers, to monitor their own health at home.

**Results** – In various studies performed during the passing 15 years we found that salivary 'tools' are those focused on measuring changes of specific salivary macromolecules such as proteins or nucleic acids (as fatty acids are rather scarce in saliva), i.e. examining genomic or proteomic targets such as enzymes, cytokines, growth factors, metalloproteinases, endothelin, telomerase, cytokeratines, mRNA's, DNA aberrations, etc. Hence, saliva testing, a non-invasive alternative to serum testing, may be an effective modality for diagnosis and for prognosis prediction of oral cancer, as well as for monitoring post therapy status, by measuring specific salivary macromolecules. Salivary analysis has been shown to be a useful diagnostic tool also for distant malignancies such as breast cancer. In recent years, significant alterations have been demonstrated in the saliva of oral cancer patients in the epithelial tumor markers - Cyfra 21-1, TPS and CA12, various oxidative stress-related salivary parameters as ROS and RNS, biochemical and immunological parameters as IGF and MMP's and various other RNA transcripts.

**Discussion** - Salivary analysis is predicted to alter the field of oral cancer diagnosis by employing highly sensitive new tools enabling both medical professionals and the patients themselves to monitor their saliva for diagnosis and prognosis prediction.

## MASTERCLASSES

### NEW INDICATIONS FOR THE ZYGOMA IMPLANTS: FROM THE BRANEMARK PROTOCOL TO REHABILITATING SEVERE MAXILLAR ATROPHY OR BONE CONTINUITY DEFECTS

*Caesar Guerrero*  
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**Statement of the Problem:** The aim of the study was to critically analyze retrospectively new indications to reconstruct the maxilla and mandible by anchored prosthesis on zygoma implants, based on 402 fixtures inserted in a ten-year period.

**Materials and Methods:** 145 patients between 19 and 82 years old (average 62.3) were treated between 1999 and 2010 with 402 zygoma implants for maxillary and mandibular atrophy or deficiency. They were used in a variety of biomechanical protocols. The patients were rehabilitated based on 2 posterior zygomas and four standards, 4 posterior zygomas and either one or two anteriors, 5 zygomas, unilateral situations with one, two or three zygomas and mandibular reconstructions according to the remaining bone after tumor surgery. All surgeries were based on biomechanical principles. All fixtures were inserted under general anesthesia utilizing Brånemark concepts and instrumentation. Every patient was diagnosed, planned and treated individually secondary to quantity and quality of bone, remaining dentition, occlusion, vertical and antero-posterior maxillo-mandibular relationship. The zygoma implants were inserted transmucosally while the sinus membrane was separated and medially repositioned before the implant placement. All implants were immediately loaded after surgery. Prosthodontists were available for immediate impressions and metal substructure fabrication, with meticulous metal to metal adaptation. Most of the patients were rehabilitated definitively within 60 days after surgery. Prostheses were removed and evaluated every 12 months, and periodontal visits were scheduled every 3 months.

**Methods of Data Analysis:** Records included clinical radiographs and photographs analysis, pre- and post-operative; all patients were followed-up for a minimum of 6 months. Also, prosthodontist and surgeon's clinical evaluations were obtained and charts filled with information on dental occlusion, range of mandibular motion, tissue health around fixtures, level of the implant related to soft tissue, rehabilitation stability, hygiene, nasal airway and patients' satisfaction.

**Results of Investigation:** All implants were rehabilitated definitively within 6 months after surgery. A metal structure uniting all implants was utilized. One patient lost two zygoma implants; they were inserted after radiotherapy and the prosthodontist was not able to construct the metal bar. One zygoma underwent bone overheating creating a bone burn and facial fistula; the implant was sectioned and the upper part of the implant was removed leaving the alveolar portion as anchorage and dental rehabilitation did not suffer. Two patients with sinusitis were treated via Caldwell-Luc approach, and one oro-antral fistula was treated with local flaps with no long-term consequences.

**Conclusion:** The zygoma implant offers an excellent option to treat maxillo-mandibular atrophy as an alternative to conventional implants when there is not adequate bone volume and quality. They can offer function and aesthetics, immediate loading and predictable results as well as st

### FACIAL SCULPTURING & STRUCTURAL FAT GRAFTING: PRINCIPLES, SURGICAL TECHNIQUE, INDICATIONS, RESULTS

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The aim of the masterclass is to give an overview on the use of Structural Fat Grafting ( SFG ) in the field of cranio maxillofacial surgery, giving technical surgical details as well as the most common tricks and traps.

Autologous transplantation of fat tissue is not a new technique. SFG was introduced as a new way to improve facial aesthetics.

In recent years indications have evolved into cranio-orbito maxillofacial volumetric restorations.

Key to technique. The fat is aspirated by using very thin liposuction cannulas attached to a 10 cc syringe, fat must be gently woven in several layers to pick up a blood supply, allowing the fat cells to survive and maintain the filamentous architecture.

The fat is slowly absorbed by the body, although the amount of reabsorption is sometimes unpredictable. If a significant amount of fat is reabsorbed, a second or third procedure may be considered to improve the final result. In fact, using more fat tissue in a single-step corrective procedure can cause poor vascularization and more reabsorption, particularly in areas covered by a thin layer of soft tissue. The definitive result is however strictly technical dependant.

Recent applications include: correction of localized tissue atrophy, loss of substance due to trauma, post-tumor sequelae, congenital complex orbito craniofacial deformities, burns and hemifacial atrophy such as Parry Romberg syndrome, scleroderma.

Recent studies have proved that human adipose tissue represents a rich source of mesenchymal stem cells even if additional studies on volume maintenance as well as researches in the adipocyte stem cells are needed to predict the clinical outcome.

The Authors consider SFG a safe procedure and an excellent method for facial reconstruction with a low rate of complications and a high degree of patient satisfaction.

### CHANGES IN THE FACE AND SMILE OF PATIENTS WITH DENTOFACIAL DEFORMITIES

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Patients with dentofacial deformities commonly suffer from malocclusion, chewing deficit and aesthetic problems. Some of these patients are associated with obstructive sleep apnoea syndrome with potential threat to their life. What commonly overlooked is the psychology of these patients. It is increasingly accepted that the best management is by a multidisciplinary team of specialists, including an oral and maxillofacial surgeon, orthodontist, and other medical/dental

professions. The patients should be assessed in a joint consultation clinic for establishing the diagnosis and treatment plan. The integrated treatment plan is commonly composed of a sequence of orthodontic dental decompensation, surgery and post-surgical orthodontic alignment and retention. Orthognathic surgery remains the mainstream treatment and is accomplished by a combination of maxillary and mandibular osteotomies with mini-plate fixation. There is an increasing trend of applying distraction osteogenesis for treatment of cleft maxillary deformities and severe mandibular hypoplasia. The treatment concept and cases of different dentofacial deformities corrected by orthognathic osteotomies and distraction osteogenesis will be illustrated resulting in transforming of not only the face but also the smile of these patients.

### SYSTEMATIC TREATMENT OF ZYGOMATICO-ORBITAL FRACTURES

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Zygomatic fractures are common facial injuries and represent the most common orbital fracture. Based upon both cosmetic and functional reasons, it is imperative that zygomatic injuries be properly and fully diagnosed and adequately treated. This lecture will discuss the diagnosis and management of zygomatico-orbital fractures based upon the findings on the pre-operative CT scans. One must be aware that zygomatic complex fractures can result from both high and low energy injuries. Those resulting from altercations seem to be more linear in character and displaced en bloc. These can frequently be treated with limited exposure, simple reduction, and simple methods of fixation, if any. Conversely, high-energy injuries such as those sustained in motor vehicle accidents produce more comminution, and are much less amenable to simple methods of treatment. These fractures usually require extended open reduction and rigid fixation techniques. The surgeon must therefore be aware of the nature and extent of the injury while planning treatment. The necessity of internal orbital reconstruction and the technical aspects of reconstruction will be stressed. The main point of this lecture is to show how these injuries represent a spectrum and the amount of intervention to satisfactorily treat them varies considerably.

### ARTHROSCOPY OF THE TEMPOROMANDIBULAR JOINT: FROM BASIS TO ADVANCED

*Rafael Martín-Granizo  
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Arthroscopy of the temporomandibular joint (TMJ) is a consolidated technique that is used mainly to treat the TMJ dysfunction syndrome (TMD). However it can also be used in other pathologic conditions of the TMJ, as osteoarthritis, recurrent chronic dislocation or synovial chondromatosis. It is a minimal invasive surgery and many arthroscopic techniques have been developed. The aims of this masterclass are:

- To know the pathologic conditions that can be successfully treated through arthroscopy of the TMJ.
- To see the material used for a standard procedure and to know how to use and care it.
- To know the anatomic basis and puncture sites to perform an arthroscopic lysis and lavage.

-To know what techniques of operative surgery can be done: pterygoid muscle myotomy, disc repositioning techniques, focused in the resorbable pin technique, a new technique that seems to be the most effective method to fix the disc.

-To see the different possibilities of using electrocautery (radiofrequency): cutting and coagulating various tissues of the TMJ.

-To learn how to do intra-articular infiltration of several substances: estheroids, sclerosing agents and the new hyaluronic acid, a substance imported from the orthopaedic surgeons that provides very good results.

-To know the complications of this procedure and how to avoid them.

-To review long-term results of these techniques and search for evidence based studies.

For these purposes, theoretical lectures will be offered as well as some videos of these procedures. Also an interactive discussion will be organized with the assistants. Arthroscopy of the (TMJ) is an effective method that should be known and practiced in every Oral & Maxillofacial Surgery Department.

### HOW TO AVOID SURGICAL COMPLICATIONS AND FAILURES IN IMPLANTOLOGY

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Implants have evolved to a rapidly growing techniques for replace the missing teeth.

The total number of implants being placed has increased significantly over the years, as the prevalence of complications.

In oral implantology, the most serious complications and those most frequently described in the literature occur during surgery.

They may result from inadequate planning, overworking of the implant bed, contamination of the implant by incorrect manipulation or mishandling; by poor implant orientation, or by the surgical procedure itself, which is not without risk. There are several reasons for the increased number of implant complications in the last years, mainly related to the increased number of implants being placed, the increased number of dentists, and the lack of adequate training.

Intraoperative complications may be related with surgery such as hemorrhage, neurosensory alterations, damage to adjacent teeth and mandibular fractures.

Otherwise complications may be associated with implant placement such as absence of primary stability, fenestration or displacement into maxillary sinus.

A spectrum of surgical implant complication is reported, and the author provide a detailed analysis of the etiology, prevention and treatment.

The possibility of potential complications has to be considered before placing or restoring implants, and knowledge, learning, and experience are paramount to reducing the number and the severity.

## DIFFERENTIAL DIAGNOSIS AND MANAGEMENT OF OBSTRUCTIVE SLEEP APNEA BY SKELETAL SURGERY

*Reha Kisnisci*

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Obstructive sleep apnea is a serious health problem and may potentially lead to life-threatening consequences. Its adverse effects have been widely documented involving on various systems and organs. Several signs and symptoms may alert the affected individual or physician to further evaluate and expose the underlying sleep disorder which may be of obstructive in nature. These risks related to obstructive sleep apnea may have an impact on the quality of life such as day time sleeplessness from the mild end to cardiovascular ramifications leading to death at the other end of the scale.

The standard management protocol includes nocturnal ventilation by means of continuous positive airway pressure. In fact the majority of such patients benefit from its therapeutic effect as the respiratory events during sleep reduces to a physiological level. However to maintain compliance in such patients have been shown to lower drastically even with a successful treatment outcome.

In obstructive sleep apnea multiple sites are encountered in cases presenting with hypnoic or apneic episodes. Oropharyngeal and hypopharyngeal levels are the causative sites with higher incidences. Hence many multi-level soft tissue surgical techniques have been advocated, proposed and developed in isolation or in combination with varying results.

On the other hand through proper identification, diagnosis and management by maxillomandibular skeletal of this problem may be selected for enhancing posterior airway space multi-dimensionally. This may avoid life-time compliance that is needed in medical and repositional orthotic devices.

The ultimate aim of maxillomandibular advancement is to volumetrically increase retropharyngeal airway space not at an isolated level and direction but more of an extended area at the oropharyngeal level. Synchronous maxillomandibular advancement is executed in the form of Le Forte I and bilateral sagittal split osteotomies unless preexisting malocclusion dictates otherwise with or without advancement genioplasty.

However it should be noted that despite that the fundamentals of orthognathic surgery are followed there may be some crucial differences exist when applied to obstructive sleep apnea patients. Distraction osteogenesis for bilateral or unilateral mandibular advancement may also be planned for selected cases to improve obstructive sleep apnea. It has also been reported that midfacial distraction osteogenesis can improve posterior pharyngeal airway thus ameliorate the condition. Skeletal surgery aims to reposition related structures so that at a certain extend volumetric changes in the oropharyngeal airway would improve the problem. In addition and even more crucial by pulling the soft tissues most notably the tongue considered as the major contributing factors.

## REAL TIME IMAGE GUIDED NAVIGATION IN MAXILLOFACIAL SURGERY.

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Similar to traffic navigational systems, modern surgical navigational systems are leading us through the human body. Different terms are currently used in medicine: Computer Assisted Surgery (CAS), Image Guided Surgery (IGS) Navigational Surgery (NS) or Surgical Navigation (SN). The first term includes the application of surgery robots and is not addressed in this lecture. The focus will be on Real Time Image Guided Surgical Navigation, short SN.

First of all, we have to establish the preconditions necessary for using SN in daily routine surgery, when a system is available. It seems to be most important in clinics getting the adequate image database, to be able to navigate right away without problems. The radiologist needs specified information's to deliver the best possible scans for navigation and to avoid waiting time, double imaging and delay in the beginning of SN. Only that, what can be seen in the images is possible to navigate in surgery. Nevertheless, it is not in all cases predictable if surgical navigation will be used for further therapy.

It is the decision of the surgeon in what procedures NS will bring considerable advantages. That's why it is indispensable to know what the available surgical navigation is able to perform and to be familiar with function and use of the system. It is the aim of this masterclass giving support in the beginning of using Real Time Image Guided Surgical Navigation and to report some cases.

## FLAP HARVEST TECHNIQUE FOR THE ILIAC CREST WITH INTERNAL OBLIQUE

*James S Brown*

*Aintree University Hospital and Liverpool University, UK*

The iliac crest remains a common site for the autotransplant of bone but this site has become less used since the popularization of the fibula site for composite free tissue transfer. The deep circumflex iliac artery (DCIA) supplies the iliac crest and also the internal oblique through the ascending branch as first described by Ramasastry(1). The flap was popularised by Mark Urken who used it successfully for mandibular reconstruction including immediate implant placement with Danny Buchbinder(2). It was described for the reconstruction of the maxillary defect with emphasis on the use of the internal oblique muscle(3), which had advantages for the sealing of the dead space left by the removal of the maxilla, restoring the nasal lining and the palate. The aim of this masterclass is an opportunity for trainees and consultants to learn the top tips for the safe harvest of the flap to optimize the chance of flap success and achieve an optimum length of pedicle for maxillary cases.

The following steps describe the technique in brief and the masterclass will be an opportunity to ask questions for clarification.

The incision runs 2cm above the iliac crest and the inguinal ligament to the iliac vessels

External oblique is incised at the same point and separates easily from the internal oblique

Plan the extent of the internal oblique harvest and start more posteriorly to sharp dissect the muscle off the transversalis.

Ensure the ascending branch is included on the undersurface of the internal oblique

Continue to divide internal oblique 2cm above the inguinal ligament towards the iliac vessels and then transversalis and the associated fascia

The DCIA can be identified either by following the ascending branch on the undersurface of the internal oblique or looking directly in the transversalis fascia on the undersurface of this muscle

Dissect out the pedicle with care as the vein is thin-walled and there are deep branches to the iliacus

Sharp dissect the lateral muscle attachments to the iliac crest exposing the lateral side

Incise the transversalis 2cm from iliacus to reveal the peritoneal fascia which can then be retracted from the abdominal side of the crest

Make the anterior vertical bone cut from the lateral side with due protection of the DCIA on the abdominal side

The posterior vertical and horizontal bone cuts can be made from the abdominal or lateral side to complete the bone harvest

Deliver the flap by completing the dissection whilst protecting the ascending branch and completing the division of the internal oblique

Closure is in 3 layers with transversalis to iliacus. Use prolene mesh to strengthen the defect in the internal oblique and secure this to the bone. Close the external oblique after inserting a drain and then skin

A series of slides will demonstrate the technique and there will be a video demonstration with sufficient time.

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### ANTERIOR SKULL BASE SURGERY-OPEN AND ENDOSCOPIC APPROACHES

*Lawrence Marentette*

*University of Michigan Department of Otolaryngology Head and Neck Surgery, US*

This class will review approaches to the anterior skull base. These include open and endoscopic techniques including expanded endonasal and transorbital.

Using patient examples, the open and endoscopic approaches used at the University of Michigan Cranial Base Program will be presented to illustrate our application of these techniques. This will cover the spectrum of pediatric and adult patients.

### CORRECTION OF ASYMMETRIES IN CHILDREN AND ADULTS

*Gert Santler*

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Symmetry plays a key role in facial harmony. Whereas diagnosing shifted midlines of upper and lower jaw and chin is solvable by means of conventional planning tools, asymmetries involving the mandibular angle, the malar bone or the orbit appears to be a still a challenging task.

CT-scans however containing the whole information but only by putting this information together to a 3d-image or even better a 3d-model enable us to diagnose precisely and to plan the necessary corrections in all directions. In our hand distraction osteogenesis is the right choice in children whereas conventional osteotomies are preferable in adults serving more options for 3d-positioning.

For precise 3d-measurements and operation simulation on 3d-models a system was developed (3d COSMOS), providing us with cephalometric measurements and the definition of a symmetry plane defined by individual reference planes and landmarks. 6d-tracking devices, fixed to each jaw during simulation surgery, give us real time measurements of translation and rotation in space of each landmark. A mechanical navigation device allows us to position the jaws during surgery with highest precision.

The problem of correcting bony landmarks and teeth precisely in asymmetric cases appear to be solved. Soft tissue discrepancies however still need much experience of the surgeon to achieve symmetry by means of bony overcorrection, secondary corrections or soft tissue transfer.

### OTOPLASTY TECHNIQUES

*Ira D. Papel*

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Cosmetic otoplasty has a long and interesting history. In this lecture we will review some historical highlights and then describe the modern operation. Anatomic and aesthetic indications will be addressed, and clinical examples of various otoplasty techniques will be demonstrated. The management of perioperative problems and complications will also be explored.

### NECK DISSECTION: AN OPERATION IN EVOLUTION

*Ashok R. Shaha*

*Memorial Sloan-Kettering Cancer Center, New York, US*

The classical neck dissection was described by George Crile and published initially in 1905 as 'radical neck dissection'. In 1906, his landmark article was published in JAMA with 132 patients having undergone radical neck dissection. Interestingly, in the same article, Crile mentioned preserving the accessory nerve if the tumor is not invading or surrounding the accessory nerve. The modified neck dissection was initially described by Oswaldo Suarez, from Argentina. He published his article on functional neck dissection. Unfortunately, it was written in Spanish; however, his followers, Dr. Ettore Bocca and Dr. Javier Gavilan popularized this operation in Europe as a 'modified neck dissection'. In the United States modified neck dissection was popularized by Richard Jesse, Allando Ballantyne, and Robert Byers at MD Anderson Cancer Institute. The major concerns about radical neck

dissection are shoulder dysfunction, shoulder syndrome, cosmetic deformity, and the inability to raise the arm completely.

The patterns of lymph node metastasis are well defined in various publications, including writings of Robert Lindberg from MD Anderson Cancer Center, and Jatin Shah from Memorial Sloan-Kettering Cancer Center. The patterns of lymph node metastasis are well defined in the head and neck area. Tumors of the oral cavity generally metastasize to Level I, II, or III. Tumors of the larynx metastasize into Level II, III, and IV, while the thyroid cancer commonly metastasizes to Level IV, V, and VI. Even though these patterns of lymph node metastasis are well defined, skip metastases are rarely noticed, especially in cancer of the tongue having Level IV metastatic disease as a positive node. Modified neck dissection became very popular in the United States in the mid-eighties and has now become a common operation and the standard of care for the majority of patients with head and neck cancer. In spite of this, there is still a definite role for radical neck dissection and even extended neck dissection in patients with advanced metastatic tumor to the neck, especially with the involvement of the accessory nerve, posterior belly of the digastric, etc. The extended neck dissection is reserved for certain select circumstances in patients with bulky nodal disease or involvement of the platysma, skin, or carotid artery. Carotid resection poses a different subject altogether, and indications for carotid resection are rare and selected.

The levels of lymph node metastasis were defined initially at Memorial Sloan-Kettering Cancer Center; Level I being the submandibular lymph nodes; Level II, III, and IV along the jugular vein, high, mid, and low; Level V lymph nodes in the posterior triangle of the neck; and Level VI lymph nodes in the paratracheal area. These levels are commonly involved in thyroid cancer. The American Academy of Otolaryngology, Head and Neck Surgery has looked at this system very critically and divided Levels I, II, and V into 'a' and 'b'. Even though this classification complicates the levels of lymph node metastasis, it does adhere to the anatomical principles and the patterns of nodal metastasis. Level Ia is rarely involved in metastatic tumors except for tumors of the lip and floor of the mouth. Level Iib is also rarely involved in metastatic tumors in the absence of Level Iia lymph node metastasis. Level Va is also rarely involved. This information is quite helpful to avoid extensive dissection along the accessory nerve or in the submental area. The Academy Committee on Head and Neck Oncology is currently re-reviewing and standardizing the nomenclature and leveling system. The comprehensive neck dissection includes removal of all lymph nodes from Level I to V, while the selective neck dissection includes a selected group of lymph node removal. The classical supraomohyoid neck dissection includes removal of the lymph nodes at Level I, II, and III. This is primarily used for cancer of the oral cavity, mainly as a staging procedure. Level II, III, and IV are commonly removed for cancer of the larynx and hypopharynx. Level V nodes are rarely involved in the metastatic process from the head and neck region, however, they may be involved in cancer of the nasopharynx or tumors of the skin of the occipital region.

There continues to be considerable controversy concerning the indications for each modified neck dissection and under what circumstances comprehensive versus selective neck dissection should be considered. There appears to be a considerable shift of interest in selective neck dissection, both

from a cosmetic and a functional point of view. Every effort is made today to preserve the accessory nerve if there is no direct involvement of the tumor. However, there is controversy about the role of selective neck dissection in clinically positive nodal disease. If clinically apparent nodal disease is present in the neck, a comprehensive neck dissection is generally planned and the accessory nerve is evaluated carefully to make every effort toward preservation. However, in select circumstances, if disease is present in the submandibular region or at Level II, a carefully performed selective neck dissection yields similar results, especially with the routine use of postoperative radiation therapy. A majority of patients who have clinically apparent disease would be considered for postoperative radiation therapy. Recently there appears to be interest in extending this philosophy to chemoradiation therapy in the postoperative period in patients with high risk nodal disease which includes multiple positive nodes, gross extranodal extension and soft tissue extension of the metastatic disease. However, these studies need to be evaluated critically in view of the complications related to concurrent chemoradiation therapy. It must be understood that the most important prognostic factor in head and neck cancer management is the presence of nodal metastasis. Survival drops almost fifty percent in patients with positive neck nodes and these patients immediately fall into the group of Stage III or IV (advanced head and neck cancer).

The elective node dissection should be considered for patients who have a higher than twenty percent likelihood of having metastatic disease to the lymph nodes in the neck. The decision regarding elective node dissection is based on the site of the primary, the extent of the primary, the stage of the primary, the depth of infiltration, and presence of perineural, perivascular or perilymphatic spread. There appears to be considerable interest in elective nodal dissection in upper aerodigestive tract tumors. In most situations this is considered to be a staging procedure to see which patients will benefit from postoperative radiation therapy. However, with the increasing incidence of tongue cancer in the United States there appears to be more popularity of elective nodal dissection in patients presenting with tongue cancer. The overall incidence of metastatic disease in T1, T2, and T3 tongue cancer is around thirty, fifty, and seventy percent respectively.

In recent years the philosophy of sentinel node biopsy in the mucosal tumors of the head and neck has gained academic interest. Current experience is limited, though ACOSOG (American College of Surgeons Oncology Group) has undertaken a prospective study. Once again, the purpose of sentinel node biopsy is to identify the patients at the highest risk and consider neck dissection or postoperative radiation therapy only in those selected patients. The experience gained from head and neck melanoma has been extended to the mucosal tumors; however, the contrary argument is that supraomohyoid neck dissection or modified neck dissection can be performed with minimal morbidity and may be considered as a standard surgical procedure avoiding sentinel node biopsy. Future prospective studies will answer some of these complex issues.

#### **THE ROLE OF MAXILLOFACIAL PROSTHODONTICS IN CONTEMPORARY CRANIO-FACIAL SURGERY,**

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The consequences of the head and neck cancer treatment (majority of cases), trauma and congenital deformities could produce loss of function (mastication, food intake, speech intelligibility) and of course decreased aesthetics, which all lead to a poor quality of life.

Reconstruction of the maxillofacial defects, particularly after introduction of free microvascular flaps, poses the first choice for these patients. However, maxillofacial prosthodontics also has an important role in their rehabilitation. Acceptable aesthetic and functional results after orbital exenteration, nose or ear amputation sometimes could not be achieved with surgical reconstruction techniques.

However, when these surgical techniques could not achieve satisfactory results, the treatment of choice is maxillofacial prosthodontic. It enables restoration of the lost part of the face with specially manufactured prosthesis (epithesis). These prostheses match the missing part of the face completing the patient appearance. Prosthodontic rehabilitation present functional and aesthetic alternative for plastic and reconstructive surgery.

Generally, indications for maxillofacial prostheses are: 1. the necessity of optimal tumor aftercare, e.g. in the cases of a high risk of recurrence; 2. if local or general contraindications concerning procedures of reconstructive surgery exist (e.g. in the case of severely damaged skin following radiation); 3. poor general condition; 3. during individual stages in plastic reconstructive surgery (interim prosthesis); 4. following failed reconstructive procedures; 5. the rejection of reconstructive procedures on the part of the patient; 6. high aesthetic demands.

The main problem in maxillofacial prosthodontic is retention of prosthesis. In order to achieve some improvements in the quality of life of these patients the modern concept of maxillofacial prosthodontic has to be established. This concept considers introducing of maxillofacial implants as an anchorage for prosthesis, which significantly improves their stability.

However, there are some specifics of maxillofacial implantology: explicit anatomical relation to the intracranial structures; less bone quality and quantity; more compact bone and irradiated tissues.

Lack of the bone sometimes limits use of conventional screw like implants. Also, implant survival in irradiated tissues is much lower. Implantation during the primary surgical procedure is not recommended in patients who will undergo post-operative irradiation. According to the literature, there is no type of implant which could be considered as superior for the implantation in the irradiated bone.

The various implant systems for those purposes are in use. Using of basal osseointegration concept on "disk" implants will be emphasised, particularly because this is, to our knowledge, first time used. Basally osseointegrated (BOI) implants present an excellent solution for maxillofacial prostheses anchorage, particularly in irradiated patients.

Patients with extraoral maxillofacial prosthesis (auricular, nasal, orbital, facial) as well as with intraoral (maxillary – obturator) and mandibular prosthesis will be presented owing to long tradition of the maxillofacial prosthodontic department of Clinic of Maxillofacial surgery, School of Dentistry in Belgrade which was established in 1965.

Complications associated with extraoral implants in relation to complications associated with intraoral placement are different. However, they are not too frequent and serious. Infection usually develops at the place of skin penetrations

superficially, as skin reaction which surround bars, while dental implant are protected from that type of reactions, primarily because of oral environment. Salivation and tongue movements facilitate self-cleaning. 91.1% of patients with orbital epithesis and 89.3% of patients with auricular epithesis developed skin reactions. Surgical procedure that includes skin thinning around the implants is very important as factor which enables maintaining adequate hygiene. This procedure is preventive measure and present the possible solution to avoid complications and skin reactions.

The modern way of life today takes care about beauty, as one of important factor in successful life of the individuals. Therefore, adequate reconstruction of face appearance, which is the mirror of humans, as well as the first impression to the environment, presents absolute aim. Despite very good results with contemporary reconstructive methods, maxillofacial prosthodontics plays an important role in treatment of patients with maxillofacial defects. It is approved that regardless to the disadvantages, implementation of implants as anchorage for maxillofacial prostheses contribute to: significantly improvement of retention and stabilisation of prosthesis; faster adaption of patients to the prosthesis; prosthesis's comfort; better aesthetic; easier maintaining of hygiene.

## PRINCIPLES OF TREATMENT OF WAR INJURIES

*Naranđa Aljinović Ratković*  
*Department of Maxillofacial and Oral Surgery University Hospital Dubrava, Zagreb, Croatia*

*Introduction:* Maxillofacial wounds caused by missiles (especially high velocity missiles) are often in war injuries. Their wounding patterns are different from blunt trauma which is usual in peace time. The extent of the injury depends on the velocity and type of the missile, but even more on the location of entrance wound and the direction of penetration of the missile. The fracturing patterns usually include direct fracturing at the site of the impact and the related amount of the bone defect at the fracture site.

*Objective:* Description of typical missile wounds of the maxillofacial region in relation to level and direction of the missile penetration and principles of treatment based on own experience.

*Patients:* From the beginning of the war in Croatia in summer 1991. till November 31, 1995., 349 war casualties were admitted to the Department of Maxillofacial Surgery in Zagreb. 313 sustained missile injuries, 19 of them with low velocity missile injury were excluded. Soft tissue wounds as well as sites and extension of facial fractures were recorded. Clinical observations were completed with X ray and CT scans and compared to intraoperative findings in operated patients.

*Study Design :* The injuries are presented according to the site (mandible, midface) and extension of injury and analyzed in relation to the missile type and level of penetration. Typical cases are presented. The characteristics of missile wounds of each facial region and principles of treatment are outlined. Wound ballistic in relation to specific tissue structures is discussed. The penetrating missile injuries of the midface were divided into: transorbital, transmaxillar, palatoalveolar, central and tangential. The characteristics of each group are described.



*Results:* Facial fracture was present in 69,9% of the casualties. For the mandible injuries two and more sites were fractured in 65.6% fragment wounds and 49.2% in bullet wounds. The bone defect was present in 61.2% of the bullet wounds and 57.8% of the fragment wounds. Craniocerebral injury was associates in 40% casualties with midface injury, 15% with mandible injury and 29.7% with the injury of both. Immediate surgery was performed in 30,9% casualties, delayed surgery (up to 14 days) in 36,2% and secondary treatment after first treatment in other surgical service in 32,9%. In mandibular fractures plating was a rule – to bridge the defect and allow healing in position for further reconstruction. Midface fractures were also treated by rigid fixation in 69%. Secondary surgery was performed in more than 50% and included: osteoplasties, soft tissue corrections and osteotomies for delayed cases.

## PANELS

### CRANIOMAXILLOFACIAL DISTRACTION OSTEOGENESIS 25 YEARS LATER: CURRENT CONCEPTS & FUTURE DIRECTIONS

#### A QUARTER OF A CENTURY IN CRANIOMAXILLOFACIAL DISTRACTION OSTEOGENESIS. WHERE ARE WE NOW; WHERE ARE WE GOING ?

*Manlio Galiè, MD DMD*

*Unit of Cranio Maxillo Facial Surger, Center for Orbital Pathology & Surger, St. Anna Hospital and Universit, FERRARA – Italy*

Distraction osteogenesis has been one of the most innovative concepts in craniomaxillofacial surgery through the last 25 years.

In 1987 Cesar A. Guerrero first performed a mandibular widening by distraction osteogenesis. Joseph G. McCarthy in 1992 published an extensive paper on the treatment of hemifacial microsomia.

In 1994 Wangerin and Gropp and in 1996 Diner et al. published on the use of intraoral devices for mandibular distraction. After a quarter of century of extensive use Distraction Osteogenesis has today specific indications for congenital craniofacial and cleft deformities.

Technology has evolved from the first application of external devices to intraoral and hybrid or semiburied techniques.

In congenital craniomaxillofacial anomalies distraction is indicated during growth.

Mandibular distraction osteogenesis can be safely and effectively used to avoid or remove tracheostomy in neonates with severe airway obstruction caused by micrognathia in Pierre Robin sequence.

There is a great range of indications of DO in pediatric craniofacial deformities and this new concept seems to well combine the proven Tessier principle of “ first build, then move ”.

On the other hand thorough Team evaluation needs to be established prior to the surgical decision, and the indications of early distraction in neonates should be well-considered.

#### DISTRACTION OR ORTHOGNATHIC SURGERY FOR CLEFT PALATE DEFORMITIES – WHICH IS BETTER?

*Lim K. Cheung*

*Discipline of Oral and Maxillofacial Surgery, The University of Hong Kong, Hong Kong, China*

Maxillary hypoplasia leading to a sunken midface is a common developmental problem in cleft lip and palate (CLP) patients. These deformities were corrected by orthognathic surgery traditionally from 1970 – 90s. However, this type of immediate transposition of the cleft maxilla is technically difficult due to severe deformity demanding large surgical movement and the tension from the palatal scar. Distraction osteogenesis, the process of generating new bone through gradual traction between two surgically separated segments fixed to a mechanical device, has become increasingly popular. It has opened new perspective for the treatment of various skeletal anomalies, particularly for the cleft lip and palate patients. A comprehensive literature review of orthognathic surgery and distraction osteogenesis for the treatment of

maxillary hypoplasia in patients with cleft lip and palate deformities will be presented. The difference in the indications, surgical relapse, complications, soft tissue changes, and velopharyngeal changes from both surgical methods will be discussed. The current results of our randomized clinical trial focused on the morbidity, surgical relapse, soft tissue changes as well as psychological changes of CLP patients will also be presented.

#### 3-D MANDIBULAR ADVANCEMENT VIA INTRAORAL DISTRACTION OSTEOGENESIS

*Caesar Guerrero*

*Santa Rosa Maxillofacial Surgery Center. Caracas, Venezuela*

Patients suffering sleep apnea, severe mandibular AP and transverse deficiency, TMJ arthrosis and syndromic mandibles have been treated with limited success with traditional surgery. Distraction osteogenesis offers new possibilities, unlimited amount of controlled progressive movements and excellent bone and soft tissues healing.

The original surgical techniques were based on extraoral appliances, cutaneous incisions to approach the bone and very uncomfortable devices. Scientific research, continuous evolution, psychological evaluations and engineers input have created a myriad of new surgical techniques, better instrumentation, sophisticated evaluation imaging and Orthodontics combination have opened a complete surgical subspecialty to treat the above mentioned problems with a higher level of care, improving children and young adults living standards with minimal morbidity and predictable outcomes.

Minimal incisions, osteotomies under controlled temperature, different surgical designs, miniaturized distractors and special extensions for easy activation, permit the surgeons to correct deformities that were impossible in the past.

Trans-mucosal devices with closed distraction chambers, lengthening the ramus protecting the temporo-mandibular joints, distraction anterior to the mental nerves to avoid paresthesias, longer consolidation periods to ensure bone healing and stability, use of blood morphogenetic proteins into the chamber to improve healing and decrease remodeling; are some of the new improvements in treating patients.

Newer technologies, instrumentation and long term follow up based on 25 years experience and 1210 patients treated with Intraoral distraction osteogenesis will be discussed.

#### DISTRACTION OSTEOGENESIS : EVOLUTION IN TECHNIQUE AND APPLICATION

*Patrick A. Diner, Catherine Tomat, Arnaud. Picard*

*AP-HP, hôpital d'enfants Armand-Trousseau, Service de Chirurgie Maxillo-Faciale et Chirurgie Plastique, Paris, F-75012, France*

Over the last 18 years our definition of how use Distraction procedures has evolved on different points:

-Deciding the best age for D.O. remains a debate. However, over time we have narrowed the indications for D.O. in children to severe cases because we have observed a return to the original bone Hypoplasia after D.O. in patients still growing resulting from the affected bone's slower rate of growth, especially in syndromic patients. Severe cases include:

- 1)those with an already established overjet(superior to 8 – 10 mm),
- 2)Hemi-facial microsomia, Pruzansky IIB cases with severe malocclusion,

3)severe anterior dental mandibular crowding, in syndromic patients (Hanhart, Freeman-Sheldom, Silver Russel...), 4)patients with severe SAS 5)patients with strong psychological requests.

In accordance with this philosophy D.O. has to be considered as the first step in a global treatment plan that will finish at the end of puberty.

-D.O. has not lived up to all of its expectations especially concerning soft tissue and the correction of severe occlusal cant in children. For this reason, we perform adjunctive procedures (fat transfers) and we delay the treatment of the occlusal cant until after puberty, avoiding early bimaxillary D.O. as described for Molina – Ortiz Monasterio.

- Over time our choice of device has evolved. This device has evolved to reach the best vector, to be more comfortable for the patient (rod exit, auto removable rod) to be more easily removable (fixation by pins or bio resorbable screws), to increase the work capacity (telescopic, per D.O. partial change of the device), to be placed internally for increasing the consolidation time.

- New applications for the use of devices can be proposed e.g. huge chin advancement.

- Our techniques have also evolved especially in adult patients where conventional surgery is not possible: this new concept of Dynamic Orthognatic Surgical Procedure (DOSP) uses the ability for the callus to be modified. The concept has been adapted by extending the bone floating concept to solve severe asymmetrical mandibular cases or open bite by manipulating the device and the callus.

## FREE FLAPS FOR HEAD AND NECK RECONSTRUCTION

### DEVELOPMENT AND PROGRESS OF MANDIBLE RECONSTRUCTION

*Cai Zhigang, Zhang Jie, Zhang Jianguo, Zhao Fuyun, Shan Xiaofeng, Huang Jinwei*  
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**Abstract:** With the development of microsurgery, dental implant, distract osteogenesis and digital surgery, the head and neck reconstruction achieved progress rapidly in the last decades. We will introduce some clinical works in our department (Dept. Oral & Maxillofacial Surgery, Peking University School & Hospital of Stomatology). Four kind of methods for mandible reconstruction were usually used: free vascular fibular flap was the best reconstructed method for the larger defects of mandible or with soft tissues defects; autologous non-vascularized free iliac was used in block bone graft or the length of mandibular defect was under 6 cm resulted by benign lesions; reconstructive titanium palate was used in recurrence malignant lesions; distraction osteogenesis was propitious to block defects of mandible. There were different characteristics and indications in the four kinds of methods. However, with digital surgery techniques have been widely spread all over the world, more and more attention has been paid to the individual and functional reconstruction of the mandible.

**Key words:** mandible reconstruction, fibular flap, digital surgery

## RECONSTRUCTION OF THE MAXILLA

*James S Brown*  
Aintree University Hospital and Liverpool University

There are multiple options available for the reconstruction of the maxillary and midface defect after ablative surgery or trauma. The above classification(1) helps to define the differing problems faced by the clinician in most situations. Class I and a can be easily treated often without formal reconstruction but as the defect becomes more complex from Class II-IV and b-d for the maxilla and Class V-VI in the midface there is an increasing need for composite free tissue transfer.

In Class II defects the fibula is a very useful flap as it can restore the alveolus and there is less need for obturation of the lost maxillary sinus. Dental rehabilitation can be reliably achieved with an implant-retained denture and reasonable facial contour.

In Class III the orbit is retained but with no support to the floor and hence both the alveolus and the facial height should be ideally restored. In this situation I favour the iliac crest with internal oblique especially for Class d cases crossing the midline. Muscle is an excellent tissue to obdurate the sinus cavity and close the oro-nasal fistula whilst lining the medial nasal wall retaining a functioning nasal passage. Adapting the fibula(2) and positioning the skin paddle is not easy and requires multiple osteotomies resulting in a pedicle length of no advantage over the iliac crest.

The task becomes easier for the Class IV defect as the eye has been resected and the reconstruction can be supported with an orbital prosthesis which if skillfully made can mask some of the deficiencies of even a soft tissue only reconstruction. Using muscle to close the oro-nasal fistula, however, will facilitate dental rehabilitation. I will often consider the thoracodorsal angular artery flap with the tip of scapula, as latissimus dorsi with skin, serratus anterior or teres major can be utilised for the obturation of the sinus, nasal lining and oral closure.

In the Class V defect only soft tissue is generally required, but for the loss of nasal bones and medial orbital walls I favour the composite radial forearm flap and have had good results.

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## FREE FLAP MONITORING

*Frank Hölzle*  
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Flap failure can be avoided through early recognition of compromised flap perfusion.

Owing to the limited ischaemia time of the tissue, immediate surgical intervention to re-establish vascular patency is the key to successful salvage rates of 70% and

more. The author reports on various monitoring devices that allows invasive and non-invasive free flap monitoring and discusses advantages and disadvantages.

### DYNAMIC FACIAL REANIMATION

*Federico Biglioli<sup>1</sup>*

<sup>1</sup>*Ospedale San Paolo, Milano*

Facial paralysis implies soft tissues drooping because of mimetic musculature atrophy and subsequent facial asymmetry. While attempting facial expression the appearance of the face worsen because of the impossibility to activate movements: people stop smiling. The biggest functional problem is represented by loosing of spontaneous blinking and the capability to close the lids voluntarily: corneal irritation, lesions and infections are a common consequence leading sometimes to loosing visual acuity.

Facial reanimaiton means “to give back movements to the face“. All the static techniques leading to improve facial symmetry but “forgetting” to restore movements fail to reanimate the face. Dynamic procedures are the only ones that attempt to reanimate: complete restoring of facial nerve function is thought still a mirage.

There are three different timing among facial reanimation: a) reconstruction of the nerve immediately after its lesion or soon after; b) reactivation of the nerve by anastomosing it to a new motor nerve source no more than 18 months after the onset of paralysis; c) reanimation of the long standing paralysis (onset prior to 18 months) by new musculature transfer. For all three moments there are different techniques to be applied:

Substitution of a branch of the facial nerve with a minor nerve graft (great auricular or sural nerves). In case of total facial nerve branching that may be substituted by the branching of the thoracodorsal nerve: the trunk of the facial nerve is anastomized to the branch of the thoracodorsal nerve, while the branches of the facial nerve are anastomized to the branches of the thoracodorsal nerve.

Masseteric to facial nerve anastomosis may reactivate mimetic musculature function. In order to restore emotional smiling and spontaneous blinking two cross-face sural nerve grafts anastomized to the contralateral facial nerve must be added.

One-stage free muscle flap is the quickest and most reliable method to restore facial nerve function. The most guaranteed flap is the gracilis anastomized to the masseteric nerve. A second nerve source given by a cross-face sural nerve graft anastomized to the contralateral facial nerve branch ensure activation of the flap during emotional smiling. By now the most utilized method to restore lid closure is the transposition of a forked temporalis flap. If the goal is restoring blinking, a platysma graft must be innervated by a cross-face nerve graft anastomized to a contralateral facial nerve branch for the orbicularis oculi muscle.

Applying those techniques it is possible to limit facial paralysis sequelae, partially restoring facial symmetry and expressions.

### FURTHER DEVELOPMENTS IN MICROVASCULAR SOFT TISSUE RECONSTRUCTION

*Klaus Dietrich Wolff*

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Since more than three decades, microvascular tissue transfer is a proven procedure, but challenges still remain. An increasing number of patients present with comorbidities, in old age or with an irradiated and vessel depleted neck. Advances of intra- and perioperative patient care as well as methods like vascular loops, reverse flow anastomoses, and carrier flaps were developed to expand the limits of technical feasibility. We present our approach to soft tissue reconstruction in high-risk patients. Perforator flaps became popular due to their extremely low donor site morbidity. To handle their anatomic variations and short pedicle, sophisticated planning methods and skilful surgical techniques were established. We present four different donor sites for perforator flaps from the lower leg and our experience with these flaps in more than 70 patients. Despite their routine clinical use, free flaps might get a much wider spectrum of indications with new insights into the flaps physiology and immunogenicity, offering new transplantation techniques. We report about our understanding of flap autonomisation and flap perfusion in an experimental setting.

### CONSENSUS AND CONTROVERSY IN CLEFT SURGERY

#### EVOLUTION OF A PHILOSOPHY IN CLEFT LIP TREATMENT

*Brusati R.*

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My evolution in CLP treatment starts with one of the most diffused technique in the seventies, the Tennison Randall repair at 6 months, followed by soft palate repair at 18 months and hard palate at 6 years. All nasal surgeries were delayed at 16-18 years. After a stage at Prof Delaire Clinic in Nantes in eighties I adopted his philosophy particularly regarding a simultaneous repair of soft palate, lip and nose at 4-6months, followed by hard palate repair with gingivoperiosteoplasty(GAP) at 18-24 months. According this protocol we avoided in 99% of cases the need of bone grafting.

Regarding lip and nose repair the preferred tracings, according anatomy of philtrum are: modified Millard, Mohler, Pfeifer. The muscular preparation and reconstruction is performed according the suggestions of Talmant. To obtain the best symmetry of Cupid bow, if necessary, a small Z plasty in the lower part of the lip can be done.

My most recent evolution are the simultaneous septal reposition and in cases not larger than 1 cm on the hard palate the simultaneous hard palate repair with vomer flap(Pichler) and, if the alveolar processes are in contact, GAP.

The aim of the new approach is to reduce as much as possible the number of operations together with a better speech and a good morphology.

## THE EVOLUTION OF A PHILOSOPHY FOR TREATMENT OF CLEFT PALATE

*Brian Sommerlad*  
Great Ormond Street Hospital for Children, London, UK

**Consensus:** It is generally agreed that at least the soft palate should be repaired before the age of 12 months to give the best opportunities for speech and language development. It is also generally agreed that some form of reconstruction of the soft palate musculature should be undertaken but the degree of that dissection is debated. It is also generally agreed that the more radical the surgery on the hard palate the more likely it is that maxillary growth will be impaired.

**Controversies:** There is debate about the technique and timing of hard palate repair:

Worldwide, the most common technique is the two-flap palate repair (Bardach). The pushback technique of Veau-Wardill-Kilner is now less commonly performed. Some (including the author) believe that the fewer incisions in the hard palate the better as far as maxillary growth is concerned. Those who delay hard palate repair believe that delaying the repair of the hard palate improves maxillary growth. The downside is the effect on speech and language development when the hard palate is open

The other major controversy is about the role of the Furlow palatoplasty

**The author's technique:** The author's technique of palate repair has evolved over more than 25 years and is based on experience and anatomical study. It combines radical dissection of the velar musculature with minimal disturbance to the mucoperiosteum of the hard palate.

The operating microscope is used for all repairs, and in 90% of cases the dissection is carried out through a cleft marginal incision only, without any mucoperiosteal flap elevation or lateral incisions. In clefts involving lip and palate, closure of the hard palate with a single layer vomerine flap has dramatically reduced the need for lateral releasing incisions.

Velar reconstruction is carried out by elevation of the oral mucosa from the musculature, suture of the combined nasal layer/muscle layer, and then dissection of the velar musculature from the nasal layer, separation from the back of the hard palate, tensor tenotomy and splitting of the palatopharyngeus muscle, followed by identification and retro-positioning of the levator palati muscle which is then sutured in the midline, usually behind the middle third of the velum.

Secondary velopharyngeal surgery rates at 10 years follow-up have reduced to 4.6%, although such figures are of little value in comparing techniques. There is evidence that this percentage increases with longer follow-up.

Submucous cleft palate has been subdivided into classical and occult. However, it is better viewed as a spectrum and a system of grading has been described. The technique for submucous cleft palate repair is similar to that used in muscle reconstruction in an overt cleft. Results can be evaluated early. Pre- and post-operative speech can be more objectively assessed. The results of surgery for the spectrum of SMCP are presented for two consecutive series.

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**Videos:** Videos of repair of a cleft palate (in a patient who had a complete unilateral cleft of lip and palate) and repair of a submucous cleft palate are available for surgeons as part of a 6 video series and will be posted free of charge on request from [www.sommerlad.co.uk](http://www.sommerlad.co.uk)

## FACIAL TRANSPLANTATION

### PANEL FACIAL TRANSPLANTATION - EXPERIENCE OF SEVILLE (SPAIN)

*Dr. Pedro Infante-Cossio*  
Seville (Spain)

Clinical experience has clearly demonstrated the viability of facial transplantation (FT) as a reconstructive option, and the good results obtained have encouraged the evolution from the first partial FT to the full FT procedures, expanding the range of eligible patients. However, unresolved issues and crucial aspects to be defined regarding functionality, quality of life, mid-term and long-term FT complications still remain. All FT teams must be committed to being transparent in communicating surgical experiences. Until now, FT has been indicated in a small group of highly selected patients and has been performed only in five countries. In the near future it is expected that many more transplants will be performed, and FT may become a first-line reconstructive option for patients with severe facial disfigurements. In Seville (Spain), on January 26, 2010, our team carried out the world's second face transplantation in neurofibromatosis type 1 with involvement of the second and third divisions of the trigeminal nerve. The recipient received a composite tissue allograft of the lower parts of the face to restore a severe defect after bilateral massive plexiform neurofibromas excision. The allograft included the lower two thirds of the face and an osseous chin segment. The facial appearance of the recipient has improved gradually within the first 2 years. The patient is highly satisfied and has re-integrated to normal social life.

### FACE ALLOTRANSPLANT: A CRITICAL ASSESSMENT.

*Jean-Paul Meningaud*  
Department of Plastic and Aesthetic Surgery CHU Henri Mondor, Creteil, France

Composite tissue allotransplantations may be indicated when autologous transfers fail to restore human appearance and facial functions. After having participated in a registered

clinical research protocol that included nine patients, I report my personal views on the reproducibility, difficulties, serious adverse events and outcome. Two patients suffered from plexiform neurofibromas, two from third degree burns, four from gunshot injuries and one from Xeroderma Pigmentosum (XP). All were included on a national waiting list with a dedicated face procurement procedure. Transplants were harvested from heart beating brain-dead donors before other tissues and organs. Induction immunosuppressive therapy included anti-thymocyte globulins, steroids, mycophenolate mofetil and tacrolimus. Maintenance therapy included the last three ones associated to extracorporeal photopheresis. Seven patients were transplanted with 1 to 40 month follow-up. One could not be transplanted due to multiple panel reactive antibodies after 18 months on waiting list and one (XP) was cancelled because of intercurrent melanoma. Acute cellular rejections were controlled by conventional treatment. Opportunistic infections affected all patients and lead one patient to die two months after the transplantation. Voluntary facial activity appeared from 3 to 5 months. Face transplantation has been reproducible under conventional immunosuppression. Major improvements in facial aesthetic and function allowed patients to recover social relations and improved their quality of life. Nevertheless, after this case series, it was time to mark a pause for a critical assessment of the overall procedure: what is requested to perform face transplant, what I will never do again? Which indications should remain? Should all centres that practice facial surgery be allowed to carry out face transplant?

#### CHALLENGES IN FULL FACE TRANSPLANTATION

*Juan Pedro Barret Nerin<sup>1</sup>*

<sup>1</sup>*University Hospital Vall d'Hebron, Barcelona, Spain*

Facial transplantation has become a new paradigm in facial reconstructive surgery. Patients presenting with catastrophic deformities extending to many facial aesthetic units with severe functional deficits (implicating facial sphincters) may be reconstructed with new native allo-tissues.

To date, different units, tissues and facial structures have been transplanted, extending from the first break-through facial transplant in Amiens to the first full-face transplant (including bone) in Barcelona. Many lessons have been learnt, which include feasibility of the surgical intervention, immune tolerance, functional integration, and long-term outcomes.

A comprehensive and in-depth analysis of each patient and facial deformity has to be implemented, together with a robust team and transplant protocol to warrant excellent results and outcomes.

The present lecture will overview the history of facial transplantation, ethical and immunological issues, the need for a specific donor procurement protocol, and present the current outcomes of the Barcelona Experience.

#### CHALLENGES IN FACE TRANSPLANTATION

*Maria Siemionow, MD, PhD, DSc*

*Department of Plastic Surgery, Cleveland Clinic, US*

Cleveland Clinic's challenges and experience with the first U.S. face transplantation are summarized in this lecture.

*Evidence of Experience and IRB Approval*

Cleveland Clinic was the first institution in the world to get approval for facial transplantation in humans, on October 15, 2004. This happened following one year of presentation of evidence by our experts to the Cleveland Clinic Institutional Review Board. Once all technical, ethical, and social issues were addressed, the Board approved the protocol.

#### *Organ Procurement Organizations*

The organ procurement organization approval was a challenging process. Following IRB approval, it took two years to obtain approval from some of the OPOs in Ohio, Michigan, and Pennsylvania and an additional two years after that, to receive approval from our local organ procurement organization, LifeBanc. In July 2008, the patient was listed as a transplant candidate and then, finally, in December 2008, the transplant was performed.

#### *Patient Selection Process*

The protocol of inviting potential candidates included requests for the medical history, history of the accident/injury, history of all previous surgeries, as well as series of photos showing different views which were most representative of the disfigurement of the face. This served as a screening process for the evaluation of potential candidates before inviting them for the formal screening by all experts of the multi-disciplinary team.

Our patient had undergone 23 reconstructive procedures which all failed to restore normal function and, for this reason, the patient requested evaluation as a potential face transplant candidate.

#### *The Team*

The face transplantation team was comprised of over 35 experts in different specialties including plastic surgery, transplant surgery, psychiatry, psychology, immunology, infectious disease, anesthesia, intensive care, neurology, ethics, dentistry and prosthetics. Media were also included in the multi-disciplinary team which was ready for evaluation of potential candidates.

#### *Cost*

It was clear that the cost of the first face transplant patient within our institution, and in the United States, would be in the vicinity of \$500,000 or more, based on the cost of reported hand transplantations. Cleveland Clinic management supported the program of face transplantation and approved coverage of the entire cost of the first patient.

#### *Transplant Surgery*

Transplantation surgery took 23 hours, 8 reconstructive surgeons, and over 30 supporting staff who participated in 2 operating rooms. The transplant was, at that time, in December 2008, the most complex transplant performed worldwide and included over 80% of the entire face including bones, maxillary sinuses, entire nose, lower eyelids, upper lip, palate, hard palate, and alveolus.

#### *Outcome*

The patient's outcome was satisfactory, and the patient had one episode of rejection, at day 47 post transplant, and a second episode of rejection at day 459 post transplant, both of which were treated with a bolus of steroids, after which the rejection reversed from grade 3 to grade 0, at 3 days. The patient has returned good function of breathing through the nose, smelling, eating solid foods, tasting, and drinking from a cup. There was no occurrence of post-traumatic stress disorder. The patient regained self confidence and self es-

team. There was also reduction of pain after surgery. The patient's therapy included standard immunosuppression consisting of thymoglobulin induction followed by triple therapy for the first 6 months with Prednisone, MMF, and FK506, and after 6 months, MMF was withdrawn and the patient was on the two-drug therapy of Prednisone and FK506. The reconstruction of the skeletal, as well as soft tissue features of the patient, was excellent. There was return of sensory recovery starting at 3 months post transplant and normal sensation of light touch, temperature, cold and heat. Colometric studies showed normal sensation at 6 months.

The functional outcome of the patient being able to pucker, smile, and say vowel sounds was excellent, and facial nerve recovery took about a year.

The aesthetic outcome, up to one year, was satisfactory; however, there was redundant skin on the jaws which required additional surgical removal. After this reconstructive procedure of extra skin removal and tightening of the soft tissues, there has been a very pleasing aesthetic outcome.

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## CLEFT TREATMENT AROUND THE WORLD

### CLEFT LIP AND PALATE CARE IN PEKING UNIVERSITY SCHOOL OF STOMATOLOGY

*Lian MA*

*Cleft Lip and Palate Center, Peking University School of Stomatology, Beijing CHINA*

The incidence of cleft lip and palate in China is about 1.32% to 1.82%. Most of cases were operated by oral and maxillofacial surgeon in Dental hospital or dental department of general hospital. However, Plastic surgeon, ENT doctor, and pediatrics also treat some of cases. Cleft lip and palate treatment centers were set up one after another in China during the past 20 years and some centers in big cities such as Beijing, Shanghai, Chengdu and Xian are facilitated and functioned well.

Cleft lip and palate center in Peking university school of stomatology was set up in 1991, and has treated about over 40,000 patients, The procedure for primary cleft lip and palate care is followed as below:

Cleft lip repair	1-3 m
Cleft palate repair	8m
Follow up	2.5y (photo, tape recording)

Speech training (if needed)	4.5y
Pharyngoplasty (if needed)	5y
Alveolar bone graph	9-11y
Rhinoplasty	13y above
Orthognatic Surgery	16y around

Individual plan for cleft lip and palate patient with difference type, Difference intervention was made in difference age according to the, for example, the osteotomy surgery has to be done for correct displacement of premaxillary before alveolar bone graph; lip revision has to be done when lip deformity has effected the psychiatry development. Also the full recordings for hearing, maxillary growth and speech in difference stages were made. Photographs were taken

Secondary deformities of cleft lip and palate include lip and nose deformity, malocclusion maxillary hypoplasia and velopharyngeal incompetence. Some of secondary deformities are inevitability but some of them are iatrogenic. Purpose of this part is to identify the characteristics of secondary deformity after primary cleft lip/palate repairing, to analyze the causes of secondary deformity – inevitability or iatrogenic which is caused by surgical technique or/and surgical skill. 1000 cases of secondary deformities treated in Cleft Lip and Palate center Peking University School of Stomatology were analyzed. The photos were take, the evaluations were made pre-operatively. The variable deformities were classified and the percentage of different deformities is calculated.

The characteristics and causes were analysis, which indicate the causes for some of secondary deformities such as small nostril, asymmetry of vermilion, severe maxillary hypoplasia in nonsyndromic cleft palate are more like iatrogenic. The part also raised issues about prevention for iatrogenic secondary deformities.

## COMPREHENSIVE CARE OF CLEFT AROUND THE WORLD: OPERATION SMILE, A MODEL OF SCIENTIFIC APPROACH, QUALITY AND SAFETY

*Scopelliti D, MD*

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Every child deserves the ability to smile and a chance to thrive. But in many parts of the world, children with cleft lip and cleft palate are hidden away, too embarrassed to attend school and face uncertain futures because their parents cannot afford to provide the surgery they need. Operation Smile is an international children's medical charity, founded in 1982, dedicated to raising awareness of cleft lip and cleft palate and providing lasting solutions that will allow children to be healed, regardless of financial standing, well into the future. Global Standards of Care is our commitment to ensuring that every patient cared by Operation Smile will benefit from the same sophisticated equipment, procedures and highly trained, credentialed medical professionals, no matter where they receive treatment: that is why medical volunteers provide safe, effective and free surgical, orthodontic and logopedic treatment for children born all over the world. The global demand for cleft repair surgery is staggering and can only be met if a self-sustaining solution is built. Education, training, medical equipment, best surgical practices and an expanding network of Operation Smile Care Centers are some of the highest priorities. With a presence in over 60 countries, more than 5000 medical volunteers, more than half of medical missions originate in-country and follow the

proven Operation Smile model — allowing us to deliver essential high-quality care to more and more children each year. Nevertheless, free surgeries and medical missions are made possible by the thousands of volunteers and donors, throughout the world, who generously contribute time, talent and resources to the cause.

## COMPREHENSIVE CARE OF OROFACIAL CLEFTS IN EUROPE

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It has been estimated that every year between 7,500 and 10,000 children are born with orofacial cleft in Europe (27 countries, a population of 500 million). Apart from other care, they all need highly specialised surgery, rehabilitation of speech and orthodontical treatment to be adequately functionally and aesthetically rehabilitated. In a number of European countries treatment costs are covered by national health services or insurances. If costs need not be covered by the family follow up is easier and treatment can be evaluated also at the later stages. Despite all efforts, care may be linked with impairment of facial and dental development, occasionally also with speech impairment and facial disfigurement, which in turn may lead to socio-psychological maladjustment.

In Europe orofacial cleft care differs from country to country. In Scandinavia and in some countries of Central and Eastern Europe centralised care traditionally prevails, while decentralised care is characteristic of Western and Southern European countries, where cleft care is provided by a large number of local services with low caseload. It is not known how many children born with a cleft in Europe are not treated by a team of specialists consisting of, at least, a surgeon, an orthodontist and a speech therapist. It has been found that different treatment approach leads to different outcomes. As early as the first comprehensive multicentre study (Ross, 1987), which included also 9 European cleft centres (Scandinavian countries, UK, Switzerland), showed that, after a treatment of an unilateral cleft, facial skeleton differs from an unaffected one. Results of this study also suggest that the age of 4-5 months is the most appropriate for the lip repair. The least interference with growth was noticed in cases with no hard palate repair or repair in late teens. An intercentre study conducted 20 years ago (Shaw *et al.*, 1992), which analysed results of centres in UK and Scandinavia, concluded that decentralised care by low volume operators is associated with inferior outcomes. The need for major corrective secondary operation (maxillary osteotomy) differed between the best and the worst services by a factor of 8 (6% vs. 48%). These findings led to several projects financed by European Commission (Eurocleft 1996-2000, Eurocran 2000-2004, EUROcleftNet 2011-2016). Eurocleft project resulted in the following consensus recommendations which should be followed in the management of all children born with a clefts in Europe:

Cleft care should be provided by a multidisciplinary team of specialists.

Team members should have special training.

The team should agree on the stages of treatment including examination, record collection and a general protocol.

There should be one person responsible for quality improvement and communication within the team.

Co-ordination of the care of individual patients.

The number of patients referred to the team should be such as to sustain the experience and skill of all team members (40-50 new cases per year).

Recommendations concern the organisation of treatment, but they do not relate to the most appropriate timing and extent of surgery. There are ongoing multicentre randomised prospective trials to answer these two key questions. European projects also initiated collaboration among centres and led to several multicentre retrospective studies looking at different aspects of facial growth and speech. Results of these studies suggest conditions in which facial growth is the most or the least interfered with and the effects on speech development. Several centres have carried out analyses of their treatment outcomes at different age stages and at full growth. A comparison of their results also indicates significant outcome differences.

It may be concluded that, due to organisation and standards of care, children born with orofacial cleft in Europe can receive a comprehensive treatment by a team of specialists, who monitor progress of individual patients until they are grown-up. Such conditions make it also possible for relevant research to be carried out and for recommendations to be adopted as to the most appropriate service of different types of orofacial clefts.

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## DEVELOPING AND STANDARDIZING A CENTER OF EXCELLENCE FOR CLEFT AND CRANIOFACIAL SURGERY.

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The range of facial deformities is enormous. All produce some degree of disfigurement and result in the impairment of function to some degree, sometimes even to the point of incompatibility with life. Congenital facial defects in India are associated with considerable superstition, social rejection, and failure to integrate into society.

In India, cleft defects occur in 1 in 500 births. Congenital facial defects are a pressing problem in India owing to the limited resources to treat such patients. Poverty is a major factor for parents of such children to get appropriate treatment.

Setting up an institute to treat children with cleft and craniofacial deformities in India presents problems with financing treatment for poor patients, procuring the right infrastructure, and employing well-trained human resources.

The authors have set up such an institute in Hyderabad in the southern state of Andhra Pradesh in India. The logistics of setting up such a facility in a developing country and the future of funding for cleft treatment are important factors to consider while establishing a center for patients with cleft and craniofacial anomalies.

The aim of setting up such centers was to provide quality comprehensive treatment for patients from all sections of society with cleft and craniofacial anomalies.



## GUEST SOCIETIES SYMPOSIA

### Spanish Association of Oral and Maxillofacial Surgery (SECOM)

#### CONTROVERSY IN MANAGEMENT OF FRACTURES OF THE FACE

#### CONTROVERSY IN MANAGEMENT OF SUBCONDYLAR FRACTURES

*Jacinto Fernandez Sanroman  
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Treatment of subcondylar fractures is up-to date controversial. Closed reduction with maxillomandibular fixation (CR/MMF) or open reduction with internal fixation (ORIF) are the main surgical techniques available. There is no consensus on indications of each technique and different complications when using both techniques have been published. Shortening of the ascending ramus with secondary malocclusion and deviation of mouth opening with TMJ subluxation of the contralateral side are the main problems reported when CR/MMF is used. In the other hand, potential complications of ORIF includes: visible scars, vascular lesions with hemorrhage, damage to the facial nerve, wound infection, avascular necrosis of the condylar head, malalignment of the fracture with secondary malocclusion, and different complications related to the osteosynthesis material used.

Endoscopic-assisted treatment of subcondylar fractures can decrease the complication rate of the traditional ORIF procedures. With the transoral approach the risk of facial damage is minimal and visible scars are avoided. Patients are allowed to regain a soft diet in only some hours after operation and the final recovery time is substantially reduce when compared with the CR/MMF treated patients.

Possible indications and waited results of each technique are presented in this lecture.

#### CONTROVERSY IN TREATMENT OF FRACTURES OF THE ORBIT

*Rafael Martín-Granizo  
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Traumatology of fractures of the facial skeleton in an important part in oral and maxillofacial surgery. However, there are still controversial areas in the management of these fractures. One of them is the management of fractures of the orbit. In this presentation a brief review of the interesting and special features of the surgical anatomy of the orbit is made. Also, controversy exists in the surgical approaches to the orbit, mainly the transconjunctival vs the skin (subciliary, suborbital...) incisions. Advantages and disadvantages of each technique is performed, mostly based in evidence based studies. Furthermore, what kind of material is the most appropriate to reconstruct the floor of the orbit has been a topic of interest. Autogenous (calvarian bone) and alloplastic

material (resorbable s non-resorbable, titanium) has been employed, and their indications are also reviewed.

### American Academy of Facial Plastic and Reconstructive Surgery (AAFPRS)

#### RHINOPLASTY

#### ANALYSIS OF C-RING DYNAMICS: IMPLICATIONS OF LOWER LATERAL CARTILAGE TREATMENT

*James Ridgway  
Larrabee Center for Facial Plastic Surgery, Seattle, US*

Considerable attention has been given to the architecture and surgical management of the lower lateral cartilages. The current medical literature is replete with discussions involving tip rotation, projection, soft tissue alteration and refinement. Unfortunately, there is limited integration of nasal embryology and anatomic studies involving the tissues of the nasal base. In our surgical experience we have noted significant, posterior extensions of the lateral crus of the lower lateral nasal cartilages that may be of considerable significance in the treatment of the nasal base. This configuration is analogous to a C-ring configuration and model. Attention to these anatomic findings are a useful tool in a more refined conceptualization of interconnected forces as well as the surgical maneuvers necessary in nasal base surgery.

#### TONGUE-IN-GROOVE TECHNIQUES FOR NASAL TIP CONTROL

*James Ridgway  
Larrabee Center for Facial Plastic Surgery, Seattle, US*

Treatment of nasal tip rotation, projection, caudal excess and deviations is, in many aspects, the requisite goal of nasal tip surgery. To this end, no single technique or maneuver is capable of correcting all variants. This lecture will highlight the advantages, limitations and surgical results of the tongue-in-groove technique. Additional attention will be given to using this technique in a combined approach of near complete nasal reconstruction.

### Korean Association of Oral and Maxillofacial Surgeons

#### SURGERY-FIRST ORTHOGNATHICS FOR MANDIBULAR PROGNATHISM

#### BACKGROUND, NECESSITY, PROS & CONS OF SURGERY-FIRST ORTHOGNATHIC TREATMENT.

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Conventional surgical-orthognathic treatment includes pre-operative orthodontics for dental decompensations to maximize stable postoperative occlusion. Recently, surgery-first orthognathic approach without presurgical orthodontic treat-

ment has been introduced (Nagasaka et al, 2009). It is now widely documented especially for East Asian patients with mandibular prognathism. As the surgery-first approach corrects skeletal problem from the beginning, esthetic concern during the decompensation period and total treatment time can be minimized.

The indications of the surgery-first approach had been proposed as, 1) moderate or minimal crowding and adequate inclination of mandibular anterior teeth, 2) in cases with at least 3 stable occlusal stops between the upper and lower arches, 3) little or no transverse discrepancy, 4) adequate curve of Spee (Baek et al, 2010; Liou et al 2011). However, dental occlusion cannot be used as a guide for establishing treatment, there is fundamental limitations in accurate prediction of postsurgical results. Moreover, postsurgical occlusion is unstable and concept for postsurgical orthodontic treatment is continuously developing. We will compare conventional versus surgery-first orthognathic approach and discuss whether this elimination of presurgical orthodontics can be applied to only particular cases or can change the paradigm of the orthognathic surgery.

### ESTABLISHMENT OF TREATMENT PLANNING

*Seong Kyu Byun*

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Surgery –First Orthognathic Treatment (SFOT) concept had been newly developed by Dr. Hong-Bum Sohn at mid 1990s in Korea. He had named it as Functional Orthognathic Surgery (FOS).

Without presurgical orthodontic treatment, two –jaw surgical procedure can be done for skeletal correction of malpositioned jaw bone, more stable occlusal relationship and shortening of orthodontic treatment periods in Cl. III skeletal malocclusion patients.

Surgery –First Orthognathic Treatment concept will be considered by two view-points,

1. Is this treatment concept reliable one in dentofacial deformity patients especially, Cl. III skeletal malocclusion?
2. Is it reproducible treatment modality and stable in results for DFD patients?

A case for patient who had been treated according to SFOT concept will be introduced.

- (1) Diagnosis and presurgical considerations
- (2) Treatment planning
- (3) Surgery
- (4) Postoperative care
- (5) Postoperative orthodontic treatment
- (6) Long-term results

Many patients who had been treated according to SFOT concept have been satisfied with the less postoperative orthodontic periods, rapidly tooth movements and immediately improved facial profile. But several complications and diagnostic mistakes had been recognized during retrospective study for SFOT patients

Patients who have been treated as SFOT for past 11 years since 2001 in SMCMS(Sychar MAXFACE center for maxillofacial surgery) were classified as to treatment timing, surgical techniques, osteotomy types of mandible, multi-segmental osteotomy of maxilla.

We have developed the more comprehensive Surgery –First Orthognathic Treatment (SFOT) including molar width modification, control of tooth axis and space closure of pre-molar extraction. And We have applied this concept for the treatment for Cl. II and facial asymmetry patients also.

SFOT has been developed for the past 19 years and is now one of the selective treatment concept for DFD patients in Korea. SFOT concept in treatment for DFD patients will be rapidly improved and engineering advances in orthodontic treatment and 3-D imaging technology will be helpful for SFOT. The research of SFOT will give us much information about science of maxillofacial skeletal architecture and structural physiology.

### PRE- AND POST-OPERATIVE CONSIDERATION IN SURGERY-FIRST ORTHOGNATHIC APPROACH FOR MANDIBULAR PROGNATHISM

*Min-Suk KOOK, Hong-Ju PARK, Hee-Kyun OH*

*Chonnam National University, School of Dentistry, Dept of Oral and Maxillofacial Surgery*

Conventional procedures of orthognathic surgery for mandibular prognathism are composed of three stages: the pre-surgical orthodontic treatment for dental decompensation followed by the orthognathic surgical procedure, and finally post-surgical orthodontic finishing improving the occlusion. This traditional approach requires pre-surgical orthodontic decompensation. However, the incisor decompensation results in the worsening of pre-surgical facial profile. Moreover, the long treatment time for pre- and post-surgical orthodontics discourages patients in many cases.

In recent years, these challenges involved with the conventional orthognathic surgery have given rise to the "surgery-first" approach mainly in several Asian countries - Korea, Japan, Taiwan, and so on. The surgery-first approach of orthognathic treatment can bring immediate improvement in facial appearance to the better satisfaction of patients. It can also shorten the overall treatment time by having pre-surgical orthodontics eliminated or greatly reduced.

However, there are some drawbacks to this approach. In many cases, the upper and lower dental arch cannot be placed in an ideal occlusion due to dental interferences. There are some factors that might reduce post-operative skeletal stability due to unstable occlusion after surgery. Even the final occlusion has been determined carefully by the orthodontist, the surgical procedure must be performed meticulously since any minor surgical error can deteriorate the result. Hence, the orthodontist and maxillofacial surgeon must be experienced enough to be able to know the limitations and possibilities.

This surgery-first approach has some limitations and drawbacks of its own, but the paradigm shift may be what should be faced and overcome. In this presentation, pre- and post-operative consideration of surgery-first orthognathic approach will be discussed with several cases."

### PREDISPOSING FACTORS AND CONSIDERATIONS FOR THE POSTOPERATIVE STABILITY OF SURGERY FIRST ORTHOGNATHIC SURGERY

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The conventional treatment protocol for patients with dentofacial deformity has deemed pre-surgical orthodontic

treatment a mandatory component. This protocol has been thought of as gold standard of sorts as it assures stable post-operative results. However, it does require a long treatment period of treatment and is considered bothersome for patients because of dental decompensation and a consequent deterioration of esthetics and function. Therefore, many surgeons have recently been considering the utility of surgery first orthognathic surgery (SFOS) and suggesting its possibilities and advantages. On the other hand, those opposed cite the procedures instability and lack of supporting evidence. Is SFOS a good and effective treatment alternative for dentofacial deformity patients? Or should we consider and recognize its particular indications and limitations? This presentation will deal with the perioperative considerations regarding the postoperative stability of surgery first orthognathic surgery with focus on the importance of the usage of surgical stents and the monitoring of occlusion, as well as predisposing factors such as a predictable surgical plan that considers the existence of poor interdigtation just after surgery.

### Japanese Society Of Oral And Maxillofacial Surgeons – JSOMS

#### CONTEMPORARY MANDIBULAR RECONSTRUCTION

##### THE TRANSITION OF MANDIBULAR RECONSTRUCTION UTILIZING COMBINED SCAPULAR OSTEOCUTANEOUS AND LATISMUS DORSI MYOCUTANEOUS FLAP

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Selection of approach and the technique of bone reconstruction after mandibulectomy is crucially important and influential to the facial contouring and recovery of the oral function as well as the patients' QOL.

In the present report, results of retrospective analysis of the postoperative oral function and the prognosis was carried out on 91 post-operative cases, which were associated with mandibular reconstruction using combined scapular osteocutaneous flaps.

Out of the 91 reconstructive cases, 80 were of malignant tumours in oro-maxillfacial regions, 1 of ameloblastoma, 10 of osteo-radionecrosis. As per pathological diagnosis of malignancies, 74 SCCs, 2ACCs, 1 AC, 3MFH were diagnosed histo-pathologically. Male/Female ration of the above cases was 55 versus 36 and the age predilection was found to be 18-77 years (average 65.2years)

In the presentation, the presenter will demonstrate the technical details of the reconstructive approach employed and also touch upon the issues for further improvement in combined scapular osteocutaneous and latismus dorsi myocutaneous flap particularly making maximal use of the information, which was obtained from the long-term post-operative monitoring of the reconstruction results.

#### CONTEMPORARY MANDIBULAR RECONSTRUCTION

*Yoshiki Hamada<sup>1</sup>, Tsuyoshi Takato<sup>2</sup>, Tetsuro Yamashita<sup>3</sup>, Michihiro Ueda<sup>3</sup>*

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Mandibular reconstruction has to be discussed on various viewpoints, such as success rate of grafting, postoperative complications, functional recovery, reconstructed configuration influential to the facial contour and occlusal reconstruction, and morbidity of donor site. Although the mandibular reconstruction has been well established by using microsurgery, prostheses and biomaterials, we still have many challenges. In our symposium, we would like to present an aspect of contemporary mandibular reconstruction in Japan and a future vision of bone and cartilage regenerative medicine in the oral and maxillofacial area.

At first, the postoperative function and prognosis, technical details of the reconstructive approach, and the issues for further improvement of mandibular reconstruction using combined scapular osteocutaneous and latismus dorsi myocutaneous flap will be presented on the basis of clinical experience of 91 cases.

Then, we will introduce the procedure of mandibular reconstruction using a custom-made titanium (Ti) -mesh tray and particulate cancellous bone and marrow (PCBM) harvested from the iliac crest. A Ti-mesh tray is fabricated from a commercial Ti-mesh sheet by using a mandibular model designed from the preoperative 3D-CT and dental techniques. The greatest advantage of this reconstructive procedure is that we can precisely reproduce the designed mandible without intra-operative troublesome.

Finally, the present situation and future prospects of bone and cartilage regenerative medicine will be showed. We have tried to develop artificial bone that would maximize bone formation, but would be subsequently replaced by autologous bone. We have also developed a rapid prototyping technique, and the replication of complicated features, even in the maxillofacial area, has become feasible. In cartilage, we have developed tissue-engineered cartilage with a 3D structure and mechanical strength. Following a preclinical study confirming efficacy and safety, we have now started clinical research on implant-type tissue-engineered cartilage for patients with nasal deformity in cleft lip and palate.

## Korean Cleft Palate Craniofacial Association

### TREATMENT OF HEMIFACIAL MICROSOMIA & MICROTIA

#### TREATMENT OF HEMIFACIAL MICROSOMIA PATIENTS USING DISTRACTION OSTEOGENESIS TECHNIQUE : LONGITUDINAL FOLLOW UP STUDY.

*Dae Hyun Lew*

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The hemifacial microsomia is a congenital anomaly caused by the growth retardation of unilateral face, which symptoms involve mandible and maxilla and soft tissues including skin, muscle, subcutaneous tissue or facial nerve. The clinical symptoms and features appears to vary widely depending on its degrees. Not only the maxilla and mandible, but the complicated area such as skull, external ear, middle ear, buccal tissue and dental complex can be involved and patients, although different in degrees, usually show microtia and craniofacial asymmetry. The craniofacial asymmetry may appear as chin deviation to affected side from growth retardation of mandibular ramus and deviation of occlusal plane, or anterior-posterior asymmetry from growth restriction of soft tissue and masseter muscles. The rudimentary cause of this facial asymmetry is hypoplasia and abnormal shaping of mandible due to the abnormal condyle head which has the growth center of mandible. Distraction osteogenesis technique has been introduced for its resolution.

In 1992, the distraction technique in hemifacial microsomia was first applied to human by McCarthy<sup>3</sup>. In 1995, Molina and Monasterio reported a superior cosmetic result<sup>4</sup> in by attempting mandible distraction after lateral cortical osteotomy technique leaving medial cortex to induce bulging to the lateral side of mandible angle, and many successful clinical cases were reported thereafter. Now it is recognized as a general and standard treatment method for hemifacial microsomia patients.

However, for successful outcome, various factors must interactively be considered. Proper selection of distraction timing, selection of proper pin sites for the effective distraction vector, and post operative orthodontic therapy for descent of maxillary alveolar bone and stable occlusion, should be carefully considered. Moreover, there are a lot of factors to be overcome including unsatisfactory result from distraction to the unwanted direction, relapse after traction or recurrent craniofacial asymmetry from growth or lack of soft tissue.

We will introduce distraction protocol for hemifacial microsomia treatment which the authors have been using. And discuss about preoperative evaluation to derive a good outcome, timing of operation, operative planning and various kinds of osteotomy technique including L osteotomy and its indications. Also we will discuss postoperative management, proper amount of distraction to minimize relapse, and orthodontic treatment after surgery.

#### ORTHODONTIC MANAGEMENT FOR HEMIFACIAL MICROSOMIA PATIENTS PRE- & POST-DO

*Kwon Soon Man*

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HFM( Hemifacial Microsomia) is the congenital facial deformity affecting half of the face with growth deficiency resulting in facial asymmetry with varying range of severity. This deformity should be treated by the craniofacial team including surgeon and orthodontist. HFM used to be corrected definitely by orthognathic surgery after the end of growth conventionally until DO(Distraction Osteogenesis) has been introduced, which can be utilized in earlier ages. The orthodontist, as a member of craniofacial team for DO procedures, should involve in all stages of treatment including treatment planning, pre, intra, & post-DO, and follow-ups. In most HFM, all three dimensions( vertical, horizontal, transverse) demonstrate varying degrees of growth deficiency. As the severity increases, the ascending ramus is affected to a greater extent. It is therefore required to increase ramus vertically mostly. Orthodontic managements can also be divided with stages of DO procedures. For pre-DO stage, DOSA( DO stabilizing appliance), modified RPE and LLHA) has to be installed to guide the distal segment of the regenerate and to facilitate the vector control during distraction. Maxilla sometimes needs to be widened as the mandible moves to forward and contra-lateral side. During distraction, orthodontist evaluates the clinically observed vector with planned one because the vector observed may varies from its planned direction. As DO goes well, new malocclusion ranging from mild to severe starts to occur because the lengthening of ramus affects the mandibular occlusal plane lowering, resulting in posterior open bite. This also shifts mandibular body towards contra-lateral side, resulting in laterognathism. it is the post-DO stage for orthodontist needs to correct new malocclusion following good lengthening of ramus, consequently resulting in better facial balance. There are several ways to level the maxillary occlusal plane while holding mandibular occlusal plane applying bite block, functional appliance and selective leveling. In conclusion, active orthodontic management is necessary before, during and after DO for Hemifacial Microsomia patients. Co-operation between surgeon and orthodontist is crucial to perform DO procedures well enough to obtain and maintain better facial balance for HFM patients.

#### TWO JAW SURGERY FOR ASYMMETRY CORRECTION

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##### 1. Basic and Functional Anatomy.

Co-Cr discrepancy : Sometimes, HFM present abnormal TMJ and Co(centric Occlusion)-Cr(Centric relation) Discrepancy. Therefore Co-Cr discrepancy control is important for post-operative stability.

Soft tissue envelop – tension free : Soft tissue of affected site can produce tension to the jaw movement. Wide dissection and adequate release of peri-mandibular ligament and pedicles can permit passive jaw mobilization.

Treatment Strategy (STO) : Small and young looking face is preferred in East Asian Countries. Therefore Treatment Strategy is modified to reduction of normal side from elongation of affected side. It's opposite of Distraction Osteogenesis.

##### 2. Lab and Surgical Procedure :

Computer Based Simulation Surgery  
Model Surgery for Surgical Splint Making  
Surgical Procedure

- Preservation of Descending Palatine and Inferior alveolar neurovascular bundle
  - Control of condylar segment – condylar repositioning device, Lingual fracture technique Obwegeser II.
  - 3.Cases ( Unilateral and Bilateral HFM)
  - 4.Fine tuning for soft tissue asymmetry
- Fat manipulation (Liposuction and Fat graft) is useful for controlling of soft tissue asymmetry.

*Conclusion:* In conclusion, for the success facial asymmetry treatment using two jaw surgery, occlusal analysis, soft tissue envelop control, condylar segment reserving, tension free dissection and management of soft tissue asymmetry are important. In addition, for the treatment strategy, beauty concepts of each country must be understood.

### SOFT TISSUE ISSUES IN FACIAL ASYMMETRY CORRECTION

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It is known that symmetry is the important factor in our perception of beauty. Although the other facial harmony was obtained, we tend to perceive the object as a not perfect one unless the symmetry is given. According to the various reports, more than half of the general people are known to have a mild to moderate facial asymmetry. Actually, in terms of the mirror image, no one has a perfect symmetric face. In spite of this finding, most people are inclined not to notice their innate facial asymmetry. In addition to this, our perception of the facial asymmetry can vary according to the subjective conceptual traits.

Therefore, the restoration of the facial symmetry in various syndromic and non-syndromic patients including hemifacial microsomia, romberg's disease and developmental asymmetry using the orthognathic surgery would be the one of the major challenges so far because the complete restoration of the facial symmetry is not easy and our perception could be biased. Especially, given the fact that the orthognathic surgery is based on the concept of the correction of the soft tissue using the hard tissue correction, this issue can be more challenging. Although we undertook the perfect restoration of the facial skeletons, it would not be possible to restore the facial asymmetry in terms of the soft tissue correction unless we were not aware of the correlating ration between the hard and soft tissue changes. Moreover, because the some of facial asymmetry are accompanied by soft tissue asymmetry, plans for the soft tissue contouring using micro-fat graft and so on would be necessary based on their origins of the facial asymmetry.

This presentation will deal with these sorts of issues including the comparison between the hard and soft tissue landmark in orthognathic surgery and how to deal with correction of the soft tissue after the orthognathic surgery. More importantly, the overall strategies regarding the correction of the facial asymmetric problem using the skeletal and soft tissue surgery will be presented and discussed in order to get the best possible results.

### MICROTIA RECONSTRUCTION: VARIABLE COVERAGE METHODS FOR NEW FRAMEWORKS

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*Purpose:* The author presents his 21 year-experience of microtia reconstruction performed in a single team, and outlined his algorithm for coverage method for a variety of microtia.

*Methods:* The data for patients who underwent microtia reconstruction between 1991 and 2012 were reviewed retrospectively. One thousand and seven hundred microtia cases with presence of lobule-remnant, medum-remnant, or large-remnant were analyzed by focusing on framework coverage methods. The reconstructions were performed using a method that hinges on the following principles: 1. All disfigured remnant cartilages were removed; 2. A new framework was fabricated as one unit, using autogenous costal cartilage; 3. Remnant skin was maximally used in order to cover the new framework; 4. When additional skin coverage was needed, arterial skin or fascia flap were used.

*Results:* 1. For the lobule-remnant microtia cases, the expanded two-flap method or modified Nagata-type embedding method was used. 2. For the large-remnant microtia cases, coverage in one-stage erect position was preformed; four options were used. 3. For the medium-remnant microtia cases, coverage in two-stage erect position was performed; first, upper portion of framework was embedded, and secondly elevated. Z-plasty, propeller-type, helical, or mastoid arterial skin flap technique was used. 4. For unsuccessfully reconstructed cases or meatoplasty cases, tempoparietal fascia flap technique was used.

*Conclusion:* For the aesthetic reconstruction of variable type of microtia, individualized coverage method was used. This author provides algorithm for coverage method for new framework in various type of microtia.

### North American Skull Base Society

#### MANAGEMENT OF MALIGNANCY OF THE ANTERIOR SKULL BASE AND INFRATEMPORAL FOSSA

#### SUBCRANIAL APPROACH TO THE ANTERIOR CRANIAL BASE

*Lawrence Marentette*

*University of Michigan Department of Otolaryngology Head and Neck Surgery, US*

This presentation demonstrates the subcranial approach to the anterior skull base allowing access to the cranial and nasal cavity without retracting the brain. This also will allow, in selected cases, olfactory preservation.

**INTRACRANIAL CONSIDERATIONS FOR SINONASAL CANCER IN SKULL BASE SURGERY***Franco DeMonte**University of Texas M.D. Anderson Cancer Center Neurosurgery,  
Houston, Texas, United States*

Malignancy of the skull base is rare and few centers have the opportunity to amass much experience in the management of these complex patients. Over the course of 20 years at one of the nation's largest comprehensive cancer centers approximately 450 patients with malignancy affecting the skull base had surgery as part of the management of their disease. Data collected from this group of patients as well as from patients with sinonasal malignancy have been reviewed and several publications have ensued. This presentation summarizes those studies and identifies continued surgical limitations to optimal patient outcome. All patients operated upon by the author for malignancy involving the skull base were identified from the Neurosurgical departmental database. Similarly all patients with surgically treated sinonasal malignancies were identified from the Head and Neck departmental database and reviewed with express interest on tumor histology. Patient outcomes were analyzed by skullbase site, tumor histology, perineural, transdural, infratemporal and cavernous sinus extension, surgical technique, patient age, and the presence of metastatic disease. An evaluation of patient quality of life was also performed using both general and specific measures. Site specific patient 2year overall survival for the anterior, anterolateral and sphenoid sinus was 63%, 81% and 55% respectively. 5year overall survival based on tumor histology was 89% for olfactory neuroblastoma, 85% for low-grade sarcoma, 71% for adenoid cystic carcinoma, 66% for high-grade sarcoma and 38.7% for mucosal melanoma. 5year disease specific survival for purely endoscopic tumor resection was 86% compared to 92% for a cranio-endoscopic technique. Disease specific survival was not found to be significantly different between a group of young patients (mean age 56) and a group with a mean age of 70years. Well selected patients with perineural, transdural and infratemporal fossa extensions of malignancy all had 5year survivals of approximately 50%. Conversely patients with ICA and cavernous sinus extension had markedly reduced survival. The majority of patients with metastases to the skullbase were successfully palliated. Quality of life was not adversely affected when specific measures were used but was diminished in 30% when general measurement tools were utilized.