

## **ORAL SESSION 1: EVIDENCE BASED PRACTICE THROMBOPROPHYLAXIS IN ORAL AND MAXILLOFACIAL SURGERY. HOW LOW CAN YOU GO?**

*M. Gregory<sup>1</sup>, J. Hanratty<sup>2</sup>, B. Thomas<sup>3</sup>*

*<sup>1</sup>Altnagelvin Area Hospital, Oral & Maxillofacial Surgery, Newry, United Kingdom*

*<sup>2</sup>Ulster Hospital, Oral & Maxillofacial Surgery, Belfast, United Kingdom*

*<sup>3</sup>Altnagelvin Area Hospital, Oral & Maxillofacial Surgery, Londonderry, United Kingdom*

### Introduction

NICE guidelines advise that pharmacological venous thromboembolism (VTE) prophylaxis in the form of low molecular weight (LMW) heparin should be considered for all patients undergoing procedures with a total anaesthetic time above 1.5 hours.<sup>1</sup> Many hospital policies advise a dose of 40mg, although no specific dose is guided. Mechanical VTE prophylaxis is also advised in all such patients unless contraindicated.<sup>1</sup> We have experienced that the 40mg dose can increase the complication of intra and post-operative bleeding and post-operative haematomas, both important complications in head and neck surgery and that the lower dose of 20mg has no adverse effects.

### Aims

The primary goal of this study is to demonstrate that the lower (20mg) dose of LMW heparin is sufficient in head and neck surgery for thromboprophylaxis and that no adverse effects (PE, DVT) are demonstrated.

### Methods

A retrospective study of all case notes, theatre log-books and all GP attendance was undertaken on all patients undergoing maxillofacial procedures with a total anaesthetic time of 2 hours or greater starting April 2011 in Altnagelvin Hospital.

### Results

102 patients were included in the study, including Oncological (18), Trauma (9) and Facial Deformity (47). Surgical times ranged from 2–14 hours. All patients who received pharmacological VTE prophylaxis received 20mg (LMW heparin). There were no DVT or PE cases in those studied.

### Conclusion

This study demonstrates that using the lower (20mg) dose of LMW heparin is sufficient for VTE prophylaxis with no VTE events recorded

1. NICE Clinical Guideline 92. 2010, revised 2015. NICE

**ORAL SESSION 1: EVIDENCE BASED PRACTICE  
SOME ASPECTS OF APPLYING PERONEAL AUTOTRANSPLANTS FOR  
RECONSTRUCTING MID-FACE AREA**

*E. Verbo<sup>1</sup>, A. Kulakov<sup>1</sup>, S. Butsan<sup>1</sup>, O. Moskaleva<sup>1</sup>, K. Gileva<sup>1</sup>, M. Bolshakov<sup>1</sup>, T. Brayalovskaya<sup>1</sup>,  
M. Chernenkiy<sup>1</sup>*

*<sup>1</sup>Central Research Institute of Dental and Maxillofacial Surgery,  
Reconstructive Maxillofacial surgery, Moscow, Russia*

**Aim**

To improve functional and aesthetic results of treating patients having combined defects in midface area. Materials and methods: The authors analysed practice of treating 23 patients having combined defects in midface area. Special features of fibula flap application were: computer three-dimensional analysis of defects, studying structure of sensing osseous tissues and formation of counterforts for sound fixation.

**Method used**

Inverse planning of reconstructive operation. This comprises virtual modeling of final orthopedic result. Positioning of the bone part of the auto-transplant corresponds to the axis of the implants' position. The transplants' osteotomy was performed at an individually calculated angle taking into account the opposite side's symmetrisation. Cutting and assembling guides were made for that purpose.

**Results**

In 1 case the necrosis of the auto-transplant was observed while in 22 other cases there was complete autotransplant acceptance. Computer simulation of peroneal auto-transplants has made it possible to successfully eliminate various mid-face area defects: upper jaw, cheek bone, the lateral border of eyehole and the infra-orbital edge. Simulating the terminal parts of a peroneal bone based on the shape of the sensing fragment enabled the reliable fixing of auto-transplants. In 70 % of cases, more reliable fixation of extended flaps required the autotransplantation of some fragments of individually simulated parietal bone into the lost counterforts area.

**Conclusions**

Applying a peroneal bone and a subsequent auto-transplantation of parietal bone into the counterforts area make it possible to obtain guaranteed full-scale dento-alveolar rehabilitation. Applying contour correction and lipofilling provides good aesthetic results.

**ORAL SESSION 1: EVIDENCE BASED PRACTICE**  
**PREDICTIVE VALUE OF PANORAMIC RADIOGRAPHY FOR INJURY OF INFERIOR ALVEOLAR NERVE AFTER MANDIBULAR THIRD MOLAR SURGERY**

*N. Su<sup>1</sup>, A. van wijk<sup>1</sup>, E. Berkhout<sup>2</sup>, G. Sanderink<sup>2</sup>, J. De Lange<sup>3</sup>, H. Wang<sup>4</sup>, G.J.M.G. van der Heijden<sup>1</sup>*

*<sup>1</sup>Academic Centre for Dentistry Amsterdam, Department of Social Dentistry, Amsterdam, Netherlands*

*<sup>2</sup>Academic Centre for Dentistry Amsterdam, Department of Oral Radiology, Amsterdam, Netherlands*

*<sup>3</sup>Academic Medical Centre/Academic Centre for Dentistry Amsterdam, Department of Oral and Maxillofacial Surgery, Amsterdam, Netherlands*

*<sup>4</sup>West China Hospital of Stomatology, State Key Laboratory of Oral Disease, Chengdu, China*

**Aims:** To assess the added value of panoramic radiography in predicting (ruling in or out) postsurgical injury of inferior alveolar nerve (IAN) in the decision making prior to mandibular third molar surgery (MM3S).

**Methods:** MEDLINE and EMBASE were searched electronically to identify studies that had assessed the predictive value of 7 panoramic radiographic signs including root-related signs (darkening of root, deflected of root, dark and bifid apex of root) and canal-related signs (interruption of white line of canal, diversion of canal and narrowing of canal) for IAN injury after MM3S.

**Results:** A total of 8 studies were included for meta-analyses. The pooled sensitivity and specificity of the 7 signs ranged from 0.06 to 0.49 and 0.81 to 0.97, respectively. The area under the summary receiver-operator curve (sAUC) ranged from 0.42 to 0.89. The pooled positive predictive value (PPV) and negative predictive value (NPV) ranged from 7.5% to 26.6% and 2.3% to 4.0%, respectively. The added value (PPV minus prior probability) in ruling in IAN ranged from 3.4% to 22.2%. The added value in ruling out IAN (NPV minus prior probability) ranged from 0.1% to 2.2%.

**Conclusions:** For all 7 signs the NPV and added values are too low to consider them valid for ruling out postsurgical IAN in the decision making prior to MM3S. The PPV and added values for presence of the canal-related signs and darkening of root may be considered sufficient for ruling in the risk of postsurgical IAN injury in the decision making prior to MM3 surgery.

**ORAL SESSION 1: EVIDENCE BASED PRACTICE**  
**ORAL CAVITY CANCER FOLLOW-UP: PATTERN OF RECURRENCE**

*M. Brands<sup>1</sup>, L. Smeebens<sup>2</sup>, A. Verbeek<sup>3</sup>, T. Merckx<sup>1</sup>, S. Geurts<sup>3</sup>*

*<sup>1</sup>Radboudumc, Department of Oral and Maxillofacial surgery, Nijmegen, Netherlands*

*<sup>2</sup>Radboud University Nijmegen, Medical Student, Nijmegen, Netherlands*

*<sup>3</sup>Radboudumc, Department for Health Evidence, Nijmegen, Netherlands*

**Aims**

Routine follow-up after curative treatment of oral cancer (OC) for 5 years is common practice because second primaries and recurrences (i.e. second events) occur frequently. Current follow-up is not evidence based and the benefits are unclear. This is even more so for follow-up after a second event. To facilitate the development of a personalized follow-up program for OC, we investigated the timing of the second and subsequent events and aimed to define several risk groups related to the risk, timing and treatment intent of these events.

**Methods**

We retrospectively studied 594 patients treated for OC with curative intent in our unit in 2000-2012. Overall survival was calculated with the Kaplan Meier method. Risk of recurrence was calculated taking death as competing risk into account.

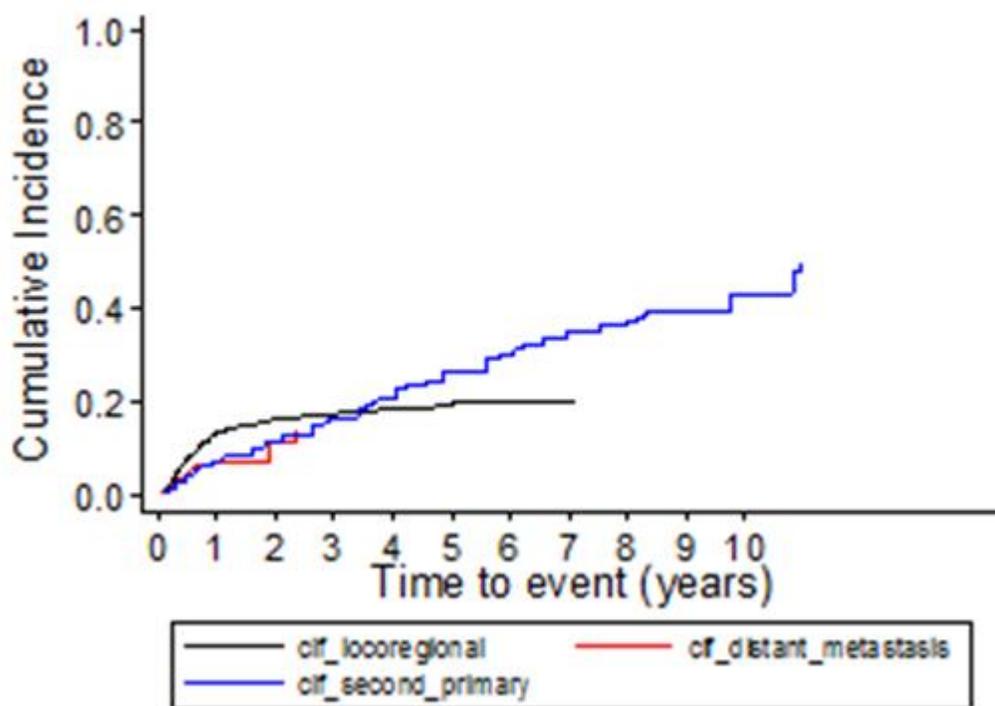
**Results**

The risk of recurrence was highest in the first year after treatment (i.e. 17%). All locoregional recurrences occurred within 1.5 years after primary treatment (fig. 1). The incidence of second primary tumors was constant over the years (fig.1). It was not possible to define clinically relevant high and low risk groups for a second event. These patterns were similar for the third event.

**Conclusions**

Our findings support a shorter follow-up time of 1.5 years after curative treatment for OC. Based on patterns of recurrence, a separate follow-up protocol after treatment of second events is not necessary.

Figure 1: cumulative incidence of locoregional recurrences, distant metastases and second primary tumors



**ORAL SESSION 1: EVIDENCE BASED PRACTICE  
TO COMPARE THE RECORDING OF TOBACCO HISTORY AND SMOKING CESSATION  
REFERRALS IN A PRIMARY CARE DENTAL PRACTICE (GDP) TO A SECONDARY CARE  
(MAXILLO-FACIAL UNIT)**

*L. Maybin<sup>1</sup>, D. Keshan<sup>2</sup>*

<sup>1</sup>*Bradford Teaching Hospital Trust- Maxillo-facial, Maxillo-facial, Bradford, United Kingdom*

<sup>2</sup>*Bradford Teaching Hospital Trust, Maxillo-facial, Bradford, United Kingdom*

**Introduction:** Studies confirm a referral to a smoking cessation clinic has a good outcome for quitting smoking. The evidence behind the success of brief intervention has shown that just three minutes of brief intervention has helped 2% of smokers stop smoking and is cost effective in the long term.

**Aim:** Identify tobacco/alcohol history record keeping. Identify the number of patients offered a SCR in primary vs secondary care.

**Gold standard:** 100% of clinician should offer a SCR.

**Methodology:** The audit compared GDPs and clinicians in secondary care. Retrospective data collection from March–April 2015, re-audited January-February 2016 and July-August 2016. The data recorded from 600 patients medical records included: the number of cigarettes smoked, years smoked, SCR offered and if the patient accepted or declined the referral. Additionally Alcohol units were recorded.

**Results:** There has been a significant improvement of 3%-53% in the SCR offered in secondary care. However primary care has remained at 54% of patients offered a SCR. The years recorded has improved in both settings from 8%-48%(GDP) 38%-67%(Maxillofacial). Results are displayed in table.

	First Audit Cycle		Second Audit Cycle	
	GDP	Maxillofacial	GDP	Maxillofacial
Amount recorded	97%	99%	100%	95%
Years recorded	8%	38%	48%	67%
SCR offered	54%	3%	54%	53%
Referral accepted by patient	31 out of 54	1 out of 3	7 out of 54	10 out of 53

**Conclusion:** Primary and secondary care are falling short of offering a SCR. The re-audit showed a significant improvement in the SCR offered in secondary care.

**Implementations:** Results presented. Posters displayed. Specialist training to all Maxillo-facial staff. Free oral cancer screens provided in GDP. New proforma data collection sheet for alcohol and tobacco history.

Acknowledgement: M.Gill BDS contributed to the first audit.

**ORAL SESSION 1: EVIDENCE BASED PRACTICE**  
**IS A COMPUTER-ASSISTED DESIGN AND COMPUTER-ASSISTED MANUFACTURING**  
**METHOD FOR MANDIBULAR RECONSTRUCTION ECONOMICALLY VIABLE?**

*S. Battaglia<sup>1</sup>, A. Tarsitano<sup>2</sup>, S. Crimi<sup>3</sup>, R. Cipriani<sup>4</sup>, F. Contedini<sup>4</sup>, C. Marchetti<sup>2</sup>*

*<sup>1</sup>University of Parma-Bologna-Ferrara, Head and Neck, Bologna, Italy*

*<sup>2</sup>University of Bologna, Department of Biomedical and Neuromotor Science, Bologna, Italy*

*<sup>3</sup>University of Messina, Maxillofacial Surgery, Messina, Italy*

*<sup>4</sup>S. Orsola Hospital, Head and Neck, Bologna, Italy*

**Aim:** Computer-aided design/computer-aided manufacturing (CAD-CAM) has created many new opportunities for the planning and implementation of mandibular reconstruction. Although this surgical method is being more widely used, the question of the additional cost has to be discussed. To evaluate the cost generated by the management of this technology, we studied a cohort of patients treated for mandibular neoplasms. **Methods:** The population was divided into two groups of 20 patients each who were undergoing a 'traditional' freehand mandibular reconstruction or a CAD-CAM mandibular reconstruction. Data concerning operation time, complications, and days of hospitalisation were used to evaluate costs related to the management of these patients.

**Results:** The mean operating time for the CAD-CAM group was 435 min, whereas that for the freehand group was 550.5 min. The total difference in terms of average time gain was 115.5 min. No microvascular complication occurred in the CAD-CAM group; two complications (10%) were observed in patients undergoing freehand reconstructions. The mean overall lengths of hospital stay were 13.8 days for the CAD-CAM group and 17 days for the freehand group. Finally, considering that the institutional cost per min of theatre time is € 30, the money saved as a result of the time gained was € 3,450. This cost corresponds approximately to the total price of the CAD-CAM surgery.

**Conclusion:** We believe that CAD-CAM technology for mandibular reconstruction will become a diffuse reconstructive method and that its cost will be covered by gains in terms of surgical time, quality of reconstruction, and reduced complications.

**ORAL SESSION 1: EVIDENCE BASED PRACTICE  
ANTIBIOTICS IN CONJUNCTION WITH ORTHOGNATHIC SURGERY –A COMPLEX  
SYSTEMATIC REVIEW**

*A. Klinge<sup>1</sup>, A. Naimi-Akbar<sup>2</sup>, S. Tranæus<sup>3</sup>, M. Hultin<sup>4</sup>, B. Klinge<sup>5</sup>, B. Lund<sup>6</sup>*

*<sup>1</sup>Faculty of Odontology - Malmö University,*

*Department of Oral and Maxillofacial Surgery and Oral Medicine, Malmö, Sweden*

*<sup>2</sup>Karolinska University Hospital, Department of Oral and Maxillofacial Surgery, Stockholm, Sweden*

*<sup>3</sup>Health Technology Assessment-Odontology HTA-O- Malmö University- Malmö,*

*Department of Dental Medicine- Karolinska Institutet, Stockholm, Sweden*

*<sup>4</sup>Faculty of Odontology- Karolinska Institutet, Department of Periodontology-, Stockholm, Sweden*

*<sup>5</sup>Faculty of Odontology- Malmö University, Department of Periodontology, Malmö, Sweden*

*<sup>6</sup>Karolinska University Hospital, Department of Oral and Maxillofacial Surgery, Huddinge, Sweden*

**Aim**

The aim of this study was to assess scientific literature investigating the efficacy of prophylactic antibiotics in conjunction with orthognathic surgery, by using the recommended methods for evaluating systematic reviews and complex systematic reviews.

**Methods**

A systematic search in the following databases was performed: Medline (OVID), The Cochrane Library (Wiley), EMBASE, PubMed and Health Technology Assessment (HTA), including a complementary hand search. GRADE and AMSTAR was used, respectively, to evaluate the scientific quality of the selected systematic reviews and primary studies.

**Preliminary results**

The literature search resulted in 372 papers, including 43 systematic reviews and 329 primary studies, of which six systematic reviews and 13 primary studies were included for full text evaluation. The quality assessment of the systematic reviews identified two studies with moderate risk of bias and four studies with high risk of bias. None of the retrieved systematic reviews were found to be of low risk of bias. A common shortcoming was inclusion of primary studies, with high risk of bias, in the meta-analysis. No systematic review comparing the use of antibiotics versus no antibiotics were found performed. Statistical significant benefits of antibiotic use (prophylactic, perioperative or postoperative) could not be identified.

**Conclusions**

Our preliminary analysis reveals no data supporting the use or no use of antibiotics in conjunction with orthognathic surgery in healthy subjects.

**Table 1.** Parameters of interest regarding eligible studies.

Study Population, Intervention, Control group and Outcome measures (PICO).

<b>P</b>	<b>Patients subjected to orthognathic surgery</b>
<b>I</b>	Antibiotics on day of surgery i.e. short-termed prophylaxis Antibiotics more than day of surgery i.e. "extended" prophylaxis Head-to-head comparison of different antibiotic compounds or regiments
<b>C</b>	No antibiotic treatment Placebo Other non-antibiotic treatment e.g. such as antibacterial rinsing Other/comparing antibiotic treatment (alternative compound) Same compound, different dose/duration
<b>O</b>	Infection (primary) Quality of life (primary) Pain (primary) Mortality (primary) Osteosynthesis removal Sensory deficiency Patient reported out-come Relapse Length of hospital stay Length of sick leave Health economy Ethical aspects

**ORAL SESSION 1: EVIDENCE BASED PRACTICE  
STRUCTURED WARD ROUND: OUR EXPERIENCE**

*R. Boyapati<sup>1</sup>, M. Kumar<sup>2</sup>*

*<sup>1</sup>Aberdeen Royal Infirmary, Department of Surgery, Aberdeen, United Kingdom*

*<sup>2</sup>Aberdeen Royal Infirmary, Department of General Surgery, Aberdeen, United Kingdom*

Closed loop Audit's aim: To identify the weaknesses in the daily ward round structure and design the best template for the structured ward round to comply with the Royal College of Physicians/Surgeons guidelines. (ward round entry should contain 1. Triple identification of patient 2. Lead ward round person's name and designation 3. Important parameters).

Evaluation of the data pre and post intervention analyses the importance of effective summarisation of the ward round in the notes.

Materials and Methods: 100 case notes were reviewed post ward round on 3 consecutive days of which one is a weekend (Initial Audit). Potential deficiencies were identified and a template in the form of a 4cm/6 cm sticky label was designed and clinicians were advised to tick all the boxes which has the important parameters to see whether this intervention has delivered effective documentation of the ward round summary. Re Audit was carried out after one month after the education of medical and nursing team in the QI meetings.

Results: Initial Audit: Only 70% of patients had the triple identification, 80% had the ward round lead's name and only 65% had the important parameters in the case notes without the use of template. Re audit with the template and education improved the documentation: 95% of patients had triple identification, 90% had the ward round lead's name and 80% had important parameters written.

Conclusion: There was 25% improvement in documentation of triple identification, 20% improvement in the documentation of ward round lead and 15% improvement in documentation of important parameters.

**ORAL SESSION 1: EVIDENCE BASED PRACTICE  
ANALYSIS OF ZYGOMATIC MAJOR MUSCLE OF HEALTHY VOLUNTEERS AND FACIAL  
PALSY PATIENTS IN 3 TESLA MRI STUDY.**

*A. Algrin<sup>1</sup>, T.T. Dao<sup>2</sup>, M.C. Ho Ba Tho<sup>2</sup>, J.M. Constans<sup>3</sup>, S. Testelin<sup>1</sup>, N. Lavagen<sup>1</sup>,  
B. Devauchelle<sup>1</sup>, S. Dakpe<sup>1</sup>*

*<sup>1</sup>CHU Amiens Sud, Department of Maxillofacial Surgery, Amiens, France*

*<sup>2</sup>Université Technologique de Compiègne Sorbonne Universités,  
Université Technologique de Compiègne Sorbonne Universités, Compiègne, France*

*<sup>3</sup>CHU Amiens Sud, Department of Radiology, Amiens, France*

Despite of few morphometric measurement data on mimic facial muscles provided by anatomical, radiological on 3D studies

The aim of this study is to obtain morphometrical measures of the zygomatic major muscle: volume, length, thickness. We achieve a prospective study in healthy volunteers and facial palsy patients.

MRI acquisitions are performed in 3 Tesla MRI Achieva Philips® with axial T1 sequence at rest. Manual segmentation and three-dimensional reconstruction are performed using the Simpleware Scan IP software. According to geometric patterns, morphometric properties of the zygomatic major muscle are characterized.

We compared the morphometrics patterns in healthy population with facial palsy patients.

This study is the first described method allowing to obtain three-dimensional morphometric measures of the zygomatic major muscle thanks to MRI.

**ORAL SESSION 2: MATERIALS**  
**OSTEOSYNTHESIS WITH DEGRADABLE PLATES AND SCREWS OF A MAGNESIUM ALLOY**  
**IN A PORCINE CRANIOOSTEOPLASTY MODEL**

*H. Naujokat<sup>1</sup>, Y. Açil<sup>1</sup>, M. Rohnen<sup>1</sup>, H. Wieker<sup>1</sup>, J. Wiltfang<sup>1</sup>*

*<sup>1</sup>University Hospital Schleswig-Holstein, Oral- and Maxillofacial Surgery, Kiel, Germany*

**AIMS**

Osteosynthesis with titanium alloys is the standard of care today. In many cases a secondary procedure for removal is performed. Research on materials focuses on magnesium alloys as a degradable alternative. This material provides suitable stability and biocompatibility, but gas release is an adverse effect. The aim of this study was to evaluate bone healing and degradation of osteosynthesis material of a magnesium alloy in vivo.

**METHODS**

In 9 minipigs osteotomy of the frontal sinus (1.5 x 3 cm) was done bilaterally. The replaced bone was fixed with osteosynthesis of titanium and magnesium alloy, respectively. Bone healing, formation of emphysema and degradation of the osteosynthesis material was monitored by using computed tomography. After 10, 20 and 30 weeks the frontal bone was harvested from three pigs at a time and evaluated by micro-CT and fluorescence microscopy.

**RESULTS**

Bone healing was completed after six to nine weeks and was not influenced by the magnesium alloy. Formation of emphysema with a medium volume of 0.1 cm<sup>3</sup> and some bone surface resorption were detected adjacent to the magnesium plates and screws. These side effects did not cause loosening or healing complications. Degradation of the material amounts approximately 40% after 30 weeks.

**CONCLUSIONS**

Degradable magnesium alloys are a promising approach to osteosynthesis in cranio-maxillofacial surgery. The relevance of the gas pocket on wound healing is not clear yet. Further development should address a more delicate design and reducing gas formation.

## **ORAL SESSION 2: MATERIALS**

### **SURFACE DELIVERY OF TUNEABLE DOSES OF BONE MORPHOGENETIC PROTEIN 2 FROM AN ADAPTABLE POLYMERIC SCAFFOLD INDUCES VOLUMETRIC BONE REGENERATION: EXPERIMENTAL STUDY ON RATS**

*G. Bettega<sup>1</sup>, M. Bouyer<sup>2</sup>, R. Guillot<sup>3</sup>, J. Lavaud<sup>4</sup>, C. Plettinx<sup>3</sup>, C. Olivier<sup>5</sup>, V. Curry<sup>6</sup>, J. Boutonnat<sup>6</sup>, J.L. Coll<sup>4</sup>, F. Peyrin<sup>5</sup>, J. Véronique<sup>4</sup>, C. Picart<sup>3</sup>*

*<sup>1</sup>Centre Hospitalier Annecy Genevois, Maxillofacial Surgery Department, Epagny Metz-Tessy, France*

*<sup>2</sup>Grenoble University Hospital, Plastic and Maxillofacial Surgery Department, Grenoble, France*

*<sup>3</sup>Grenoble Alpes University, Grenoble Institute of Technology, Grenoble, France*

*<sup>4</sup>Albert Bonniot Institute, INSERM U823- ERL CNRS3148, Grenoble, France*

*<sup>5</sup>ESRF, The European Synchrotron- CS 40220, Grenoble, France*

*<sup>6</sup>Joseph Fourier University, Unité médico-technique d'Histologie Cytologie expérimentale, La Tronche, France*

**Aims:** to prove that a polyelectrolytes film as BMP-2 surface carrier, deposited on a PLGA tube, was able to regenerate a critical size bone defect on femur of rats using low dose of BMP-2  
**Methods:** 6 mm critical-size femoral defects were created on 56 rats, 6 were used as control, the other 50 were divided in 10 groups according to BMP-2 concentration (5, 2, 50 and 100µg/ml) and according to the cross-linking of the film (10, 30 and 70 mg/ml 1-ethyl-3-(3-dimethylaminopropyl) carbodiimide (EDC)). Assessment of bone formation was made by X-ray (every 15 days until 8 weeks), µCT at 8 weeks, and histology after explantation at 8 weeks.  
**Results:** we show that the repair of bone defects was dependent on the amount of BMP-2 released by the polyelectrolytes film coating. Depending on the BMP-2 dose, a range of responses, from no effect to rapid bone repair in 1 to 2 weeks, can be achieved, including complete defect bridging without haematomas and the formation of vascularised and mineralised bone tissue. Histological staining and high-resolution computed tomography revealed the presence of bone regeneration inside and around the tube with spatially distinct organization for trabecular-like and cortical-like bone. The best condition for bone regeneration was BMP-50 EDC-30. High BMP-2 dose (BMP 100) induced haematomas in 75%of cases.  
**Conclusion:** this efficient way to trigger a fast volumetric bone regeneration via the surface of an implant opens perspectives for applications of these coatings for personalized medicine.

## **ORAL SESSION 2: MATERIALS**

### **IN VIVO DEGRADATION OF A NEW CONCEPT OF MAGNESIUM-BASED RIVET-SCREWS IN THE MINIPIG MANDIBULAR BONE**

*B. Schaller<sup>1</sup>, N. Saulacic<sup>1</sup>, S. Beck<sup>2</sup>, T. Imwinkelried<sup>3</sup>, P.L. Soong<sup>4</sup>, W. Hofstetter<sup>5</sup>, T. Iizuka<sup>1</sup>*

*<sup>1</sup>Inselspital, Department of Cranio- Maxillofacial Surgery, Bern, Switzerland*

*<sup>2</sup>Synthes GmbH, Research and Development, Oberdorf, Switzerland*

*<sup>3</sup>RMS Foundation, Research and Development, Bettlach, Switzerland*

*<sup>4</sup>National Dental Centre Singapore, Department of Oral and Maxillofacial Surgery, Singapore, Singapore*

*<sup>5</sup>University of Berne, Department of Clinical Research, Bern, Switzerland*

**Aims:** Self-tapping of magnesium screws in hard bone may be a challenge due to the limited torsional strength of magnesium alloys. To avoid screw failure upon implantation, the new concept of a rivet-screw was applied to a WE43 magnesium alloy. The *in vivo* degradation of the magnesium implants and the performance of the used coating were studied in a human standard-sized animal model.

**Methods:** Hollow cylinders with threads on the outside were expanded inside drill holes of minipig mandibles. During the expansion with a hexagonal mandrel, the threads engaged the surrounding bone and the inside of the screw transformed into a hexagonal screw drive. Four magnesium alloy rivet-screws were implanted in each mandible of 12 minipigs. Six animals received the plasmaelectrolytically coated magnesium alloy implants; another six received the uncoated magnesium alloy rivet-screws. Two further animals received one titanium rivet-screw each as control. *In vivo* radiologic examination was performed at one, four, and eight weeks. Euthanasia was performed for one group of seven animals (3 animals with coated, 3 with uncoated magnesium alloy implants and 1 with titanium implant) at 12 weeks and for the remaining seven animals at 24 weeks. After euthanasia, micro-computed tomography and histological examination were performed.

**Results:** Significantly less void formation as well as higher bone volume density and bone-implant contact area were measured around the coated implants compared to the uncoated ones. The surface coating was effective in delaying degradation.

**Conclusions:** Our results showed potential for further development of magnesium hollow coated screws for bone fixation.

## **ORAL SESSION 2: MATERIALS**

### **IN VITRO ASSESSMENT OF A NOVEL SURFACE MODIFIED MAGNESIUM ALLOY FOR THE DEVELOPMENT OF RESORBABLE OSTEOSYNTHESIS MATERIALS**

*R. Smeets<sup>1</sup>, O. Jung<sup>1</sup>, D. Porchetta<sup>2</sup>, A. Kopp<sup>2</sup>, C. Ptock<sup>2</sup>, U. Müller<sup>3</sup>, M. Heiland<sup>1</sup>, A. Gröbe<sup>1</sup>, M. Schwade<sup>4</sup>, L. Kluwe<sup>1</sup>, P. Hartjen<sup>1</sup>, H. Hanken<sup>1</sup>*

*<sup>1</sup>University Medical Center Hamburg-Eppendorf, Department of Oral and Maxillofacial Surgery, Hamburg, Germany*

*<sup>2</sup>Meotec GmbH & Co. KG, Meotec GmbH & Co. KG, Aachen, Germany*

*<sup>3</sup>BMP, Laboratory for Medical Materials Testing, Aachen, Germany*

*<sup>4</sup>RWTH Aachen University, Laboratory for Machine Tools and Production Engineering WZL, Aachen, Germany*

**Background:** We aim to develop fully degradable magnesium implants with bone-like mechanical properties as an osteosynthesis material. The magnesium implants are treated by plasma electrolytic oxidation (PEO) resulting in a ceramic layer that slows down the corrosion-rate for optimal degradation kinetics and provides a microstructured surface that promotes cellular attachment.

**Methods:** EDM-cut material specimens with 12 different ceramic surfaces resulting from plasma electrolytic oxidation using different electrolyte-compositions were generated and analyzed. Scanning electron microscopy was used to characterize the physical surface properties. The degradation kinetics were assessed electrochemically with potentiodynamic polarization measurements and by measuring the evolution of hydrogen gas under conditions that mimic the in vivo situation. The in vitro cytotoxicity was determined by performing direct live-dead staining assays as well as extract analyses that included XTT-, BrdU- und LDH-assays with L929-cells. Statistically significant differences were determined by ANOVA.

**Results and conclusion:** PEO-treated material specimens showed significantly decreased corrosion rates and promising degradation profiles. Several surface variants resulting from PEO-treatment with phosphoric acid based electrolytes showed excellent in vitro biocompatibility and supported firm cellular attachment of L929 cells. In a next step, the overall concept and the promising material characteristics of the best identified surface variant in vivo will be validated to develop an osteosynthesis plate and screw.

## **ORAL SESSION 2: MATERIALS**

### **“BONELESS” RECONSTRUCTION OF COMPLEX MANDIBULAR DEFECTS WITH PATIENT-SPECIFIC TITANIUM REPLICAS: RESULTS OF A FEASIBILITY TRIAL**

*A. Bedogni<sup>1</sup>, G. Saia<sup>2</sup>, G. Bettin<sup>2</sup>, A. Sandi<sup>3</sup>, L. De Leonardi<sup>2</sup>, F. Apollon<sup>2</sup>, G. Ferronato<sup>2</sup>*

*<sup>1</sup>University, Neurosciences-DNS, Padova, Italy*

*<sup>2</sup>University of Padova, Neurosciences-DNS, Padova, Italy*

*<sup>3</sup>Sintac S.r.l., Biomedical Engineering, Trento, Italy*

**Aims:** to assess the safety of patient-specific titanium replicas of the mandible for segmental bone reconstruction.

**Methods:** Patients eligible for the study had failure of standard reconstruction plates previously implanted or segmental mandibular bone defects that could not be reconstructed with standard techniques. Customized mandibular implants resembling the natural shape of native jaw were virtually manufactured starting from a 3-D template based on CT scans. Mandible replicas were designed according to the patient's individual anatomical bone profile/conditions. Cutting guides were designed to improve implant fitting. Patients were followed-up prospectively at 3-month intervals up to 1 year. Primary outcome was the safety profile of the device. Secondary outcomes were a) the functional and esthetic result as compared with standard techniques and b) the impact of the procedure on patient's quality of life. Local ethical committee approved the study.

**Results:** between March 2012–July 2015, 12 consecutive patients (mean age 70 years), underwent reconstruction with mandible replicas. MRONJ was the most common diagnosis. Free-flap soft-tissue coverage of the device was required in 3 cases. One patient died 4 days postoperatively. Oral feeding was always resumed after surgery (range 1-14 days). All patients maintained stable occlusion. Extrusion of the device occurred in 3 cases, two of which had to be removed. No radiological signs of dislocation/fracture of the device were detected.

**Conclusion:** though further research is warranted to assess the efficacy of the proposed technology, customized mandible prostheses is likely to become a reasonable reconstructive option under complex anatomical conditions.

## **ORAL SESSION 2: MATERIALS**

### **CRANIOMAXILLOFACIAL CAD/CAM PATIENT SPECIFIC IMPLANTS BASED ON CONE BEAM TOMOGRAPHY DERIVED DATA - A FEASIBILITY STUDY**

*O. Thiele<sup>1</sup>, D. Rothamel<sup>2</sup>, M. Kreppe<sup>2</sup>, J. Zöller<sup>2</sup>, R. Mischkowski<sup>1</sup>*

*<sup>1</sup>Klinikum Ludwigshafen, Dep. of Oral- Maxillofacial & Facial Plastic Surgery, Ludwigshafen, Germany*

*<sup>2</sup>University Hospital Cologne, Dep. of Craniomaxillofacial and Plastic Surgery, Cologne, Germany*

The implication of CAD/CAM based, 3-dimensional patient specific implants (e.g. mandibular reconstruction plates or individually prefabricated meshes for orbital reconstruction) as a routine procedure into everyday's clinical practise is maybe one of the most important developments in maxillofacial surgery in the last years.

So far, the planning of these individual implants was usually based on conventional computer tomography scans. We present a series of 21 patients whose individual implants for primary or secondary reconstruction (n=24 implants) were exclusively based on cone beam tomography scans. We can show (in a feasibility study approach) that in all patients the planned implants could be used and the fitting was excellent. The individual implants were used in the whole area of our field, as mandibular reconstruction plates combined with microvascular reconstruction, for midface and maxillary reconstruction, for secondary reconstruction of the orbital region and for forehead reconstruction.

We discuss the advantages and some avoidable pitfalls using this series of individual implants. We can show that the maxillofacial surgeon could use the cone beam tomography to directly gather the data required for complex individual CAD/CAM patient specific implants. That could save time in the planning procedures and reduces the dosage of radiation for the patients.

## **ORAL SESSION 2: MATERIALS**

### **FIXATION OF UPPER AND MIDDLE THIRD FRACTURES WITH RESORBABLE PLATES IN ADULTS**

*V. Battista<sup>1</sup>, A. Bardazzi<sup>1</sup>, F. Ruscitti<sup>1</sup>, A. Barbaggio<sup>1</sup>, A. Puccio<sup>1</sup>, M. Rampinelli<sup>1</sup>, F. Terranova<sup>1</sup>, A. Cassisi<sup>1</sup>*

*<sup>1</sup>Azienda Ospedaliera Papa Giovanni XXIII, Maxillofacial Surgery, Bergamo, Italy*

**Aim:** To assess the reliability of resorbable materials in the treatment of upper and middle third facial fractures in adult patients.

**Methods:** From January 2013 to January 2015, 24 patients with upper and middle third facial fractures were treated at Papa Giovanni XXIII Hospital in Bergamo with resorbable plates and pins (Martin Sonic Weld system). 18 males and 6 females with an average age of 57. Minimum follow-up time was 1 year. Alongside regular clinical assessments, all patients had a postoperative CT scan repeated 6 months after surgery to assess the stability of the reduction.

**Results:** a satisfactory reduction and fixation were achieved in all patients. In 3 patients a temporary swelling was documented at the level of the fracture 9 to 10 months after the operation. Antibiotics were prescribed in 2 patients with resolution in 4 weeks. The third patient required a surgical exploration and removal of fibrotic tissue over the healed fracture at the level of the zygomatic-frontal suture. In three cases of frontal bone fracture partial resorption of the bone at the level of the resorbed plate were documented on the 12 months post-op CT scan.

**Conclusions:** resorbable materials are reliable in surgical treatment of middle third facial fractures in adult patients. In the treatment of upper third fractures, in particular the anterior wall of the frontal sinus a partial resorption of the bone can occur. The authors recommend selecting suitable patients for absorbable materials by avoiding use in smokers and those with metabolic deficiencies.

## **ORAL SESSION 2: MATERIALS**

### **OUTCOME IN PATIENT-SPECIFIC CRANIOPLASTY: A TWO-CENTER COHORT STUDY OF 40 IMPLANTS OF PEEK**

*S. van de Vijfeijken<sup>1</sup>, J. Jonkergouw<sup>2</sup>, E. Nout<sup>3</sup>, T. Theys<sup>4</sup>, E. van de Castele<sup>5</sup>, H. Folkersma<sup>6</sup>, P. de Pauw<sup>7</sup>, A. Becking<sup>8</sup>*

*<sup>1</sup>Academic Medical Center, Oral and Maxillofacial Surgery, Amsterdam, Netherlands*

*<sup>2</sup>St. Elisabeth hospital, Department of Oral and Maxillofacial Surgery Tilburg, Tilburg, Netherlands*

*<sup>3</sup>St. Elisabeth Hospital, Department of Oral and Maxillofacial Surgery, Tilburg, Netherlands*

*<sup>4</sup>University Hospital Leuven, Department of Neurosurgery, Leuven, Belgium*

*<sup>5</sup>University of Antwerpen, iMinds-Vision Lab- Department of Physics, Antwerpen, Belgium*

*<sup>6</sup>Academic Center Amsterdam, Neurosurgical Center Amsterdam, Amsterdam, Netherlands*

*<sup>7</sup>St. Elisabeth Hospital, Department of Neurosurgery, Tilburg, Netherlands*

*<sup>8</sup>Academic Medical Center, Department of Oral and Maxillofacial Surgery, Amsterdam, Netherlands*

#### **AIM**

The best material for cranioplasty following craniectomy is long-term subject to discussion. Complication rates after cranioplasty tend to be high (10-40%)<sup>1</sup>. Computer-assisted 3-dimensional modeling of polyetheretherketone (PEEK) has been introduced for cranial reconstruction.

The aim of this study is to evaluate patient- and surgery-related characteristics and risk factors that predispose patients to cranioplasty complications.

#### **METHODS**

This retrospective study includes a total of 40 consecutive cranial PEEK implants in 38 patients, performed at two centers in the Netherlands from 2011 to 2014. Complications were systematically registered and patient and surgery related data were carefully analysed.

#### **RESULTS**

The overall complication rate of PEEK cranioplasty was 28%. Complications included infection (13 %), postoperative hematoma (10 %), cerebrospinal fluid leak (2.5 %) and wound-related problems (2.5 %). All postoperative infections (n=5) required removal of the implant. Nonetheless 3 of the removed implants could be successfully re-used after re-sterilization.

#### **CONCLUSION**

Outcomes after PEEK cranioplasty were consistent with recent literature<sup>2</sup> reports on cranial vault reconstruction. PEEK has good properties for cranial reconstruction due to its strength, imaging characteristics, esthetic outcomes and its possibility to re-sterilize and re-use after removal.

1. Routine but risky: a multi-centre analysis of the outcomes of cranioplasty in the Northeast of England. Coulter IC, Pesic-Smith JD, Cato-Addison WB, Khan SA, Thompson D, Jenkins AJ, Strachan RD, Mukerji N. *Acta Neurochir*, 2014 Jul

2. Patient-specific polyetheretherketone implants for repair of craniofacial defects. Rammos CK, Cayci C, Castro-Garcia JA, Feiz-Erfan I, Lettieri SC. *J Craniofac Surg*. 2015

## **ORAL SESSION 2: MATERIALS**

### **CRANIOFACIAL POLYETHERETHERKETONE (PEEK): A 'PEEK' THROUGH THE VERSATILITY OF ITS APPLICATIONS**

*L. Vassiliou<sup>1</sup>, C. Huppa<sup>1</sup>, R.P. Bentley<sup>1</sup>*

*<sup>1</sup>King's College Hospital London, Oral & Maxillofacial Surgery, London, United Kingdom*

#### **Introduction**

Craniofacial defects carry significant functional and aesthetic consequences. The complex skeletal morphology of the region renders its reconstruction particularly challenging. The recent advances in computer-aided design, biomaterial sciences and 3-dimensional (3D) printing, offer new methods in the reconstructive armamentarium. Amongst the most prevailing alloplastic materials, polyetheretherketone (PEEK) shows excellent biocompatibility and mechanical properties.

#### **Aims**

This case series aims to demonstrate the versatility of PEEK in the reconstruction of the craniofacial skeleton.

#### **Methodology and results**

We report 10 cases treated with custom-made PEEK craniofacial implants in the two-year period from 2014 to 2015. The indications included developmental or acquired skeletal facial asymmetry (hemi-mandibular hypertrophy, delayed midfacial trauma) and cranial vault reconstruction following ablative surgery (sphenoid wing meningioma) or decompressive craniectomy (traumatic brain injury). The PROPLAN CMF and 3-matic software (Materialise) were used for the implant design. We describe the virtual planning protocol, the implant fabrication and the surgical outcomes. There were no reported complications. In the cases of facial asymmetry the PEEK implants successfully restored a balanced facial contour. In the cases of joint neurosurgical-craniofacial ablation, PEEK implants offered an excellent solution for immediate cranial reconstruction, providing cerebral protection with biomechanical durability along with an aesthetic result.

#### **Conclusions**

The recent developments in computer-aided design software and 3D printing have allowed biomaterial fabrication in complex anatomical configurations suitable for reconstructing the craniofacial region. Our experience with PEEK demonstrates that this multiform and versatile material is suitable for fabrication of personalized implants for a wide spectrum of facial and skull defects.

**ORAL SESSION 3: SKIN SURGERY**  
**CUTANEOUS ROSAI-DORFMAN DISEASE OF THE FACE. A COMPREHENSIVE**  
**LITERATURE REVIEW AND CASE REPORT**

*T. Al-khateeb*<sup>1</sup>

<sup>1</sup>*Jordan University of Science and technology, Oral and Maxillofacial Surgery, Irbid, Jordan*

**Purpose:** To characterize C-RDD of the face through a literature review of published case reports of this lesion; a new case is also reported.

**Methods:** An English language search through 3 databases was conducted looking for cases of C-RDD, that has been published since 1969. Repeated citations of the same article were omitted. Cases of C-RDD with sole facial involvement, or mixed facial and other skin parts involvement, were included and analyzed. Details of C-RDD cases (demographic feature, regional distribution, clinical presentation, treatment and follow-up course) of each patient were methodically reviewed and collected and analyzed on Excel spreadsheets.

**Results:** 578 published cases of C-RDD affecting any skin area were found, of these 65 (11.2%) cases had facial skin involvement. The male: female ratio was 1: 1.5, and the average age was 43.5 ( $\pm 12.4$  SD) years. The racial distribution of facial C-RDD was as follows: Asians (74.5%), Caucasians (20%) and Blacks (5.5%). The most commonly affected facial skin regions were the cheeks and the periorbital area, and most of the lesions were multiple in number and bilaterally distributed. The vast majority of facial C-RDD lesions presented as asymptomatic, nonulcerative, red nodulo-plaques with durations ranging from one month to few years. Many methods have been tried for treatment. However, the combined cure rate for all treatment methods was only 28.6%. Surgical excision was the most effective, and corticosteroids were the least effective.

**Conclusion:** We have tried to characterize facial C-RDD lesions for an easier management of these lesions by maxillofacial surgeons

**ORAL SESSION 3: SKIN SURGERY**  
**RECONSTRUCTIVE MODALITY ACCORDING TO AESTHETIC CONSIDERATION OF**  
**SUBUNITS OF THE CHEEK AFTER WIDE EXCISION OF SKIN CANCER**

*I. Suh<sup>1</sup>, H.S. Jeong<sup>1</sup>, J. Kim<sup>1</sup>*

*<sup>1</sup>Hallym University, Dept. of Plastic and Reconstructive Surgery, Seoul, Republic of Korea*

Background: Defects of the cheek present a reconstructive challenge because of the visibility of the site, as well as the limited local tissue supply. In addition, the cheek abuts several structures with expressive function, such as the eye, mouth, and surrounding facial musculature. This report describes a system of classifying cheek defects according to tumor size and location and present corresponding reconstruction techniques used to accomplish three-dimensional restoration of all missing components and adequate texture matching.

Methods: From 2008 to 2013, 227 patients with cheek defects resulting from skin cancer excision were treated. According to the size of the defect, location on the cheek, and relationships to adjacent structures and existing skin tension lines, different surgical methods were applied.

Results: The procedures used for cheek reconstruction included direct closure, Limberg flap, V-Y advancement flap, slide-swing flap, cheek rotation flap, and full-thickness skin graft. All flaps healed well without major complications, and no cancer recurrence was detected during follow-up.

Conclusions: The anatomic classification of skin cancers and surgical protocols described in this report is simple and appropriate for reconstruction involving the cheek. Wide excision of skin cancer and appropriate, relatively easy-to-perform flaps based on this classification system can successfully produce safe and aesthetically-pleasing surgical outcomes.

### **ORAL SESSION 3: SKIN SURGERY**

#### **TREATMENT OF LARGE AND GIANT MELANOCYTIC NEVI OF MAXILLOFACIAL AREA IN CHILDREN**

*A. Baindurashvili<sup>1</sup>, J. Stepanova<sup>1</sup>, A. Usoltseva<sup>1</sup>*

*<sup>1</sup>The Turner Scientific and Research Institute for Children's Orthopedics, Maxillofacial Surgery, Saint-Petersburg, Russia*

Congenital melanocytic nevus is a benign pigmented tumor composed of nevus cells, which clinically are manifested at birth or appear during the first weeks after birth. The incidence is approximately 1 in 20,000 newborns. Anatomical and physiological features of the maxillofacial area create a number of problems in the selection of surgical tactics. Errors in the treatment and its complications can lead to deterioration of the aesthetic and functional results.

In the period from 2010 to 2014 in the department of oral and maxillofacial surgery we operated 40 children aged from 1 to 18 years old with congenital large and giant nevi of MFA. 68 surgical interventions. Among them 16 patients had a single operation carried out, in 24 patients from two to four surgeries.

The choice of method of plastic surgery is different and depends on the size and location of the defect. We have used different types of surgery: local plastic, expander dermotension and transplantation of free skin grafts. Early surgical treatment led to the rehabilitation of children up to seven years and reduced the risk of malignancy. In 39 patients, we obtained good consistent results, in 1 patient - a satisfactory result.

Optimal surgical treatment starts from the second year of life. In the treatment of giant nevi of maxillofacial area with the injury of several zones, a combination of all three methods of surgical treatment should be recommended.

### **ORAL SESSION 3: SKIN SURGERY**

#### **BILATERAL MANDIBULAR SQUAMOUS CELL CARCINOMA IN A 8 YEAR CHILD LEADS TO DIAGNOSIS OF XERODERMA PIGMENTOSUM – CLINICAL MANIFESTATION AND SURGICAL THERAPY**

*A. Mueller<sup>1</sup>, M. Kreuz<sup>1</sup>, A. Kaempfen<sup>2</sup>, D. Schaefer<sup>2</sup>, J. Beinemann<sup>1</sup>, H.F. Zeilhofer<sup>1</sup>, C. Jaquier<sup>1</sup>, C. Kunz<sup>1</sup>*

*<sup>1</sup>University Hospital Basel, Cranio-Maxillofacial Surgery, Basel, Switzerland*

*<sup>2</sup>University Hospital Basel, Plastic- Reconstructive and Aesthetic Surgery, Basel, Switzerland*

#### **Aims**

Although primary squamous cell carcinoma (SCC) lesions of the tongue in Xeroderma pigmentosum patients are known, the manifestation of a mandibular infiltrating SCC has, to our knowledge, not yet been documented.

#### **Methods**

In the early medical history there was crying as a baby, when exposed to sun light. Later he avoided sunlight and he suffered from itchiness and pain. At 5 year of age he developed pigmentation irregularities and finally multiple crusts and a progressive hard swelling in the chin region at 8 year.

We performed a two-staged surgical procedure. First, the mandibula was resected from angle to angle including the adjacent skin lesion in the chin area, which was presumably the site of tumour initiation. A bilateral supraomohyoid neck dissection was performed and the resected volume has been replaced with titan spacer. Six weeks later, after histologic proof of complete tumour resection (pT4a, pN0(0/54)), the patient underwent defect reconstruction with two microvascular osseo-cutaneous fibular transplants. Both fibula had one osteotomy and the L-shaped transplants overlapped in the chin region, to achieve correct chin projection.

#### **Results**

The healing process was uneventful. Intraorally granulation over the fibula periost lead to a neo-formation of floor of the mouth. Oral intake of liquid and mashed food was possible 2 weeks after reconstruction.

#### **Conclusions**

Pain and itchiness are the first clinical signs of Xeroderma pigmentosum and precede skin alterations. Early diagnosis is critical to avoid inapparent, deep tumour progress. Extensive curative surgery is the sole therapeutic option, since irradiation is not applicable.

### **ORAL SESSION 3: SKIN SURGERY**

#### **MERKEL CELL CARCINOMA OF THE HEAD AND NECK: OUR EXPERIENCE AND REVIEW OF THE LITERATURE**

*B. Patiño-Seijas<sup>1</sup>, R. Luaces Rey<sup>1</sup>, J. Collado López<sup>1</sup>, V. Chávez Bonilla<sup>2</sup>, J.L. López-Cedrún Cembranos<sup>3</sup>*

*<sup>1</sup>Staff. University Hospital of A Coruña., Oral and Maxillofacial Surgery, A Coruña, Spain*

*<sup>2</sup>Resident. University Hospital of A Coruña., Oral and Maxillofacial Surgery, A Coruña, Spain*

*<sup>3</sup>Chief. University Hospital of A Coruña., Oral and Maxillofacial Surgery, A Coruña, Spain*

#### Introduction

Merkel cell carcinoma (MCC) is a rare form of skin cancer of neuroendocrine origin that has been described as the most aggressive cutaneous malignancy. MCC has a high propensity for nodal metastases and local recurrence: in 20% to 60% of patients, lymph nodes are positive at presentation. Locoregional spread increases to 55% to 79% during the course of the disease. Distant metastases appear in 70%. MCC occurs most commonly in the elderly, in areas of the body that are exposed to the sun, with 50% occurring in the head and neck region.

#### Materials and methods

Sixteen cases of MCC of the head and neck treated at our center (CHUAC Hospital, A Coruña, Spain), from 1997 through 2015 were reviewed. The histopathological examination was made using immunohistochemistry in all the cases.

#### Results

The anatomical location was eyelid (5 patients), scalp (1), auricle (3) and the rest of facial skin in the other 7 cases. The mean age range was 75 years. 9 patients (56.25%) died until now, 6 of them due to MCC and 3 due to other causes. Five of the six patients died due to MCC presented positive lymph nodes at diagnosis, three of them also with distant metastases. The other one had distant metastases without regional spread. None of the survivors had regional or distant metastases (all of them presented stage I disease).

#### Conclusions

Regional metastases are the worse prognosis variables in MCC, even in MCCs located in the eyelid. An aggressive surgical approach is mandatory when dealing with non-metastatic MCCs.

### **ORAL SESSION 3: SKIN SURGERY**

#### **INTRA-OPERATIVE DEEP MARGIN INSPECTION IS AN ACCURATE WAY OF DETECTING POSSIBLE TUMOUR INVOLVEMENT, AND GUIDES FURTHER RESECTION TO IMPROVE CLEARANCE RATES IN NON-MELANOMA SKIN CANCER**

*C. Newlands<sup>1</sup>, N. Axiotis<sup>1</sup>*

*<sup>1</sup>Royal Surrey County Hospital, Oral and Maxillofacial Surgery, Guildford, United Kingdom*

#### **Introduction:**

Incomplete tumour clearance, particularly at the deep margin, is an important risk factor for recurrence following surgical excision of skin cancer. Surgeons may opt to take a separate cuff of deep tissue to ensure marginal control. This is an intra-operative technique which relies on the clinical acumen and experience of the surgeon.

**Aim:** To analyse the accuracy of intra-operative judgement and investigate whether removal of extra deep tissue can improve the rate of complete excision.

**Method:** Retrospective analysis of two groups of 100 NMSC patients: The 'control group' without a separate deep margin (as these resections were clinically judged to be clear at the time of resection) vs the 'study group' where a separate deep margin was taken at the time of resection, as the margin was felt to be close or involved.

**Results:** Control group: 81% (n=81) patients had clear deep margins, 17% (n=17) had close margins and 2% (n=2) had involved deep margins.

Study group 42% (n=42) patients had clear deep margins, 43% (n=43) had close deep margins and 15% (n=15) had involved deep margins. The clearance gained by a further deep margin resection resulted in complete excision in 100% (n=58) of this group.

**Conclusion:** The results demonstrate that in a significant proportion of cases, intra-operative suspicion of deep margin involvement can predict for histological positive or close deep margins. In these cases, resection of a further deep margin significantly improves tumour clearance rates.

### **ORAL SESSION 3: SKIN SURGERY**

#### **HEAD AND NECK MERKEL CELL CARCINOMA: A 12-YEAR EXPERIENCE FROM A TERTIARY CANCER CENTRE AND WHAT ORAL AND MAXILLOFACIAL SURGEONS NEED TO KNOW**

*I. Papadiochos<sup>1</sup>, A. Patrikidou<sup>2</sup>, A. Patsatsi<sup>3</sup>, N. Kechagias<sup>4</sup>, G. Koloutsos<sup>5</sup>, I. Boukovinas<sup>6</sup>, D. Mangoudi<sup>7</sup>, H. Thuau<sup>8</sup>, K. Vahtsevanos<sup>9</sup>*

*<sup>1</sup>Theageneion Cancer Hospital, Oral and Maxillofacial Surgery, Spata- Athens, Greece*

*<sup>2</sup>Royal Marsden NHS Foundation Trust and the Institute of Cancer Research, Academic Uro-Oncology Unit, London, United Kingdom*

*<sup>3</sup>Papageorgiou General Hospital, 2nd Dermatology Department, Thessaloniki, Greece*

*<sup>4</sup>Agios Loukas Hospital, Oral and Maxillofacial Surgery, Thessaloniki, Greece*

*<sup>5</sup>Private Practice, Oral and Maxillofacial Surgery, Thessaloniki, Greece*

*<sup>6</sup>Bioclinic Thessaloniki, Oncology Unit, Thessaloniki, Greece*

*<sup>7</sup>Theageneion Cancer Hospital, Oral and Maxillofacial, Thessaloniki, Greece*

*<sup>8</sup>The Princess Grace Hospital, Oral and Maxillofacial Surgery, London, United Kingdom*

*<sup>9</sup>Faculty of Dentistry, Oral and Maxillofacial Surgery, Thessaloniki, Greece*

**Aims:** Merkel cell carcinoma (MCC) is a rare non-melanoma cutaneous malignancy characterized by high metastatic and mortality rates. More than half of MCCs occur in the head and neck region. The aim of this study was to present our experience in management of primary head and neck MCCs (HN-MCCs) over a 12-year period. Also, this study aimed to review the literature, with special focus on publications derived from Oral and Maxillofacial (OMF) surgeons.

**Materials and Methods:** We retrospectively screened the clinical database of our hospital. Inclusion criteria for analysis were patients managed in OMF Surgery Department for a primary HN-MCC. A systematic search on PubMed for HN-MCC management was also conducted to retrieve articles whose first author was an OMF surgeon and/or are derived from OMF Surgery Departments.

**Results:** Six patients were identified. Patients were managed between January 1, 2001 and July 1, 2013. The mean age at initial presentation was 71.17 years. Median follow-up time for the study was 26.5 months (mean 49.0, range 4–157). Recurrence-free survival, disease-specific survival, and overall survival were 50%, 75%, and 50%, respectively. Despite the high risk of occult regional metastases in case of clinically localized disease, observation policy for regional lymph nodes has been commonly followed by OMF surgeons.

**Conclusions:** Cervical nodal staging is of paramount importance before establishing the definite treatment plan. Since the majority of MCCs arise in the head and neck region, OMF surgeons may be the first professionals who encounter this disease, and should therefore be aware of the current diagnostic and treatment modalities.

**ORAL SESSION 3: SKIN SURGERY**

**THE USE OF THE DRUG REFNOT® (A-TUMOR NECROSIS FACTOR-THYMOSIN-A1 IN PATIENTS WITH DISSEMINATED SKIN MELANOMA**

*I. Reshetov<sup>1</sup>, A. Abramov<sup>1</sup>, E. Kirpa-Ivanova<sup>2</sup>*

*<sup>1</sup>I Sechenov First Moscow State Medical University, Oncology and Plastic surgery, Moscow, Russia*

*<sup>2</sup>Moscow Oncological Research Institute, Outpatient Dept, Moscow, Russia*

One of the promising directions in the treatment of DSM is the inclusion of TNF- $\alpha$  in the traditional treatment regimen. TNF can cause damage to blood vessels in tumors, which plays an important role in its antitumor effect. The paper presents the results of research of influence of Refnot in combination with chemotherapy on immune parameters in patients with disseminated skin melanoma (DSM) at different stages of treatment. Also, patients were analysed for mutations in the genes p53, Braf, Nras, CDKN2A, and Tert made on paraffin blocks to evaluate criteria the effectiveness of drugs, associated with TNF, which are a Braf inhibitors. The results of the determination of the main indicators of immunity in 11 patients before treatment, after treatment with Refnot and before the second course of immune chemotherapy showed that there was a tendency to normalization of some indices of immunoreactivity of patients: the number of CD3+, CD3+CD8+ and CD8+CD28+t-cells. the number of EK-cells (CD3—CD16+CD56+) before the second course of immune chemotherapy decreased after a small rise almost to the control level. Also we marked upward trend in cytotoxic activity of these cells. The results of the study confirmed the ability of Refnot to have a positive impact on key indicators of antitumor immunity in skin melanoma patients with late disease stages.

#### **ORAL SESSION 4: MRONJ**

#### **A NEW TISSUE PROTECTIVE MESH TECHNIQUE IN MANDIBULAR SURGERY FOR PATIENTS WITH MEDICATION-RELATED OSTEONECROSIS OF THE JAW**

S. Hoefert<sup>1</sup>

<sup>1</sup>*University Hospital, Oral and Maxillofacial Surgery, Tuebingen, Germany*

Treatment of mandibles with stage 3 medication-related osteonecrosis (MRONJ) remains challenging. Destruction and infection with severe extraoral fistula deter total resection and bridging with titanium plates. The surrounding tissues are at constant risk of plate perforation. Though reconstruction with microvascular bone flaps has been widely discussed, most patients are limited by their oncologic disease or general disease condition.

We would like to present a titanium mesh (TPM) fixed to the reconstruction plate in order to avoid perforation of the soft tissues. Two MRONJ patients, one with frontal resection and a second with lateral mandible resection have been treated with this technique. One patient with breast cancer developed painful therapy-resistant MRONJ after zoledronate and denosumab treatment. After complete resection she had no pain. The second patient with prostate cancer and zoledronate had severe extraoral purulent discharge. Surgery was necessary after pathological fracture of the jaw. Both patients refused microvascular reconstruction. The follow up times were 17 and 6 months after surgery, respectively. Both patients were healed with no signs of exposed or probeable bone in the follow up. One patient was even able to leave his wheelchair due to resolved infection. The mesh demonstrated adaptation to tissue forces and good tissue contouring. We recommend this technique for patients where bone tissue flaps are inadequate or those who need a longterm interim post mandibular resection.

#### **ORAL SESSION 4: MRONJ**

#### **LOCAL IMMUNE DYSFUNCTION IN BISPHOSPHONATE-RELATED OSTEONECROSIS OF THE JAW (BRONJ); A REAL-TIME MONOCYTIC THP-1 CELL ASSAY MODEL**

*S. Hoefert<sup>1</sup>, C. Sade Hoefert<sup>1</sup>, A. Munz<sup>1</sup>, A. Yuan<sup>1</sup>, M. Grimm<sup>1</sup>, S. Reinert<sup>1</sup>*

*<sup>1</sup>University Hospital, Oral and Maxillofacial Surgery, Tuebingen, Germany*

BRONJ is serious side effect of bisphosphonate therapy. Various aetiologic models have been discussed, with a recent focus on local immune dysfunction. We investigated this idea by analysing THP-1 cells in a real-time monocytic/macrophage in vitro assay (xCELLigence DP System).

THP-1 cells were exposed to zoledronate, ibandronate, alendronate and clodronate in low and high concentrations. Cell differentiation and survival were analysed in real-time with E-plates and confirmed with Live/Dead staining. Migration was performed with CIM-plates and confirmed by histological staining. Data were analysed for inflexion time points of maximum adherence, start of cell death, and reduced migration.

THP-1 cells differentiated to macrophagic cells with all bisphosphonates. High concentrations of clodronate (500  $\mu$ M), zoledronate (50 $\mu$ M), and alendronate (50 $\mu$ M) demonstrated significant early cell death after 45 to 61 hours in contrast to control (99 hours). Histologic and Live/Dead staining confirmed the observed curves at distinct time points. Migration was also significantly inhibited after 47 to 70 hours (high concentrations) in contrast to control (132 hours). Low and high concentrations of clodronate showed mostly no significant prolonged migration.

Our results underline the idea of local immune dysfunction induced by inhibited macrophage function. Due to inadequate immune function, disturbed healing of BRONJ sites and invasion by bacteria after trauma could possibly contribute to BRONJ aetiology.

#### **ORAL SESSION 4: MRONJ**

#### **MAGNETIC RESONANCE IMAGING FINDINGS IN MEDICATION RELATED OSTEONECROSIS OF THE JAW (MRONJ) AT 3 TESLA**

*A.T. Assaf<sup>1</sup>, J. Sedlacik<sup>2</sup>, R.E. Friedrich<sup>1</sup>, M. Schönfeld<sup>2</sup>, A. Gröbe<sup>1</sup>, J. Fiehler<sup>2</sup>, M. Heiland<sup>1</sup>, R. Smeets<sup>1</sup>, S. Siemonsen<sup>2</sup>*

*<sup>1</sup>University Medical Center Hamburg Eppendorf- Hamburg- Germany,  
Department of Oral and Maxillofacial Surgery, Hamburg, Germany*

*<sup>2</sup>University Medical Center Hamburg Eppendorf- Hamburg- Germany,  
Department of Neuroradiological Diagnostics and Intervention, Hamburg, Germany*

**Background:** MRI offers a radiation-free imaging technique providing excellent soft tissue contrast. For the evaluation of extent and severity of MRONJ, distinction between necrotic bone areas, concomitant reaction of adjacent bone structures and soft tissue is mandatory.

**Purpose:** To evaluate the spectrum and clarity of 3T-MR imaging findings in patients with MRONJ.

**Methods:** 15 patients with MRONJ received a 3T-MRI including high resolution T1w, fsT2w and fsT1wCE images after gadolinium administration. Panoramic reconstructions of all three sequences were performed offline. MRI scans were evaluated by two experienced radiologists. In case of differing results a consensus rating was reached.

**Results:** 15 patients displayed a total of 20 findings of MRONJ. 12 displayed osteonecrosis of the mandible (4R,8L), 6 patients in the maxilla (3R,4L). Typical homogenous hypointensity in T1w and corresponding hyperintensity in fsT2w scans was observed in all cases. 9 cases displayed focal cortical disruption. In 10 cases, osteonecrosis was accompanied by focal and in 8 cases by severe involvement of the adjacent soft tissue. Further findings were lymphadenopathy (n=5), and sinusitis (n=5). Involvement of the adjacent pterygoid muscle was associated with more severe involvement of the adjacent soft tissue and osteonecrosis of the maxilla in all cases.

**Conclusion:** 3T-MRI provides valuable, distinct information not only on the extent of osteonecrosis and surrounding osseous reaction, but also on the severity of involvement of adjacent soft tissue. Areas of focal cortical disruption and necrotic areas, as well as sequestrars can be distinguished in most cases. In addition, proximity and involvement of the inferior alveolar nerve can be evaluated in detail.

**ORAL SESSION 4: MRONJ  
CELL CULTURAL INVESTIGATIONS INTO THE PATHOGENESIS OF MEDICATION-RELATED OSTEONECROSIS OF THE JAWS**

*S. Otto<sup>1</sup>, R. Fliefel<sup>1</sup>, M. Troeltzsch<sup>1</sup>, O. Ristow<sup>2</sup>, C. Pautke<sup>1</sup>, M. Ehrenfeld<sup>1</sup>*

*<sup>1</sup>Ludwig-Maximilians-University, Department of Oral and Maxillofacial Surgery, Munich, Germany*

*<sup>2</sup>University of Heidelberg, Department of Oral and Maxillofacial Surgery, Heidelberg, Germany*

**Background**

The pathogenesis of medication-related osteonecrosis of the jaws remains speculative. Different theories hypothesized about remodelling suppression, inhibition of angiogenesis and immune-modulating effects

Recently, theories dealing with a potentially infectious cause of MRONJ development have gathered more attention.

Therefore, the main aim of this study was to evaluate the role of an infectious ph milieu on the pathogenesis of MRONJ.

**Methods**

Standard cell culture conditions were used and ph was set at 7.4 and 6.7. Human mesenchymal stem cells (hMSCs) and human osteoblasts (HOBs) were used as cell source. Cell activity was measured using WST assay. Cell motility was monitored using scratch wound assays. All experiments were performed in duplicates.

**Results**

Increasing concentrations of nitrogen-containing bisphosphonates in solution lead to decreased cell survival ( $p < 0.01$ ) and cell activity ( $p < 0.01$ ) as well impairment of cell motility whereas non-nitrogen containing bisphosphonates did not show these effects. The cell inhibitory effects were even more pronounced in acidic milieus.

**Discussion**

The release and activation of nitrogen-containing bisphosphonates in infectious milieus could be an important etiological factor for the development of MRONJ. Furthermore, infectious conditions could be the link between bisphosphonate and denosumab related osteonecrosis of the jaws. Understanding the underlying mechanisms leading to MRONJ may help to optimize the strategies for prevention and Treatment of MRONJ.

#### **ORAL SESSION 4: MRONJ**

#### **SURGICAL TREATMENT OUTCOME OF 141 CONSECUTIVE PATIENTS WITH MEDICATION RELATED OSTEONECROSIS OF THE JAWS FROM THE COPENHAGEN ONJ COHORT**

*M. Schiodt<sup>1</sup>, C. Ottesen<sup>1</sup>, H. Dalsten<sup>1</sup>, P. Oturay<sup>1</sup>, M. Kofod<sup>1</sup>*

*<sup>1</sup>University hospital of Copenhagen, Department of Oral & Maxillofacial Surgery, Copenhagen Ø, Denmark*

#### **Aims:**

To present outcome of surgical treatment of Medication Related Osteonecrosis of the Jaws.

#### **Methods:**

All patients (n=204) enrolled into the Copenhagen ONJ Cohort from Jan. 2010-March 2016 were included. Patients not wanting or not complying with an operation were treated conservatively (n=63). The remaining 141 patients were operated. All patients (n=204) were assessed systematically with history, findings, imaging, jaw pain (VAS scale) and ONJ-stage at enrollment, and each following visit.

The operation patients were treated with antiresorptives for cancer (n=83) or osteoporosis (n=58) with a mean duration of 41 months (range 3-240).

Surgical procedures included superficial sequestrectomy (n=27), block resection (n=106) and continuity resection (n=8). Indication for operation type was dependent on symptoms and ONJ-stage. Differences in mean VAS score between initial/preoperative and last examination were assessed using T-test. Distribution of ONJ stages initial/pre- and postoperatively/last examination by Chi<sup>2</sup>-test.

#### **Results:**

Preoperative ONJ-stages were 26 stage-1, 70 stage-2, and 45 stage-3. Distribution of procedures included 27 superficial sequestrectomies, 106 block resections, and 8 continuity resections. Mean pain score decreased from 4.5 preoperatively to 0.1 at last examination (P<0.001). The non-operated patients had a mean VAS of 2.8 initially and 1.8 at last examination (P<0.01).

At last examination 130 (93%) of the 141 operated patients were cured, whereas only 11 (17%) of the 63 non-operated were cured at last examination (P<0.001). Further, 99% of the operated patients became free of symptoms, in contrast to 48% of the non-operated patients (P<0.001).

#### **Conclusion:**

Surgical treatment is effective in reducing pain and curing ONJ-patients.

## **ORAL SESSION 4: MRONJ**

### **BISPHOSPHONATE-ASSOCIATED NECROSIS OF THE MANDIBLE: COMPUTER ASSISTED ASSESSMENT OF PATHOLOGICAL SKELETAL CHANGES**

*B.I. Berg<sup>1</sup>, K. Göran<sup>2</sup>, C. Kober<sup>3</sup>*

*<sup>1</sup>University Hospital, Cranio- Maxillofacial Surgery, Basel, Switzerland*

*<sup>2</sup>The Sahlgrenska Academy, Oral & Maxillofacial Surgery, Gothenburg, Sweden*

*<sup>3</sup>HAW Hamburg, HAW Hamburg, Hamburg, Germany*

#### Aims

Bisphosphonate-associated pathological changes in mandibular bone due to oncologic treatment are a serious burden. Clear display of the progression of the disease is still a challenge in clinical diagnosis. Therefore, a detailed research project focused on CT-/CBCT-based visualization of necrotic changes was initiated.

#### Methods

To start with, all available CT-/CBCT data of the patient are registered on a suitable reference. After several refined image processing and programming steps, the data are subjected to slice oriented direct volume rendering with various (mostly logarithmic) transfer functions specially designed for the respective purpose.

For bisphosphonate-associated necrosis, besides destructive skeletal changes, severe sclerosing processes within trabecular structure are reported. Destructive processes correspond to decreased Hounsfield values whereas sclerosis is indicated by increasing ones. For this purpose, we refer to visualization based on an "inverted temperature color scale". As kind of control, visualization based on healthy subjects can be considered. Additionally, we compare the affected and the non-affected (or less affected) mandibular side.

#### Results

For healthy controls, the new method provides a clear and uniform appearance of the alveolar ridge. However, for pathological cases, serious changes in trabecular bone are ipsilaterally reported. Considering several follow-up CT data, progression of the described changes over the whole mandible was observed.

#### Conclusion

Recent achievements for computer assisted visualization for necrotic changes in mandibular bone are presented. Besides diagnostic significance, this research is aimed at diagnosis efficiency. The new visualization methods help the surgeon to examine the pathological changes at one glance.

#### **ORAL SESSION 4: MRONJ**

#### **EVALUATION OF PREVENTIVE EFFECT OF PHOSPHODIESTRASE INHIBITOR PENTOXIFYLLINE AGAINST MEDICATION-RELATED OSTEONECROSIS OF THE JAW: AN ANIMAL STUDY**

*G.M. Yalçın-Ülker<sup>1</sup>, A. Cumbu<sup>2</sup>, G. Duygu-Çapar<sup>3</sup>, Ü. Uslu<sup>2</sup>, K. Şençift<sup>4</sup>*

*<sup>1</sup>Okan University Faculty of Dentistry, Oral and Maxillofacial Surgery, Istanbul, Turkey*

*<sup>2</sup>Yeditepe University Faculty of Medicine, Histology and Embryology Department, İstanbul, Turkey*

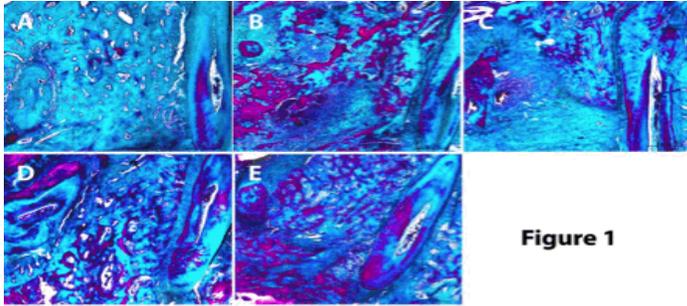
*<sup>3</sup>Trakya University Faculty of Dentistry, Oral and Maxillofacial Surgery, Edirne, Turkey*

*<sup>4</sup>Private Practice, Oral and Maxillofacial Surgery, İstanbul, Turkey*

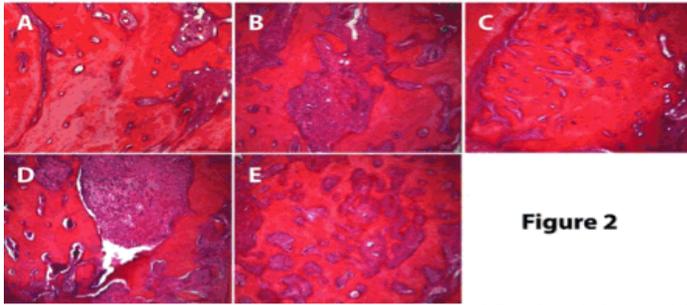
The aim of this experimental study is to investigate the prophylactic effect of Pentoxifylline (PTX) on medication-related osteonecrosis of the jaw (MRONJ).

Female Sprague-Dawley rats (n=33) received zoledronic acid (ZA) for 8 weeks to create osteonecrosis model. The left mandibular second molar teeth were extracted and the recovery period lasted 8 weeks before sacrifice. PTX was intraperitoneally administered to prevent MRONJ. The specimens were histopathologically and histomorphometrically evaluated.

Histomorphometrically (Figure1), between control group and group ZA there was no statistically significant difference in total bone volume ( $p=0.999$ ); but statistically significant difference in bone fraction in the extraction sockets ( $p<0.001$ ). Comparison of bone fraction of ZA group with ZA/PTX group (PTX administered after extraction) has showed no statistically significant difference ( $p=0.69$ ); but statistically significant difference with ZA/PTX/PTX group (PTX administered before and after extraction) ( $p=0.008$ ). Histopathologically (Figure2), between control and ZA(B) groups, there were statistically significant difference for inflammation ( $p=0.013$ ), vascularization ( $p=0.022$ ), bleeding ( $p=0.025$ ) and regeneration ( $p=0.008$ ). Between ZA and ZA/PTX groups, there were no statistically significant difference for inflammation ( $p=0.536$ ), vascularization ( $p=0.642$ ), bleeding ( $p=0.765$ ) and regeneration ( $p=0.127$ ). Between ZA and ZA/PTX/PTX groups, there were statistically significant difference for inflammation ( $p=0.017$ ), vascularization ( $p=0.04$ ), bleeding ( $p=0.044$ ) and regeneration ( $p=0.04$ ).



**Figure 1**



**Figure 2**

Histomorphometric evaluation of Masson's Trichrome stained tissue samples in Figure 1. Photomicrographs demonstrated of experimental groups stained with Hematoxyline Eosine in Figure 2. Groups: Control (A), Zoledronic Acid injected (B), Pentoxifylline injected (C), Zoledronic Acid and Pentoxifylline injected (after extraction) (D), Zoledronic Acid and Pentoxifylline injected (before and after extraction) (E) groups. The scale bar for Figure 1 and Figure 2 is 400  $\mu$ m and 200  $\mu$ m, respectively.

In this experimental model for MRONJ, it might be concluded that although PTX, given after tooth extraction, improves new bone formation that positively affects bone healing, but it is not therapeutic. However, PTX, given before tooth extraction is both prophylactic and therapeutic. In conclusion, PTX might affect healing in a positive way via optimizing inflammatory response.

**ORAL SESSION 4: MRONJ  
OSTEOMYELITIS OF THE SKULL BONES OF DRUG ADDICTED PATIENTS. CASE REPORT**

*I. Brodetskyj<sup>1</sup>*

*<sup>1</sup>National Medical University, Oral & Maxillo-Facial, Kiev, Ukraine*

**Introduction**

The problem of drug addiction in Ukraine and the prevalence of related diseases (HIV - infection, hepatitis B/C, tuberculosis) remains valid. Among all purulent-inflammatory diseases osteomyelitis of the jaws, in particular, causes the spread of infection to the bones of the skull basis and the developing of purulent sepsis complications (brain abscess, meningitis, sepsis).

**Objective**

To study the clinical case of osteomyelitis of the skull bones of drug addicted patients.

**Materials and methods**

Patient Shulga B., 43 years old, was operated twice - for the first time in maxillo-facial department - the sequestrectomy of the upper jaw, left zygomatic bone. During the next 4 years the patient had admitted to the hospital for three times with exacerbation of osteomyelitis of the basis bone wing. At the second time – in neurosurgical department - the sequestrectomy of the sphenoid bone. Before the surgery the patient underwent 10 days course of antibiotic therapy (Meronem intravenous) in order to drain brain abscess. He was prescribed a course of antibiotic therapy, detoxication and immunocorrective therapy in both cases.

**The results**

Osteomyelitis of the skull bones in case of drug addicted patients can be accompanied by the development of septic complication such as brain abscess. The surgical treatment of patients with bone lesions of the skull basis and bones of the face requires the collaboration of specialists - maxillo-facial surgeon and a neurosurgeon.

#### **ORAL SESSION 4: MRONJ**

#### **IS VITAMIN D DEFICIENCY ASSOCIATED WITH OSTEONECROSIS OF THE JAWS IN CANCER PATIENTS? A MATCHED CASE-CONTROL STUDY**

*G. Bettini<sup>1</sup>, S. Valisena<sup>2</sup>, G. Bedogni<sup>3</sup>, M. Sagron<sup>1</sup>, F. Apolloni<sup>1</sup>, L. De Leonardis<sup>1</sup>, G. Ferronato<sup>1</sup>, A. Bedogni<sup>4</sup>*

*<sup>1</sup>University Hospital of Padova, Department of Neurosciences – DNS- Unit of Maxillofacial Surgery, Padova, Italy*

*<sup>2</sup>Regional Hospital of Bellinzona and Valli, Service of Surgery and Traumatology, Bellinzona, Switzerland*

*<sup>3</sup>Liver Research Centre, Clinical Epidemiology Unit, Basovizza Trieste, Italy*

*<sup>4</sup>University Hospital of Padova, Neurosciences-DNS- Unit of Maxillofacial Surgery, Padova, Italy*

Background: Multiple pathogenetic mechanisms have been proposed for bisphosphonate-related osteonecrosis of the jaws (BRONJ). Murine studies have reported a strong association between vitamin D deficiency and the development of osteonecrosis. A recent histomorphometric case-control study of cancer patients exposed to nitrogen-containing bisphosphonates (NBP) has shown an higher odds of osteonecrosis in BRONJ patients. Vitamin D deficiency could be therefore a potential risk factor for BRONJ.

Aim: To assess the association between vitamin D deficiency and BRONJ in cancer patients.

Patients and methods: A matched case-control study was performed at the Units of Maxillofacial Surgery of the Universities of Padua and Verona. Consecutive BRONJ+ (“cases”) and BRONJ- patients (“controls”) treated with NBP were matched by gender (same) and age (decade). Serum 25 hydroxy-vitamin D (25-OH-D), parathyroid hormone (PTH), bone alkaline phosphatase, C-terminal telopeptide of type 1 collagen, pro-collagen type 1 nitrogenous telopeptide, sclerostin, and Dickkopf WNT signaling pathway inhibitor 1 were measured. Cases and controls were matched using coarsened exact matching (CEM). Between-group comparisons were performed using ordinary least squares regression for uncensored data and tobit regression for censored data taking CEM into account.

Results: 49 BRONJ+ and 72 BRONJ- patients were analyzed. 25-OH-D deficiency was equally frequent among BRONJ+ (0.60, 95%CI 0.49 to 0.71) and BRONJ- (0.57, 95%CI 0.43 to 0.71) patients. The bone turnover markers were similar, except for sclerostin which was 0.27 logeunits (95%CI 0.06 to 0.48,  $p < 0.05$ ) higher in BRONJ+ patients.

Conclusions: 25-OH-D deficiency, PTH and most bone turnover markers are not associated with BRONJ.

**ORAL SESSION 4: MRONJ  
COMPUTER ASSISTED SURGICAL RESECTION AND IMPLANT BASED  
RECONSTRUCTION IN PATIENTS WITH MEDICATION RELATED OSTEONECROSIS OF  
THE JAWS (MRONJ) FROM THE COPENHAGEN ONJ COHORT**

*T. Kofod<sup>1</sup>, M. Schiodt<sup>1</sup>*

*<sup>1</sup>Copenhagen University Hospital/Rigshospitalet, Oral & Maxillofacial Surgery, Copenhagen, Denmark*

**Aims:** Advances surgical treatment of MRONJ patients may include continuity resections of mandibles. The objectives are to evaluate the use of computer assisted surgical planning and virtual based guides and patient specific reconstruction plates in this patient group.

**Methods:** 8 patients undergoing continuity resections were evaluated clinically and radiographically based on either CT or CBCT preoperatively. Volume data were uploaded in TruMatch solution. Preoperative planned resections were performed virtually. Based on the planned resections patient specific intraoperative resection guides and patient specific implants were fabricated. All patients were successfully resected and reconstructed using the virtually planned guides and implants.

**Results:** Planned resections and reconstruction were evaluated clinically and radiographically based on pre- and postoperative CBCT or CT scans showing precise resections and implant position.

**Conclusion:** Postoperative analysis shows that computer assisted surgery (incl. preoperative virtual surgical planning, intraoperative cutting guides and patient specific implants) shows highly effective in obtaining accurate resections and reconstructions, and includes reduced intraoperative time.

#### **ORAL SESSION 4: MRONJ**

#### **PREVENTION OF MEDICATION-RELATED OSTEONECROSIS OF JAW IN A RAT ANIMAL MODEL**

*G. Brierly<sup>1</sup>, J. Baldwin<sup>1</sup>, L. Bray<sup>1</sup>, E. Hsu<sup>1</sup>, D. Nikolarakos<sup>1</sup>, M. Woodruff<sup>1</sup>, C. Werner<sup>2</sup>, P.D.W. Hutmacher<sup>1</sup>*

*<sup>1</sup>Institute of Health and Biomedical Innovation, Science and Engineering, Brisbane, Australia*

*<sup>2</sup>Max Bergmann Center of Biomaterials, Institute Biofunctional Polymer Materials, Dresden, Germany*

**Aims:** This study aimed to evaluate the efficacy of a novel polyethylene glycol-heparin hydrogel (starPEG-heparin) incorporating arginylglycylaspartic acid (RGD) coupled with rhBMP-2 for the prevention of MRONJ development at the time of dentoalveolar surgery.

**Methods:** Twenty-four (24) skeletally mature rats were divided into three equal groups (n=8) receiving two doses of intravenous zoledronic acid prior to surgery. In all animals, the right first molar of the mandible was extracted and closed using 6/0 prolene. Group 1 animals had the sockets left empty, group 2 had starPEG-heparin/RGD hydrogel without rhBMP-2 placed into the extraction socket whilst group 3 had the aforementioned hydrogel with rhBMP-2. Samples were analyzed using immunohistochemical (IHC), microcomputed tomography ( $\mu$ CT), scanning electron microscopy (SEM) and enzyme linked immunosorbent assays (ELISA).

**Results:** ELISA results of serum CTX demonstrated a downward trend during the housing period.  $\mu$ CT analysis of samples showed greater bone formation in group 3 compared to other groups as expected. H&E staining from group 1 displayed results consistent with MRONJ. IHC and histological staining demonstrated an increase in osteoclastic action and angiogenesis in interventional groups compared to controls although, the angiogenesis results were not significant. SEM analysis of samples confirmed increased osteocyte density surrounding the extraction socket in groups 2 and 3 compared to group 1.

**Conclusions:** Results indicate that a starPEG-heparin/RGD hydrogel combined with rhBMP-2 can increase osteoclastic action, localized angiogenesis and increased bone healing compared to both hydrogel-alone, or no intervention in a MRONJ rat animal model.

## **ORAL SESSION 4: MRONJ**

### **THE SCANDINAVIAN OSTEONECROSIS COHORT STUDY - REPORT ON THE FIRST 4 YEARS OF RESEARCH COLLABORATION**

*B.B. Herlofson<sup>1</sup>, C.L. Wexel<sup>2</sup>, S.E. Nørholt<sup>3</sup>, E. Igland<sup>1</sup>, C. Cardemi<sup>4</sup>, V. Ehrenstein<sup>5</sup>, M. Schiødt<sup>6</sup>*

*<sup>1</sup>Department of Oral Surgery and Oral Medicine, Faculty of Dentistry- University of Oslo, Oslo, Norway*

*<sup>2</sup>Department of Oral and Maxillofacial Surgery- Southern Alvsborg Hospital- Borås, Department of Biomaterials- Institute of Clinical Sciences-*

*Sahlgrenska Academy at University of Gothenburg, Gothenburg, Sweden*

*<sup>3</sup>Aarhus University, Department of Oral and Maxillofacial Surgery- Aarhus University Hospital, Aarhus, Denmark*

*<sup>4</sup>Department of Oral and Maxillofacial Surgery- Linköping University Hospital- Linköping, Department of Biomaterials- Institute of Clinical Sciences-*

*Sahlgrenska Academy at University of Gothenburg, Gothenburg, Sweden*

*<sup>5</sup>Department of Clinical Epidemiology, Aarhus University Hospital, Aarhus, Denmark*

*<sup>6</sup>Department of Oral and Maxillofacial Surgery, Rigshospitalet, Copenhagen, Denmark*

The Scandinavian ONJ (osteonecrosis of the jaw) cohort (Schiødt et al 2015) is a unique large-scale research collaboration on patients with ONJ related to antiresorptive treatment. All oral and maxillofacial surgeons in Norway, Sweden and Denmark are invited to contribute ONJ-patient-data to three national ONJ databases.

#### **Aims**

To report on the first 4 years of the Scandinavian ONJ research collaboration based on data collection in Norway, Sweden and Denmark.

#### **Methods**

The study utilises a research infrastructure set up for an ongoing Scandinavian epidemiologic study of incidence rates of ONJ among cancer patients treated with antiresorptive agents, between 2011 and 2019. The ONJ databases include patients with cancer and osteoporosis treated with antiresorptive drugs.

#### **Results**

By March 2016 we have enrolled in total 738 ONJ cases: Norway (213), Sweden (205) and Denmark (320). Table 1 shows the number of cases related to treatment of osteoporosis and malignant conditions.

**Table 1.**

<b>Country</b>	<b>Osteoporosis</b>	<b>Breast cancer</b>	<b>Prostate cancer</b>	<b>Multiple Myeloma</b>	<b>Other cancer</b>	<b>Total</b>
Norway	103	36	40	7	27	213
Sweden	100	35	32	11	27	205
Denmark	140	89	49	9	33	320
Total	343	160	121	27	87	738

### **Conclusions**

The Scandinavian ONJ cohort is as far as we know the first international collaboration, in which uniform data on patients with ONJ related to antiresorptive treatment prospectively are collected on a large-scale with contribution from oral and maxillofacial surgeons and other clinicians handling these patients. We anticipate that the ONJ cohort database can be an important instrument for future ONJ outcome studies on a multinational basis.

**ORAL SESSION 5: MISCELLANEOUS  
AVERAGE CHEWING PATTERN (ACP) IMPROVEMENTS FOLLOWING DISCLUSION TIME  
REDUCTION**

*R.B. Kerstein<sup>1</sup>, J. Radke<sup>2</sup>*

*<sup>1</sup>Former Assistant Clinical Professor- Tufts University School of Dental Medicine,  
Restorative Dentistry, Boston, USA*

*<sup>2</sup>Marquette University, Biomechanics, Milwaukee, USA*

**Objectives-** Studies involving electrognathographic (EGN) recordings of chewing improvements obtained following occlusal adjustment therapy are rare, as most studies lack actual “chewing” . The purpose of this study was to determine if reducing long Disclusion Time to short Disclusion Time with the ICAGD coronoplasty in symptomatic subjects altered their Average Chewing Pattern (ACP).

**Material and Methods** - 29 symptomatic subjects underwent simultaneous EMG and EGN recordings of right and left gum chewing, before and after the ICAGD coronoplasty. Statistical differences in the mean Disclusion Time, the mean muscle contraction cycle, and the mean ACP resultant from ICAGD underwent the Student’s paired t-test (alpha= 0.05).

**Results** - Disclusion Time reductions from ICAGD were significant (2.11 sec. to 0.45 sec.  $p = 0.0000$ ). Other significant changes were in the Mean Area ( $p = 0.000001$ ), the Peak Amplitude ( $p = 0.00005$ ), the time to peak contraction ( $p < 0.000004$ ), the time to 50% peak contraction ( $p < 0.00001$ ), and decreased number of silent periods (right  $p < 0.0000002$ ; left  $p < 0.0000006$ ). Post ICAGD Significant ACP changes were the terminal chewing position became closer to MIP ( $p < 0.002$ ), the maximum and average chewing velocities increased ( $p < 0.002 - 0.00005$ ), the opening and closing times, cycle time, and occlusal contact time, all decreased ( $p < 0.004 - 0.0001$ ).

**Conclusions** - One week after symptomatic subjects underwent the ICAGD coronoplasty, many Average Chewing Pattern parameters improved.

**Clinical Relevance** - Computer-guided occlusal adjustments are a fast-acting, physiologic method of improving chewing in symptomatic patients.

## ORAL SESSION 5: MISCELLANEOUS

### EVALUATION OF LOW LEVEL LASER THERAPY ON BONE HEALING OF DIABETIC RATS: A HISTOMORPHOMETRIC STUDY

*N. Diker<sup>1</sup>, D. Yazicioglu<sup>2</sup>, F. Helvacioğlu<sup>3</sup>, C. Dagdelen<sup>4</sup>, Y. Oguz<sup>5</sup>*

*<sup>1</sup>Baskent University, Oral and Maxillofacial Surgery, Ankara, Turkey*

*<sup>2</sup>Private Practice, Oral and Maxillofacial Surgery, Ankara, Turkey*

*<sup>3</sup>Baskent University, Histology and Embryology, Ankara, Turkey*

*<sup>4</sup>Baskent University, General Dentistry, Ankara, Turkey*

*<sup>5</sup>Maktoum bin Hamdan Dental University College, Oral Surgery and Implantology, Dubai, United Arab Emirates*

**Aim:** The aim of the present study was to evaluate the effects of Low Level Laser Therapy (LLLT) and biphasic alloplastic bone graft material on diabetic bone healing.

**Methods:** Fourteen Wistar rats were used in the present study. Induction of diabetes was achieved by intraperitoneal injection of 50mg/kg dose of Streptozotocin. Animals whose blood glucose level exceeded 250mg/dl five days after injection were considered diabetic. Non-critical sized (2.7-mm diameter), two bone defects were created to parietal bones bilaterally symmetrical. Right defects were filled with biphasic alloplastic bone graft. Rats were randomly divided into two groups and one group received ten sessions of LLLT immediately after surgery and every three days. Thirty day after surgery rats were sacrificed and tissue samples were examined under light microscope. New bone formation and osteoblast density were investigated using histomorphometry.

**Results:** Analysis revealed higher new bone formation in the Graft and Graft+LLLT samples compared to the control and LLLT samples ( $p<0.05$ ). However differences between the control and LLLT samples was not statistically significant ( $p=0.597$ ). Osteoblast density was significantly higher in the LLLT samples when compared to the control samples ( $p<0.001$ ). In addition, significantly higher osteoblast density was observed in the Graft+LLLT samples than Graft samples ( $p<0.01$ )

**Conclusion:** LLLT was effective to simulate osteoblastogenesis. However, a biomaterial such as alloplastic biphasic bone graft that provide scaffolding is essential for effective bone formation. Defects should be filled with graft material and regeneration should be supported with osteogenic effect of LLLT to accelerate diabetic bone healing.

**ORAL SESSION 5: MISCELLANEOUS**  
**THE EAST GRINSTEAD CONSENT COLLABORATIVE: A TRAINEE LED HEAD AND NECK COLLABORATIVE PROJECT**

*E. [www.EG-CC.com](http://www.EG-CC.com)<sup>1</sup>*

*<sup>1</sup>Queen Victoria Hospital, Oral and Maxillofacial Surgery, East Grinstead, United Kingdom*

**Background**

The East Grinstead Consent Collaborative (EGCC) is the first UK trainee collaborative project in head and neck surgery. We wanted to draw upon the success of collaborative projects in other surgical specialties and retrospectively audited consent for head and neck procedures. From inception to delivery, it is trainee led project, which will also be used determine trainee's appetite for collaboration.

**Methods**

Trainees nationwide were contacted directly or via online forums. Those interested were expected to register the project locally and obtain consultant/governance lead approval. Early success for the head and neck project meant that we also rolled the audit project out to orthognathic and trauma surgery.

**Results**

We have collected consent data for over 2000 head and neck patients in six months from 29 units and we expect data from another 2 units. 54 trainees are involved in this project of which 61% were senior trainees. A maxillofacial trauma consent project will be recruiting medical and dental students and an orthognathic consent project has recruited an additional 55 junior trainees with data for 1000 patients.

**Conclusions**

We have demonstrated that a trainee collaborative effort can deliver high volumes of data and for future publications all contributors have collaborative author status. This simple retrospective audit has set a precedence in head and neck surgery and we hope that it will motivate trainees to recruit patients for future prospective clinical trials.

**ORAL SESSION 5: MISCELLANEOUS  
PRIMARY CHRONIC OSTEOMYELITIS OF THE JAW IN CHILDREN: CASE SERIES AND  
LITERATURE REVIEW**

*S. Farook<sup>1</sup>, R. Niziol<sup>1</sup>, P. Ayliffe<sup>1</sup>*

*<sup>1</sup>Great Ormond Street Hospital, Oral and Maxillofacial Surgery, London, United Kingdom*

**INTRODUCTION:**

Primary chronic osteomyelitis (PCO) of the jaw is a rare presentation which can lead to pain, trismus, and swelling. Only sparse cases with onset during childhood or adolescence have been reported in the literature. We report the largest series of PCO of the jaw in children and review their management; whilst examining the available current evidence.

**PATIENTS AND METHODS:**

Retrospective analysis of patients diagnosed with PCO and treated at Great Ormond Street Hospital.

**RESULTS:**

15 patients were identified satisfying the selection criteria. Median age was 8yrs and 3 months (7 months – 15 yrs). Male to female ratio was 1:3. Site of distribution; Right to Left: 1:1. All patients had a biopsy confirmed diagnosis of osteomyelitis and treated with antibiotics. 5 patients needed surgical intervention.

**CONCLUSION:**

PCO of the jaw in children requires careful examination and appropriate investigations which should be complemented with a clinical treatment plan formulated following a MDT discussion.

**ORAL SESSION 5: MISCELLANEOUS  
NON-TECHNICAL SKILLS AND SIMULATION TRAINING IN ORAL AND MAXILLOFACIAL  
SURGERY. DEVELOPING NEW LEARNING TECHNIQUES FOR SURGICAL EDUCATION.**

*R. Bhandari<sup>1</sup>, M. Millwaters<sup>1</sup>, C. Bridle<sup>1</sup>*

*<sup>1</sup>Barts Health NHS Trust, Oral and Maxillofacial Surgery, London, United Kingdom*

**INTRODUCTION:**

Surgical training in the modern era has seen many changes. Trainees and trainers have had to adapt to new working practices and enhanced technology in delivering surgical training. Two of the biggest areas of development in the delivery of training are simulation and Non-technical skills (NOTSS).

Both of these areas of the surgical syllabus share some common themes. They allow trainers to develop structured frameworks and apply them to trainees in a safe environment. In addition as practice becomes more complex and the division between training and service provision becomes narrower, simulation suites and NOTSS syllabus allows for control of the training environment.

The authors have embraced these ideas and developed a program for all levels of trainees in OMFS.

**METHOD:**

The authors present the evolution of a simulation-based teaching program for core and higher surgical trainees in oral and maxillofacial surgery. We believe that this is the first such program developed specifically for oral and maxillofacial surgery.

We show how utilising the NOTSS framework enhances the development of situational awareness, leadership, team working, communication and stress management. These skills are practiced in the simulation suite that is relevant to clinical/training environments.

**CONCLUSION:**

Using feedback from the trainees who have taken part in this pioneering training program we demonstrate the success and confidence this delivers to trainees. We show how the program has developed and the future enhancements.

We propose that these methods should be adopted nationally for training in OMFS and that regional faculties should be developed.

**ORAL SESSION 5: MISCELLANEOUS**  
**CHOOSING THE BEST CAMERA FOR A MAXILLOFACIAL DEPARTMENT**

*S. Miskry<sup>1</sup>, Z. Nimaa<sup>1</sup>, C. Hadjittofi<sup>1</sup>, K. Fan<sup>1</sup>*

*<sup>1</sup>Kings College Hospital, Oral and Maxillofacial Surgery, London, United Kingdom*

Clinical photography is a well established tool within OMFS . Standards for pre and post-operative photographs have been described. Numerous cameras are available which may offer an ideal solution for an OMFS department.

Six cameras were assessed to determine the most user-friendly solution that can be used by many members of the team with minimal training. Different cameras were compared looking at simplicity of use and quality of the photographs produced. A number of features were identified as offering the greatest benefit.

Method:

10 junior members of the team were asked to take a series of intra-oral and extra-oral photos with the camera system's (a digital SLR, two compact cameras, and an iPhone) before and after training. The photographs were scored for quality by Consultant surgeons.

Results:

The Canon G16 camera equipped with a ring flash outperformed all other cameras, including the digital SLR. It was rated highly by users and was intuitive to use.

Conclusion:

The Canon G16 is a compact camera which can be fitted with a ring flash. It is smaller, lighter and cheaper than a DSLR, has a video setting and WIFI connectivity. A significant feature is a custom shooting mode that can pre-set the camera for clinical photography and thereafter needs no adjustment. We recommend this type of camera for use within the clinic and operating theatre, for quality and ease of use for all clinicians.

**ORAL SESSION 5: MISCELLANEOUS  
MALOCCLUSION IN THE PRIMARY DENTITION IN CHILDREN WITH AND WITHOUT  
DEFORMATIONAL PLAGIOCEPHALY**

*S. Kluba<sup>1</sup>, F. Roßkopf<sup>1</sup>, W. Kraut<sup>1</sup>, J.P. Peters<sup>1</sup>, B. Calgeer<sup>1</sup>, S. Reinert<sup>1</sup>, M. Krimmel<sup>1</sup>*  
*<sup>1</sup>University Tuebingen- Center of Dentistry- Oral Medicine- and Maxillofacial Surgery,  
Department of Oral and Maxillofacial Surgery, Tuebingen, Germany*

**Aim:**

Asymmetries of the jaw and orthodontic abnormalities are suspected as long-term consequences of positional cranial deformity. But only few data exist on this issue. As plagiocephaly is a common problem in infancy, potential functional impairments should be investigated to initiate appropriate measures if necessary. The aim of our study was to compare the orthodontic situation in primary dentition of children with positional plagiocephaly and children without cranial deformities.

**Methods:**

50 children treated by helmet therapy for plagiocephaly and 50 non-affected children (age: 1.98 - 5.69 years) were examined in a cross-sectional study. Orthodontic parameters of all dimensions were assessed and analyzed.

**Results:**

Children of the plagiocephalic group showed more often orthodontic alterations compared to the others. Especially the frequencies of a class II-malocclusion (36% vs. 14%), an edge-to edge bite (28% vs. 12%) and deviations of the midline (38% vs. 16%) were conspicuous. However, none of the differences was significant ( $p > 0,003$ ). 69% of all observed mandibular asymmetries appeared as a shift to the contralateral side of the former flattened occipital region.

**Conclusion:**

Positional head deformity might be associated in some cases with a higher prevalence of occlusal abnormalities in primary dentition. Positional plagiocephaly interfaces medicine and dentistry. As it is a common disorder this etiology has to be considered in the prevention and therapy of malocclusion.

**ORAL SESSION 5: MISCELLANEOUS**  
**LAT GEL CHANGING PAEDIATRIC TRAUMA EXPERIENCE**

*R. Mamidela<sup>1</sup>, R. Calderwood<sup>1</sup>, B. Swinson<sup>1</sup>, G. Smith<sup>1</sup>, T. Barry<sup>1</sup>*

*<sup>1</sup>Altnagelvin Hospital, Oral and Maxillofacial Surgery, London Derry, United Kingdom*

Introduction

LAT Gel (LG) is a topical anaesthetic (4% Lignocaine, 1% Adrenaline, 0.5% Tetracaine), the adrenaline reducing systemic toxicity. Therefore LG can be used on open wounds unlike the common topical anaesthetics (e.g. EMLA). The introduction of LAT Gel into a Maxillofacial practice should increase patient compliance under local anaesthetic (LA) and reduce hospital admissions for general anaesthetic (GA). This will reduce both patient / parent anxiety important in any hospital experience.

Aims

The aim of this study was to assess the effect of the introduction of LAT Gel on the number of patients being admitted for treatment under GA.

Methods

A prospective study was carried out on all paediatric patients presenting for management of facial lacerations between February 2015 –January 2016. A proforma recorded all patients treated with LG with both the clinician and patient / parent experience scored on a logimetric scale.

Results

62 patients were treated (40 male, 22 female, age range 1-10 years). Lacerations were sited on the Cheek (13), Chin,Lip,Forehead (9) and Eyebrow (7). 100% of patients / parents and 93% of clinicians scored between 7-10 on the experience scale.

There were 25 hospital admissions compared to 73 admissions the previous year.

Conclusion

This study demonstrates that LG is an important addition to the management of paediatric facial trauma, reducing the use of GA thus reducing admissions and costs. Patients and clinicians also have had a good experience with the use of LG.

**ORAL SESSION 5: MISCELLANEOUS  
PROSPECTIVE AUDIT OF SURGICAL MANAGEMENT OF PRIMARY  
HYPERPARATHYROIDISM AT MAXILLOFACIAL UNIT, ST. RICHARD'S HOSPITAL,  
CHICHESTER. HOW DO WE DO IT?**

*P. Alam<sup>1</sup>, C. Wan<sup>1</sup>*

*<sup>1</sup>Western Sussex Hospitals NHS Foundation Trust, Maxillofacial Unit, Chichester,  
United Kingdom*

Background: Parathyroid glands play a vital role in calcium homeostasis. 90% of primary hyperparathyroidism is caused by a single benign parathyroid adenoma in one of four glands leading to excess production of parathyroid hormone (PTH) and calcium imbalance. Surgical removal is indicated and localisation of the adenoma is paramount to successful surgery (with normalisation of PTH and serum calcium) with minimal morbidity.

Various localisation modalities such as ultrasound, nuclear medicine and CT scan (individually or in combination) are commonly used prior to surgery. This prospective study aims to determine surgical success rates and its relationship to accuracy of localisation studies.

Methods: A proforma was completed following each parathyroid surgery recording patient demographics, localisation modalities used and their results and subsequent intra-operative location of adenoma. In addition, length of stay, return to theatre, readmission rates and use of intra-operative antibiotics were assessed.

Results: 60 patients aged 40-86 (mean: 67) identified over 27 months (53 females, 7 males). Ultrasound and nuclear medicine localisation were used in all cases. Preliminary data shows 97% successful removal of adenoma, 0% readmission and post-operative complication rates including voice change, over 90% of cases were completed as day case surgery and only two patients received intra-operative antibiotics.

Conclusion: This audit shows high success rates of parathyroid surgery in our unit compared to national averages. Parathyroid surgery requires skill and meticulous technique. We believe other factors such as appropriate localisation protocols and discussion of complex cases at local parathyroid multi-disciplinary meeting contributed to our outcomes. Other factors discussed.

## **ORAL SESSION 5: MISCELLANEOUS**

### **A PATIENT INFORMATION LEAFLET REDUCES PARENTAL ANXIETY BEFORE THEIR CHILD'S FIRST CRANIOFACIAL MULTI-DISCIPLINARY OUTPATIENT APPOINTMENT: A PROSPECTIVE, CLOSED-LOOP SERVICE EVALUATION**

*T.E. Pidgeon<sup>1</sup>, C.D. Blore<sup>2</sup>, Y. Webb<sup>3</sup>, J. Horton<sup>4</sup>, M. Evans<sup>5</sup>*

*<sup>1</sup>Broomfield Hospital, Plastic Surgery, Chelmsford, United Kingdom*

*<sup>2</sup>University of Birmingham, School of Medical and Dental Sciences, Birmingham, United Kingdom*

*<sup>3</sup>Birmingham Children's Hospital, Honorary Assistant Psychologist, Birmingham, United Kingdom*

*<sup>4</sup>Birmingham Children's Hospital, Paediatric Neuropsychologist/ Chartered Clinical Psychologist-Craniofacial Unit, Birmingham, United Kingdom*

*<sup>5</sup>Birmingham Children's Hospital, Consultant Maxillofacial Surgeon and Craniofacial Unit Lead, Birmingham, United Kingdom*

#### **Aims**

It is expected that a child's first outpatient appointment with a craniofacial multi-disciplinary team (MDT) instils anxiety in parents. Limited data exist on the aspects of the appointment that parents are most concerned about and what information they desire. The effect of written information provision on this cohort is unstudied.

#### **Methods**

Parents attending their child's first outpatient appointment with the Birmingham Children's Hospital Craniofacial MDT between September- December 2012 completed a questionnaire to identify concerns they had relating to the appointment. A patient information leaflet was subsequently developed and distributed. From September 2015- January 2016, questionnaires completed by parents assessed the usefulness of the leaflet and whether it reduced parental anxiety.

#### **Results**

Twenty-six initial questionnaires were returned. Seventeen respondents (65%) reported that they were concerned about some aspect of their child's appointment. 22 (86%) expressed a desire for more information surrounding their child's appointment. Thirteen (50%) requested for this information to be provided using a patient information leaflet.

After the introduction of the leaflet, 30 questionnaires were returned. All thirty (100.0%) found the leaflet easy to understand. Twenty-nine (96.7%) felt the leaflet provided helpful information. Eighteen (60.0%) felt less worried about the appointment after reading the leaflet.

#### **Conclusion**

The majority of parents of children referred to a craniofacial MDT appointment displayed concerns that related to the appointment itself. Specific information relating to the appointment process itself was desired. A purpose-built leaflet successfully provided parents with desired information and lowered anxiety among the majority of attendees.

**ORAL SESSION 5: MISCELLANEOUS  
EUROPEAN IN-TRAINING ORAL AND MAXILLOFACIAL FORMATIVE ASSESSMENT  
(EIOMFA) – A PILOT OF AN ON-LINE INTERNATIONAL KNOWLEDGE RANKING MCQ**

*P. Magennis<sup>1</sup>, A. Begley<sup>1</sup>*

*<sup>1</sup>Aintree University Hospital, Oral & Maxillofacial Surgery, Liverpool, United Kingdom*

**Introduction**

A number of specialties run assessments of knowledge as a formative resource within nations and across Europe. No nation currently does this for the specialty of oral and maxillofacial surgery. With the help of Orzone, the Swedish software platform provider who partner Union Européenne Des Médecins Spécialistes (UEMS), the OMFS Section of UEMS generated a pilot assessment.

**Method**

Trainees across Europe were contacted by all means possible. They were invited to complete a 115 question on-line MCQ assessment, in English, over 90 minutes. Some demographic and training information was also collected.

**Results**

Of the 284 trainees who expressed an interest, 171 trainees completed the questionnaire during the pilot period. Most were from the UK (128), but there were trainees from another 20 countries including Germany (7), Ireland (5), Lithuania (4), Greece (4), Belgium (3), Slovenia (2), Austria (2) Italy (2) and Hungary (2).

Analysing the results, the average score increased with year of OMFS training and with years after first degree suggesting that the process accurately reflected knowledge acquisition.

Trainees were given their overall ranking and their ranking against their national peers and their international 'year of training' peers. Feedback from trainees participating was very positive as an educational and developmental resource.

**Discussion**

The cost in effort and money involved in generating and updating a formative assessment for OMFS trainees has so far deterred any national training authority from creating one. This initiative demonstrates it is possible to create this type of resource using very well tried and tested technology.

**ORAL SESSION 5: MISCELLANEOUS  
MANAGEMENT OF CHRONIC DIFFUSE SCLEROSING  
OSTEOMYELITIS/TENDOPERIOSTITIS OF THE MANDIBLE IN CHILDREN WITH  
CONSERVATIVE TREATMENT**

*M. van de Meent<sup>1</sup>, H. Meshkini<sup>1</sup>, M. Wetselaar-Glas<sup>1</sup>, R. van Merkesteyn<sup>1</sup>*

*<sup>1</sup>Leiden University Medical Center, Oral and Maxillofacial Surgery, Leiden, Netherlands*

**Aims:** Chronic diffuse sclerosing osteomyelitis (DSO) of the mandible is a rare disease of unknown aetiology. One of the suggestions is overuse of the masticatory muscles as contributing factor for DSO, also known as chronic tendoperiostitis (TP). This hypothesis was tested in a group of children by treating them with conservative therapy.

**Methods:** Eleven children (7 girls, 4 boys, age:  $11.55 \pm 1.97$  years) with DSO/TP were treated with conservative therapy, which involved occlusal splint therapy, physiotherapy and/or counselling about the disease. Before the start of treatment and during every follow-up contact the patients were asked about the severity of pain on a visual analogue scale (VAS) and the frequency of their pain in days per three months. Patients were asked whether they made a connection between the disease and stress too.

**Results:** Six patients showed significant decrease in pain severity ( $p$ -value 0.04) and pain frequency ( $p$ -value 0.00) over time and they continued with conservative therapy. The remaining five patients started with bisphosphonate therapy after one year of conservative therapy; four because of persistent pain and one because of complaints about facial asymmetry.

**Conclusion:** Pain complaints of patients with DSO/TP decreased after conservative therapy. This supports the hypothesis that DSO/TP of the mandible is possibly initiated and exacerbated by muscle overuse.

**ORAL SESSION 6: CANCER  
CURRENT CONCEPTS AND FUTURE OF SALIVARY MARKERS FOR DIAGNOSING ORAL  
SQUAMOUS CELL CARCINOMA: A REVIEW AND META-ANALYSIS OF RELEVANT  
PUBLISHED STUDIES**

*E. Omar*<sup>1</sup>

<sup>1</sup>*College of Dentistry- Taibah University, - Department of Maxillofacial Surgery-, Madinah,  
Kingdom of Saudi Arabia*

**Background:** Oral squamous cell carcinoma (OSCC) has a remarkably high incidence worldwide, and a fairly serious prognosis, encouraging further research into advanced technologies for noninvasive methods of making early diagnoses, ideally in primary care settings.

**Objective:** Our purpose was to examine the validity of using salivary markers changes in OSCC,s patients by advanced nanotechnology and molecular diagnostics for diagnosing OSCC by identifying and evaluating relevant published reports.

**Methods:** MEDLINE, EMBASE, and CINAHL were searched to identify clinical trials and other information published between 1990 and 10 May 2015; the searches were updated to November 2015. Studies of noninvasive methods of diagnosing OSCC (saliva-based diagnosis and others were included). Data were abstracted and evaluated in duplicate for possible relevance on two occasions at an interval of 2 months before being included or excluded. Studies met the inclusion criteria and have been assessed by modified version of the Quality Assessment of Diagnostic Accuracy Studies instrument (QUADAS).

**Findings:** 163 studies of saliva based oral diagnosis met the inclusion criteria. Forty-two of these studies were assessed by the modified version of the QUADAS instrument. Saliva-based oral cancer diagnosis was found to be promising noninvasive methods for diagnosing OSCC.

**Conclusions:** It is clear that screening for and early detection of cancer have the potential to reduce the morbidity and mortality of this disease. Advances in nanotechnology for saliva-based oral diagnosis are a promising pathway for the future development of more effective noninvasive methods for diagnosing OSCC that are easy to perform clinically in primary care settings

## **ORAL SESSION 6: CANCER**

### **EXCESSIVE FLUID ADMINISTRATION IS A RISK FACTOR FOR 30-DAY CARDIAC AND CEREBROVASCULAR COMPLICATIONS IN HEAD AND NECK ONCOLOGIC SURGERY**

*E. Haapio<sup>1</sup>, I. Kinnunen<sup>1</sup>, J.K.E. Airaksinen<sup>2</sup>, H. Irjala<sup>1</sup>, T. Kiviniemi<sup>2</sup>*

*<sup>1</sup>Turku University Hospital, Otorhinolaryngology, Turku, Finland*

*<sup>2</sup>Turku University Hospital, Heart center, Turku, Finland*

**Introduction:** Patients undergoing head and neck surgery for cancer are at high risk (>5%) to get major acute cardiac and cerebrovascular events (MACCE). Intraoperative fluid admission and red blood cell infusion may have an effect on patient outcome. We sought to assess modifiable perioperative risk factors in this retrospective study.

**Materials and methods:** Study included all head and neck cancer patients treated in Turku University hospital between 1999-2008. Patients' medical records were reviewed and perioperative fluid administration and blood product use were assessed. Primary endpoint was MACCE (acute coronary syndrome ACS, decompensated heart failure, new-onset of atrial fibrillation, transient ischemic attack (TIA), stroke, pulmonary embolism and venous embolism, and cardiac death) during 30 days follow-up period. Adjudication committee went through all the endpoints.

**Results:** Univariate predictors of MACCE at 30 days were total amount of fluid (24h) <4000ml ( $p<0.001$ ), red blood cell infusion ( $p<0.001$ ) and microvascular surgery. Patients having >4000ml of fluids had 4.8-fold risk for MACCE. Moreover, when analyzed per units of red blood cells transfused or per liters of fluid >4000ml/24h, in both cases the risk of MACCE increased 18% per unit/liter (RBC  $p<0.001$ ; fluids  $p=0.012$ ). In a multivariate model, >4000ml fluid administration/24h remained as the only predictor for MACCE ( $p<0.001$ ).

**Conclusion:** Study provides evidence that operated head and neck cancer patients receiving more than 4000ml fluids perioperatively (24h) have clearly elevated risk for MACCE in spite of comorbidities. Other notable perioperative risk factor for adverse cardiovascular events in this study was red blood cell transfusion.

## **ORAL SESSION 6: CANCER**

### **EFFICIENCY ON SURGICAL CARE SAFETY, OF A SYSTEMATIC STAY IN INTENSIVE CARE UNIT DURING THE IMMEDIATE POST-OPERATIVE PERIOD IN PATIENTS EXPERIENCING MAXILLO-FACIAL FREE-FLAP RECONSTRUCTION**

*A. Debelmas<sup>1</sup>, S. Lanciaux<sup>1</sup>, M. Raux<sup>2</sup>, C. Bertolus<sup>1</sup>*

*<sup>1</sup>UPMC Univ Paris 06- F-75005- Paris- France, AP-HP- Service de chirurgie Maxillo-faciale- Paris- F-75013, Paris, France*

*<sup>2</sup>INSERM UMR\_S 1158 Neurophysiologie Respiratoire Expérimentale et Clinique Sorbonne Universités- UPMC Univ- Paris 06- F-75005, AP-HP- Hôpital Universitaire Pitié Salpêtrière- SSPI - Accueil des Polytraumatisés- Paris- F-75013, Paris, France*

#### **Background**

Free-flap reconstructions allow for extensive surgical resections in the head and neck region. Post operative medical issues are frequent, often involving early pulmonary infections.

Our aim was to assess if a systematic stay of at least 72 hours in intensive care unit post-operatively would improve post-surgical care safety for these patients, decreasing the ICU readmission rate for medical issues.

#### **Material and methods**

A retrospective case-control study was performed. All patients who underwent a free-flap reconstruction of the head and neck were included. The medical background, and post-operative course of all patients were collected. Patients were distributed in two groups, depending on the duration of immediate post-operative ICU stay: one group included patient who stayed less than 72 hours, the other involved patients who stayed at least 72 hours post-operatively.

The main criterion we studied was the ICU readmission rate for medical issue in both groups.

#### **Results**

146 free-flap surgical patients operated between January 2013 and May 2015 were included.

7 patients out of 93 (7.53%) who stayed less than 72 hours in ICU and 1 patient out of 53 (1.89%) in the other group were readmitted in ICU for a medical adverse event. However this result isn't statistically significant: OR = 4.233 IC95% [0.506; 35.382]; Fisher's exact test p=0.259 (bilateral).

#### **Conclusion**

Increasing immediate post-operative stay in ICU for patients undergoing a free-flap reconstruction of the head and neck seems to decrease the ICU readmission rate for medical adverse events. However, a larger sample is needed in order to get statistically relevant results.

## **ORAL SESSION 6: CANCER**

### **MOLECULAR IMAGING AND TREATMENT OF HEAD AND NECK CANCER: THE USE OF MAGNETO-ENZYMATIC SENSITIVE LIPOSOMES (MESL) AS A DRUG DELIVERY SYSTEM**

*M. Gerle<sup>1</sup>, O. Peñate Medina<sup>2</sup>, T. Peñate Medina<sup>2</sup>, C.C. Glüer<sup>2</sup>, J. Wiltfang<sup>1</sup>*

*<sup>1</sup>Universitätsklinikum Schleswig-Holstein- Campus Kiel,  
Department of Oral and Maxillofacial Surgery, Kiel, Germany*

*<sup>2</sup>Universitätsklinikum Schleswig-Holstein- Campus Kiel,  
Department of Radiology and Neuroradiology- Molecular Imaging North Competence Center,  
Kiel, Germany*

Oral squamous cell carcinoma (OSCC) consistently ranks as one of the top ten common cancers worldwide. It is characterized by a poor prognosis and 5-year survival rate. The surgical resection with certain safety distance and adjuvant chemo-radiotherapy is in most cases, with all its side effects, the treatment of choice. In the head and neck region different functionally important anatomical structures are in close contact to each other. The possibility of an optical imaging of the tumor tissue could make the resection safer and less invasive. Furthermore, a locally based and triggered chemotherapeutic drug release could lead to fewer side effects. Using liposomal nanoparticles, where 5nm iron nanoparticles are imbedded in lipid bilayer, as a remote controlled drug delivery system is a promising approach to lead to these advances in head and neck surgery.

In our experiments magneto-enzymatic sensitive liposomes (MESL) are used. The liposomes contain indocyaningreen for fluorescent labeling and cisplatin as a chemotherapeutic agent for treatment of the OSCC. In *in vitro* experiments we could show the release triggered by iron particles in the lipid bilayer membrane of the liposomes using an alternating magnetic field (AMF) and also an enzymatic release caused by acid sphingomyelinase that is highly produced in tumor tissue. In a xenograft mouse model, we could *in vivo* show the fluorescent labeling and the treatment effect of OSCC.

In conclusion MESL offer the opportunity of the needed advances in treatment of head and neck cancer.

## **ORAL SESSION 6: CANCER**

### **DO WE NEED TRACHEOSTOMIES IN FREE FLAP SURGERY?**

*B. Sandhu<sup>1</sup>, G. Mihalache<sup>1</sup>, S. Bhatia<sup>1</sup>*

*<sup>1</sup>Shrewsbury & Telford NHS Trust, Oral and Maxillofacial Surgery, Shrewsbury, United Kingdom*

#### Aim

The aim of this study was to determine tracheostomy need within maxillofacial free flap surgery, and the associated complications, including extended recovery period and post-operative infections.

Many surgeons place tracheostomies in patients for airway protection post-operatively due to suspected swelling. However, patients undergoing this extensive surgery may not require routine tracheostomy and few maxillofacial units across the UK employ this principle.

#### Method

A retrospective study was carried out of 40 patients whom underwent excision of tumours with free flap reconstruction from January 2013 to December 2015, with comparison to 2010-2012 where tracheostomies were routinely used. Analysis was made of hospital stay duration and post-operative complications.

#### Results

From the results of this study we can see that only 5% of cases underwent tracheostomies compared to 75% of the previous three years. All tracheostomy cases of 2013-2015 experienced chest or tracheostomy wound infections, compared to 31% of the 2010-2012 cases. The average hospital stay for those with temporary tracheostomies was 15-16 days and those without was 10 days for across the six years. There have been no reported cases of airway obstruction post-operatively in those cases where tracheostomies have not been placed following free flap surgery, including fibula free flaps.

#### Conclusion

As a unit it has been concluded to avoid placing a temporary tracheostomy in all cases where possible. This is to avoid post-operative complications, reduce hospital stay and improve the quality of recovery from the patient's perspective.

## **ORAL SESSION 6: CANCER**

### **ANAEROBIC THRESHOLD AS PREDICTOR OF POSTOPERATIVE MORBIDITY IN PATIENTS UNDERGOING MAJOR HEAD AND NECK ONCOLOGICAL SURGERY**

*B. Lalabekyan<sup>1</sup>, A. Jones<sup>2</sup>, R. Stephens<sup>3</sup>, E. Burdett<sup>3</sup>, D. Martin<sup>4</sup>, N. Kalavrezos<sup>1</sup>*

*<sup>1</sup>University College London Hospital, Head & neck Centre, London, United Kingdom*

*<sup>2</sup>University College London Hospital, Cardiopulmonary Exercise Laboratory, London, United Kingdom*

*<sup>3</sup>University College London Hospital, Department of Anaesthesia, London, United Kingdom*

*<sup>4</sup>University College London, Division of Surgery and Interventional Science Critical Care Unit, London, United Kingdom*

#### **Aims**

Cardiopulmonary exercise testing (CPET) and has been validated as a risk stratification tool in patients undergoing major surgery. We investigated the role of CPET in predicting morbidity in patients undergoing major surgery for head and neck cancer.

#### **Methods**

We evaluated the correlation between CPET data and length of stay (LoS) in intensive care and/or high dependency units (ITU/HDU) in 87 patients. Anaerobic threshold (AT) of  $11 \text{ ml kg}^{-1} \text{ min}^{-1}$  was used as a threshold to determine fitness for surgery.

#### **Results**

Of 87 patients 8 were excluded: 6 were unable to perform or refused CPET, 2 had incomplete data sets. Full data from 79 patients (48 male, 31 female) were analysed. The median age was 60 (range 22-89). 66 patients (79.5 %) had surgical resection followed by immediate reconstruction, 4 had resection only (4.8%) and 9 had reconstruction only (10.8%). Modes of reconstructive surgery were: 60 patients had reconstruction with free tissue transfer (72.3%), 14 had pedicled tissue transfer (14.9%). 5 had no immediate reconstruction (6 %). Median LoS in the ITU/HDU was 3 days (range 0-62) for patients with AT  $<11 \text{ ml kg}^{-1} \text{ min}^{-1}$  and 1 day (range 1-22) for patients with AT  $\geq 11 \text{ ml kg}^{-1} \text{ min}^{-1}$ . Survival analysis confirmed longer ITU/HDU stay for patients with AT  $<11 \text{ ml kg}^{-1} \text{ min}^{-1}$  (Log Rank test  $p < 0.05$ ).

#### **Conclusions**

An AT below  $11 \text{ ml kg}^{-1} \text{ min}^{-1}$  is associated with prolonged ITU/HDU stay in head and neck cancer patients undergoing major surgery. This may be an indicator of postoperative morbidity in this patient group.

## **ORAL SESSION 6: CANCER**

### **PRETHERAPEUTIC TUMORAL OXIDATIVE STRESS RATIO IS CORRELATED WITH NODAL METASTATIC SPREAD IN HEAD AND NECK PATIENTS**

*D. dequanter<sup>1</sup>, S. Nuyts<sup>2</sup>, R. Dok<sup>1</sup>*

*<sup>1</sup>University of Leuven, Laboratory of Experimental Radiotherapy, Leuven, Belgium*

*<sup>2</sup>University Hospital Leuven, Radiation Oncology, Leuven, Belgium*

#### **Introduction:**

One of the cancers with the strongest link to oxidative damage and oxidative stress is head and neck squamous cell carcinoma (HNSCC), since tobacco and alcohol-sources of massive quantities of reactive oxygen species (ROS)-have been clearly identified as etiologic factors in these malignancies. Considering the role of glutathione in ROS detoxification, we hypothesized that potential biological markers can be found among the parameters of oxidative stress. In line with previous studies pointing at the accumulation of glutathione (GSH) within tumors, we have recently reported the lower ratio of oxidized versus reduced glutathione in head and neck tumors. Here, we evaluate the prognostic and clinical significance of the ratio oxidized versus reduced glutathione in head and neck cancer patients.

#### **Methods:**

36 patients with squamous cell carcinoma of the head and neck were included in the study. The redox status of tumor was determined by measuring the oxidized/reduced glutathione (GSSG/GSH) ratio using capillary electrophoresis. Statistical analysis was performed to assess the correlation between patient, clinical factors and the redox status.

#### **Results:**

A trend for low tumoral ratio of GSSG/GSH and better locoregional control could be seen. Moreover, a significant correlation between the redox status ratio (GSSG/GSH) in tumors and nodal stage (N0 versus N1,2 and 3) could be found.

#### **Conclusion:**

A high pretreatment HNSCC tumor tissue redox status is correlated with the presence of lymph node metastasis. Moreover, a strong tendency was observed between the locoregional control of the tumors and their oxidative status.

## **ORAL SESSION 6: CANCER**

### **INVESTIGATING INTEGRIN $\alpha\beta 6$ AS A POTENTIAL DIAGNOSTIC BIOMARKER AND THERAPEUTIC TARGET FOR HEAD AND NECK CANCERS**

*M. Nieberler<sup>1</sup>, U.S. Speth<sup>1</sup>, H. Kessler<sup>2</sup>, P. Häussler<sup>1</sup>, A. Kolk<sup>1</sup>, U. Reuning<sup>3</sup>, M. Kesting<sup>1</sup>, K.D. Wolff<sup>1</sup>*

*<sup>1</sup>Hospital rechts der Isar- Technische Universitaet Muenchen, Department of Oral and Maxillofacial Surgery, München, Germany*

*<sup>2</sup>Hospital rechts der Isar- Technische Universitaet Muenchen, Institute for Advanced Study and Center for Integrated Protein Science CIPSM, München, Germany*

*<sup>3</sup>Hospital rechts der Isar- Technische Universitaet Muenchen, Department for Obstetrics and Gynaecology, München, Germany*

#### **Aims**

Up-regulated integrin  $\alpha\beta 6$ -expression has previously been described in infiltrating carcinoma cells of the squamous head and neck cancer. The main goal of this study is to test a recently developed  $\alpha\beta 6$ -binding peptide regarding its binding capability to cells of head and neck squamous cell carcinoma.

#### **Methods**

Most recently stabilised peptides were described with an enhanced metabolic susceptibility for potential biomedical applications. An integrin  $\alpha\beta 6$  selective ligand, connected to a Cy5.5 fluorescent dye, was tested in HNSCC cell lines, FFPE and frozen tissue samples. Unselective binding affinity of the Cy5.5 dye was tested by an integrin  $\alpha\beta 6$ -nonbinding peptide, connected to Cy5.5. Binding specificity was controlled by  $\alpha\beta 3$ -overexpressing cells and healthy tissue samples.

#### **Results**

Carcinoma tissue and cells, dyed with the  $\alpha\beta 6$ -binding peptide revealed a strong signal intensity, notably on the borders of the cancerous tissue. Clear signal differences between  $\alpha\beta 6$ -expressing and non-expressing tissue could be found. No unspecific signal was detected in healthy controls over background. Negative control peptides revealed no unspecific binding.

#### **Conclusions**

Integrin  $\alpha\beta 6$  selective peptides are feasible for potential diagnostic and therapeutic applications, which will be tested in an in-vivo animal model for further evaluation considering a clinical application.

## **ORAL SESSION 6: CANCER**

### **“PULL-THROUGH” RESECTION FOR TOTAL AND SUBTOTAL GLOSSECTOMY INVOLVING THE POSTERIOR THIRD OF TONGUE**

*V. Valentini<sup>1</sup>, V. Terenzi<sup>1</sup>, A. Cassoni<sup>1</sup>, A. Battisti<sup>1</sup>, O. Rajabtorik Zadeh<sup>1</sup>, M. della Monaca<sup>1</sup>*

*<sup>1</sup>La Sapienza, Maxillo - Facial Surgery Unit, Roma, Italy*

**Aim:** to evaluate the oncological safety and complication rate of resection of posterior third oral tongue margin through “pull-through” technique without the need of lip – splitting and mandibulotomy approach.

**Materials and methods:** data about patients affected by lingual malignant tumors requiring posterior tongue were retrospectively reviewed. Inclusion criteria were: a) malignant tumor of the tongue or floor of the mouth without mandibular involvement which required resection of the posterior third of the tongue; b) neck dissection performed at the same surgical time; c) surgery as first treatment; d) resection performed with “pull-through” technique; e) reconstruction using a free or regional flap; f) absence of distant metastases. Data evaluated included: pT- and pN-stage, state of resection margins, type of reconstruction, type of neck dissection, post-operative complications.

**Results:** 44 patients were identified. In 2 cases microscopic infiltration of one margin was found (R1); in 1 case a close margin (< 5 mm) was identified. In 3 cases postoperative complications were observed.

#### **Conclusion**

Pull – throw technique is, in our opinion, a valid and safety procedure that guarantees clear margin resection with acceptable low complication rate.

## **ORAL SESSION 6: CANCER**

### **IMPACT OF PERIOPERATIVE ALLOGENIC BLOOD TRANSFUSIONS ON RECURRENCE AND SURVIVAL IN PATIENTS UNDERGOING PRIMARY SURGERY FOR ADVANCED STAGE ORAL SQUAMOUS CELL CARCINOMA**

*M. Ermer<sup>1</sup>, B. Malakouti<sup>1</sup>, G. Bittermann<sup>1</sup>, M. Metzger<sup>1</sup>, R. Schmelzeisen<sup>1</sup>*

*<sup>1</sup>University Medical Center Freiburg, Oral and Maxillofacial Surgery, Freiburg, Germany*

**Background:** The influence of perioperative blood transfusion on recurrence and survival in oral squamous cell carcinoma (OSCC) is still not determined. For colorectal cancer, evidence indicates that effects in the host's immunomodulation due to transfusion can be related to adverse clinical outcomes and poorer survival rates.

**Objectives:** The objective of this study was to assess the influence of perioperative transfusions on the outcome of patients who underwent primary surgery for advanced stage OSCC.

**Methods:** 184 consecutive patients undergoing primary surgery for OSCC with UICC Stage III and IV between 2000 and 2014 from a single institution were included. Demographic, clinical and pathologic factors as well as transfusion data were analyzed retrospectively. Survival data were calculated using Kaplan and Meier analysis. Univariate and multivariate analyses were performed to assess predictors for clinical outcome.

**Findings:** Perioperative transfusion was required in 57 (30.1%) patients. Overall survival rate was 47.3% compared to 40.3% in transfused patients. Recurrence rate was 34.6% in not transfused patients compared to 42.0% in transfused patients. Median time to recurrence dropped from 11.0 to 9.1 months. In univariate and multivariate analysis, only initial positive lymph node status was significantly associated with recurrence and survival rates ( $p < 0.001$ ). Transfusion ( $p = 0.15$ ; HR 1.48; CI 0,89 – 2,59) showed no significant impact.

**Conclusions:** Allogenic blood transfusions seem not to significantly influence overall survival or recurrence rates in patients undergoing primary surgery for OSCC. Still a trend to a shorter disease-free interval and reduced overall survival can be seen.

## **ORAL SESSION 6: CANCER**

### **CK19 IS A HIGHLY SIGNIFICANT PREDICTOR FOR SURVIVAL IN ORAL TONGUE CARCINOMA PATIENTS**

*J. Ernst<sup>1</sup>, K. Ikenberg<sup>2</sup>, D. Schumann<sup>1</sup>, O. Riesterer<sup>3</sup>, G. Studer<sup>3</sup>, B. Appel<sup>4</sup>, M. Rössle<sup>4</sup>, M. Bredel<sup>5</sup>*

*<sup>1</sup>University Hospital of Zürich, Department of Maxillofacial and Oral Surgery, Zürich, Switzerland*

*<sup>2</sup>University Hospital of Zürich, Department of Pathology, Zürich, Switzerland*

*<sup>3</sup>University Hospital of Zürich, Department of Radiation-Oncology, Zürich, Switzerland*

*<sup>4</sup>Cantonal Hospital Chur, Department of Pathology, Chur, Switzerland*

*<sup>5</sup>University Hospital of Zürich, Cranio-maxillofacial and Oral Surgery, Zürich, Switzerland*

**Objectives:** To examine the predictive value of positive Cytokeratin 19 (CK19) expression in squamous cell carcinomas of the oral tongue.

**Introduction:** Cytokeratins (CK) are structural proteins forming the subunits of epithelial intermediary filaments. Higher expression of CK-19 in tumor tissue and its fragments (CYFRA 21-1) found in distant tissues have shown to be related to poorer survival in various cancers.

**Methods:** From a larger cohort, 129 representative oral tongue carcinoma patients were selected according to the quality of pathological specimens available. Where possible, both peripheral as well as central tumor tissue was sampled for inclusion in a tissue micro array to ensure a robust representativeness of the tumor. Expression of CK19 was assessed as immunohistochemical staining according to a semi quantitative scoring system.

**Results:** CK19 showed very high significance in the prediction of overall survival ( $p < 0.001$ ) as well as disease specific survival ( $p = 0.001$ ) in this cohort of oral tongue carcinomas. No significant predictive value for disease free survival could be found. A positive correlation to a higher proliferation rate was found that may partially explain the significant results. Very few demographic factors correlated with the expression of CK19.

**Conclusion:** CK19 has shown to be a highly significant predictor for overall and disease specific survival in a cohort of oral tongue carcinoma patients. CK19 and its fragment CYFRA 21-1 should be explored further to make full use of this promising biomarker.

## **ORAL SESSION 7: CLEFT CRANIOFACIAL AND ORTHOGNATHIC THE VISION OF FUNCTIONAL UNILATERAL CLEFT LIP REPAIR**

*E. Almajid<sup>1</sup>*

*<sup>1</sup>Prince Sultan Medical and Military City, Oral and Maxillofacial Surgery Department, Riyadh, Kingdom of Saudi Arabia*

### **Aims:**

To describe a technique of unilateral cleft lip repair from variety of previously described repairs . Cases have been chosen to demonstrate the applicability of this technique in unilateral cleft lip repair.

### **Materials and methods:**

Marginal incision at the cleft side with Rose –Thompson lengthening effect just above white roll with short philtrum ridge, this triangle will be combined with rotational C flap. in severe flared alar cartilage backcut is mandatory to re position fibro-areolar tissues. Nasal cell base in most cases is depressed therefore medial and lateral nasal cell floor are overlaps to build up the floor. the same as red lip overlap to reconstruct fullness of lip with addition of Prolene suture over junction between Dry and wet lip

### **Results:**

The technique improves the flareness of alar cartilage, nasal cell floor , length of philtrum ridge and fullness of red lip .

### **Conclusion:**

This modification of unilateral cleft lip repair can be applied to all degrees of unilateral cleft lip as a combination of all techniques in order to decrease the drawbacks when utilized alone and produced an acceptable esthetic results.

**ORAL SESSION 7: CLEFT CRANIOFACIAL AND ORTHOGNATHIC ASSESSMENT OF PRIMARY AND SECONDARY IMPLANT STABILITY BY RESONANCE FREQUENCY ANALYSIS IN ANTERIOR AND POSTERIOR SEGMENTS OF MAXILLARY EDENTULOUS RIDGES**

*D. Baftijari<sup>1</sup>, A. Benedetti<sup>2</sup>, B. Kapusevska<sup>3</sup>, E. Gjorgievska<sup>4</sup>, A. Stamatovski<sup>5</sup>, J. Fidoski<sup>6</sup>, A. Murtezani<sup>7</sup>, F. Baftijari<sup>3</sup>*

*<sup>1</sup>Vita Dent, Private dental office, Tetovo, FYR Macedonia*

*<sup>2</sup>University clinic, Maxillofacial surgery, Skopje, FYR Macedonia*

*<sup>3</sup>University clinic, Prosthodontics, Skopje, FYR Macedonia*

*<sup>4</sup>University clinic, Preventive and pediatric dentistry, Skopje, FYR Macedonia*

*<sup>5</sup>Prima Dent, Private dental office, Tetovo, FYR Macedonia*

*<sup>6</sup>Dental Macedonia, Private dental office, Skopje, FYR Macedonia*

*<sup>7</sup>University clinic, Oral surgery, Prishtina, Kosovo*

**Aim**

The aim of this study was to analyze the implant stability quotient (ISQ) results of the resonance frequency (RF) during the first day of surgery and 3 months after dental implant placement in maxilla during the healing period.

**Methods**

This study was approved by forty patients with total or partial edentulous maxillary jaws underwent with 85 dental implants. The ISQ values were measured at baseline (immediate) and 3 months after placement (delayed). Ostell Mentor device was invented to measure the RF value of the implant fixture through the transducer or pin, with maintain a distance of approximately 1-3 mm, angle of 90 degrees, and 3 mm above the soft tissue. Measurements were taken four times in each direction of inserted oral dental implant.

**Results**

The ISQ at baseline had a mean value of 58.061 (SD 5.91) for all dental implants. The mean ISQ value on the 3th month was 65.351 (SD 5.554). Differences between primary and secondary mean ISQ values were statistically significant ( $p < 0.001$ ). There were no statistical differences for the primary ISQs results measured between anterior and posterior sectors of maxillary ridges, but there were significant differences between the secondary and primary ISQ measurements in both sectors of maxilla. The one year cumulative success rate was 98.3% for tested and inserted oral implants.

**Conclusions**

The results of presented study suggest that the influence and reliability of Ostell ISQ values, measured immediately and 3 months after placement it's predictable for the oral implant outcomes, especially analyzing the sensibility of secondary RFA values.

**ORAL SESSION 7: CLEFT CRANIOFACIAL AND ORTHOGNATHIC  
ORTHOGNATHIC SURGERY - OCCLUSION, AESTHETICS, PSYCHOLOGICAL IMPACT AND  
PREJUDICES SHORT AND LONG TERM PSYCHOLOGICAL EVALUATION OF  
ORTHOGNATHIC PATIENTS**

*E. Paraschivescu Gidea<sup>1</sup>, C. Szuchanek<sup>2</sup>, P. Camelia<sup>3</sup>, R.E. Luca<sup>4</sup>*

*<sup>1</sup>MUNICIPAL EMERGENCY UNIVERSITY HOSPITAL TIMISOARA, Oral And Maxillo-Facial Surgery, Timisoara, Romania*

*<sup>2</sup>VICTOR BABES UNIVERSITY OF MEDICINE AND PHARMACY TIMISOARA, Orthodontics, Timisoara, Romania*

*<sup>3</sup>MUNICIPAL EMERGENCY UNIVERSITY HOSPITAL TIMISOARA, Anaesthesia and Intensive Care Unit, Timisoara, Romania*

*<sup>4</sup>MUNICIPAL EMERGENCY UNIVERSITY HOSPITAL TIMISOARA, Registrar Oral Surgery, Timisoara, Romania*

Orthognathic surgery (Greek “orthos” means straight and “gnathos” means jaw) is a single or multiple jaw surgery which is performed to reposition the jaws. The main goals of the orthognathic surgery are to correct jaw alignment and occlusion, as well as, to achieve facial harmony. One should aim to achieve both good occlusion and beautiful profile, whenever we start planning an orthognathic procedure. Since the changes in patient's appearance can be sometimes dramatic, it is of great importance to assess our patients psychologically thoroughly, to make sure they are prepared to cope with their new face. Some of them are victims of other people's prejudices, being refused chances to apply for a job, to have friends, to promote and so on. Whilst fighting against prejudices is the task of the entire society we, as individuals, can help our patients to have better chances in life. Our success could be in fact the way to show others that anyone deserves a chance despite his/her appearance. We assessed psychologically two groups of 25 orthognathic patients each, trying to evaluate the degrees of depression, anxiety and stress, pre- and postoperatively. The DAS scale (Australian) was used for evaluation. We had three cases of moderate postoperative depression and one severe. One case has proven to have severe mental problems which were kept hidden from our knowledge. One patient experienced a nervous breakdown after surgery, although everyone around considered the change in appearance to be a very good one. The main conclusion is that a psychological assessment prior to major orthognathic procedures is mandatory.

**ORAL SESSION 7: CLEFT CRANIOFACIAL AND ORTHOGNATHIC  
SECONDARY CLEFT LIP AND PALATE DEFECTS – POSSIBLE CAUSES,  
PSYCHOLOGICAL IMPACT AND WAYS TO AVOID THEIR OCCURRENCE**

*E. Paraschivescu Gidea<sup>1</sup>, P.D.D.M.S. Gosla Reddy<sup>2</sup>, P.D.D.M.D.H.M.H. Sailer<sup>3</sup>,  
C. Paraschivescu<sup>4</sup>, P.D.D.M.E. Boia<sup>5</sup>*

*<sup>1</sup>Municipal Emergency University Hospital Timisoara, Oral and Maxillo-Facial Surgery, Timisoara, Romania*

*<sup>2</sup>GSR Institute of Craniomaxillofacial and Facial Plastic Surgery, Hyderabad Cleft Society, Hyderabad, India*

*<sup>3</sup>Sailer Klinik, Oral and Maxillo-Facial Surgery/Plastic Surgery, Zurich, Switzerland*

*<sup>4</sup>Municipal Emergency University Hospital Timisoara, Anaesthesia and Intensive Care Unit, Timisoara, Romania*

*<sup>5</sup>Head of Pediatric Surgery Hospital, Pediatric Surgery, Timisoara, Romania*

Cleft lip and palate represent a true challenge for any maxillofacial or plastic surgeon and the high number of cleft patients all over the world determined more and more surgeons to approach this pathology. The main goal is to restore aesthetics and velo-pharyngeal competence. Unfortunately, sometimes the results of a primary cleft closure may lead to another deformity that could be even more disfiguring, handicapped and also difficult to correct than the initial defect. In some cases we need to spend a very long time and a lot of combined efforts to bring these patients to a decent status of functions and appearance. Sometimes, the psychological impact in these situations can be disastrous, leading to a loss of trust in doctor – patient relationship. A study conducted in our clinic in Timisoara, on two groups, first of 35 secondary cleft cases and the second of 35 primary cases, revealed that the psychological impact onto the parents or patients themselves was even more important than before any surgery had been performed. They switched from disappointment (prior to talk to a surgeon), to hope (before surgery) and again disappointment, sometimes more intense than the first time. In most cases of primary closure failure, the parents needed psychological counseling. The index of anxiety, depression and stress was 25% higher in the secondary cases, compared to primary ones. DASS scales were used for evaluation. A number of cases, including some from the humanitarian mission we accomplished in Niger, will be presented, in an attempt to emphasize the importance of a professional primary treatment.

**ORAL SESSION 7: CLEFT CRANIOFACIAL AND ORTHOGNATHIC  
3D COMPUTED TOMOGRAPHY EVALUATION OF THE UPPER AIRWAY SPACE OF  
PATIENTS UNDERGOING MANDIBULAR DISTRACTION OSTEOGENESIS FOR  
MICROGNATHIA**

*F. Ruggiero<sup>1</sup>, G. Badiali<sup>1</sup>, E. Costabile<sup>1</sup>, F. Ricotta<sup>1</sup>, C. Marchetti<sup>1</sup>*

*<sup>1</sup>Policlinico S.Orsola Malpighi - Alma Mater Studiorum University of Bologna, Oral and Maxillo-facial Surgery, Bologna, Italy*

Mandibular distraction osteogenesis (MDO) is a well-known method of treatment for patients with micrognathia. Presently, one unsolved issue is how to assess the quantitative increase of mandible length to achieve a significant change in the volume of the posterior airway space (PAS). The purpose of this study is to describe the quantitative volumetric evaluation of PAS in young patients undergone osteogenetic distraction for micrognathia, using 3D-CT data sets and compare it with pre-operative situation. In this observational retrospective study, we report our experience in five consecutive patients who underwent MDO, in order to relieve upper airways obstruction. Each patient was evaluated before treatment (T0) and at the end of distraction (T1) with both bi-dimensional and three-dimensional computed tomography (CT) scans. Using parameters to extract anatomical data, an analytic model to evaluate the PAS, was designed. The volume determination was used for the volumetric quantification of the upper airway (UA) space. The CT data were used to assess the UA volumes both before and after the treatment. The mean length of distraction was 23 mm. Quantitative assessment of UA at T0 and at T1 showed increased volumes ranging from 84% up to 3.087%, with a mean of 536%. In conclusion, our study demonstrates that MDO increases the volume of PAS fivefold in patients with UA obstruction. None of the patients developed symptoms of obstructive sleep apnea during a 24-36 months follow-up. The Authors noticed, moreover, that the worse was the patient's starting volume, the greater was the volumetric improvement at T1.

## **ORAL SESSION 7: CLEFT CRANIOFACIAL AND ORTHOGNATHIC VOLUMETRIC 3D ANALYSIS IN ORTHOGNATHIC SURGERY**

*A. Bianchi<sup>1</sup>, I.L. Lusetti<sup>1</sup>, E. Betti<sup>1</sup>, F. Bolognesi<sup>1</sup>, C. Marchetti<sup>1</sup>*

*<sup>1</sup>Policlinico S.Orsola Malpighi - Alma Mater Studiorum University of Bologna, Maxillo Facial Surgery, Bologna, Italy*

*Aim:* Balance in the face is a matter of relationship between the skeletal frame and the soft tissue draping.

Up to now the face has been studied with 2D cephalometric technique but the correct assessment of the changes requires a 3D analysis.

First objective of this retrospective study was to evaluate the volumetric changes of soft tissue caused by orthognathic surgery.

*Methods:* We have gathered CBCT (cone beam CT) scans at T1 (before surgery) and T3 (at least six months after surgery) of 17 patients, 7 affected by class II dentoskeletal malocclusion, 10 presented class III.

CBCTs have been studied using Mimics&3-matic software creating a 3D cephalometry which splitted the face in 16 areas.

Volumetric variation of each area of soft tissue has been obtained doing T3 minus T1.

The distance of the areas of the bone has been obtained after superimposing the T1 to T3 with Hausdorff distance.

*Results:* Soft tissue changes don't respond to 2D data rules and the volumes are more influenced by the vertical shifting then the sagittal one. In the maxillary advancement there isn't a total volumetric increase because there is a 3D redraping of the soft tissues.

In class III deformity correction is mainly obtained by the new relationship between the maxilla and the mandible and not reducing the volume of the mandible.

*Conclusions:* New technologies will allow to obtain normal volume values for the harmonic faces and more analysis will help to find out the correct relationship between the analyzed areas.

**ORAL SESSION 7: CLEFT CRANIOFACIAL AND ORTHOGNATHIC  
COMPARISON OF BIPARTITION DISTRACTION WITH LE FORT II AND ZYGOMATIC  
REPOSITIONING IN APERT SYNDROME**

*D. Dunaway<sup>1</sup>, M. koudstaa<sup>2</sup>, A. Ponniah<sup>1</sup>, C. Ruff<sup>3</sup>, J. Booth<sup>4</sup>, S. Zefeiriou<sup>4</sup>, G. James<sup>1</sup>, G. Glass<sup>1</sup>,  
O. Jeelani<sup>1</sup>*

*<sup>1</sup>Great Ormond Street Hospital for Children, Craniofacial Surgery, London, United Kingdom*

*<sup>2</sup>Erasmus Medical Centre, Maxillofacial Surgery, Rotterdam, Netherlands*

*<sup>3</sup>University College London Hospital, Medical Physics, London, United Kingdom*

*<sup>4</sup>Imperial College London, Computer Science, London, United Kingdom*

**Aims**

Midfacial retrusion, hypertelorism, counter-rotated orbits and a biconcave facial profile characterize Apert syndrome. Both Bipartition distraction and Le Fort II osteotomy with zygomatic repositioning partially correct these anomalies.

This study investigates the effectiveness of these techniques using conventional and geometric morphometric analysis.

**Methods**

Pre and postoperative 3D computed tomography scans of 14 patients with Apert syndrome (aged 12 to 21 years) were annotated with 98 landmarks. 14 age matched normal skulls acted as controls. 10 patients underwent bipartition distraction and 4 Le Fort II osteotomies with zygomatic repositioning. Principal component analysis was used to describe deformity and surgical changes. Results were displayed using colour difference maps. Point based measurements documented midfacial width, height and asymmetry.

**Results**

Midfacial hypoplasia and central biconcavity is corrected by both procedures.

Interorbital distance was reduced from a mean of 29 to 23mm by bipartition. No hypertelorism correction occurred with Le Fort II.

Neither procedure corrected asymmetry.

Apert skulls were wider in the zygomatic region than controls. Bipartition distraction partially corrected this, but no correction occurred in the Le Fort II group.

Midfacial height was reduced by bipartition and increased by Le Fort II osteotomy.

## **Conclusions**

Bipartition and Le Fort II and zygomatic repositioning correct midfacial retrusion and exorbitism.

Bipartition corrects hypertelorism and midfacial width anomalies.

Le fort II with zygomatic repositioning more effectively treats midfacial height disproportion.

Neither procedure is ideal. The choice of procedure should be governed by morphometric analysis of individual patterns of deformity.

**ORAL SESSION 7: CLEFT CRANIOFACIAL AND ORTHOGNATHIC  
3D MODELLING AND THE CRANIOFACIAL SURGEON; HOW ITS ROLE IN THE  
ASSESSMENT OF DEFORMITY AIDS RECONSTRUCTION**

*D. Dunaway<sup>1</sup>, A. Ponniah<sup>1</sup>, J. Booth<sup>2</sup>, A. Roussos<sup>2</sup>, C. Ruff<sup>3</sup>, S. Schievano<sup>4</sup>, N. Florez<sup>4</sup>,  
O. Jeelani<sup>1</sup>, S. Zaferoiu<sup>2</sup>*

*<sup>1</sup>Great Ormond Street Hospital for Children, Craniofacial Surgery, London, United Kingdom*

*<sup>2</sup>Imperial College London, Computer Science, London, United Kingdom*

*<sup>3</sup>University College London Hospital, Medical Physics, London, United Kingdom*

*<sup>4</sup>Institute of Child Health, Craniofacial Surgery, London, United Kingdom*

**Aims.**

Traditional morphometric techniques define facial form by measuring distances, and angles between homologous points on the face or skull. They do not provide a global description of shape, which limits their ability to describe complex deformities.

Three-dimensional (3D) imaging provides great detail, but the information provided is difficult to analyse statistically. This paper describes the use of geometric morphometrics and principle component analysis (PCA) to construct statistical models that define variation within populations that can be used to plan surgery and assess outcome.

**Method**

A statistical model of facial variation in the general population was constructed from 10,000 3D facial images (MEIN3D).

Normal skull data was analysed from CT scans of patients without craniofacial anomalies and dried skulls.

CTs from 100 patients with syndromic facial anomalies were analysed.

An automatic landmarking system registered the large datasets and dense surface correspondent models were generated. Population means were defined and variations from the mean defined by PCA.

The resultant models quantify variation in craniofacial form within and between populations. The models were used to construct best possible shape changes for individual patients and constrained so that only surgically possible changes were permitted.

**Results**

Geometric morphometrics and PCA quantify abnormalities in craniofacial form. The technique is most effective in single gene anomalies.

The PCA driven process planned best-fit surgical solutions taking into account areas of the facial skeleton that cannot be changed.

### **Discussion**

Accurate quantification of 3D changes needed to correct deformity refines surgical technique and provides an effective outcome measurement.

**ORAL SESSION 7: CLEFT CRANIOFACIAL AND ORTHOGNATHIC  
APPLICATION OF VIRTUAL PLANNING FOR IMPROVEMENT OF FOUR-WALL ORBITAL  
OSTEOTOMY IN TREATMENT OF CRANIOFACIAL DEFORMITIES**

*C. Rahimov<sup>1</sup>, R. Asadov<sup>2</sup>, I. Farzaliyev<sup>1</sup>, G. Hajiyeva<sup>1</sup>, N. Verdiyev<sup>3</sup>*

*<sup>1</sup>Azerbaijan Medical University, Oral and Maxillofacial surgery, Baku, Azerbaijan*

*<sup>2</sup>Medical center for aid to children with defects of cranio-maxillofacial region and congenital pathologies of nervous system, Neurosurgery, Moscow, Russia*

*<sup>3</sup>Republic Neurosurgery center, Neurosurgery, Baku, Azerbaijan*

**Introduction.** Congenital deformities are the most frequent causes of child mortality and disability which occur in 2-3% of newborns. From surgical point of view a great emphasis is placed on those who need four-wall orbital osteotomy. Firstly, this kind of osteotomy was introduced by Paul Tessier in 1963 and continues to develop up until now. Success of this procedure is in its exact positioning of osteotomized orbits and its fixation. Modern progress in computer technologies allows us to determine exact lines of osteotomy and the degree of displacement of osteotomized segments at the stage of preoperative planning. The aim of current study is to demonstrate the outcomes of four-wall orbital osteotomy done by the means of virtual preoperative planning in treatment of frontonasal dysplasia and Cruzone syndrome.

**Materials and methods.** The study was executed on two girls 16 and 20 y.o. Additional to the clinical evaluation- CT scan followed by virtual planning by the means of Materialise Mimics Research (Belgium) have been done. Virtual osteotomy followed by virtual displacement of osteotomized segments was performed. The accumulated virtual data was well documented and used as guidance during the surgery.

**Results:** No significant complications occurred, while postoperative outcomes were reasonable from esthetic and functional point of view. Postoperative radiology shows concurrency of effects of surgery with virtual preoperative data.

**Conclusions.** Application of virtual planning could significantly improve functional and esthetic outcomes of four-wall orbital osteotomy in the treatment of different craniofacial deformities.

**ORAL SESSION 7: CLEFT CRANIOFACIAL AND ORTHOGNATHIC  
EVALUATION OF CHANGES IN LIP CLOSING FORCE AFTER SURGICALLY ASSISTED  
RAPID MAXILLARY EXPANSION**

*E. Yuçe<sup>1</sup>, T. Baykuş<sup>2</sup>, Y. Findik<sup>2</sup>, H. Alkis<sup>3</sup>*

*<sup>1</sup>Istanbul Aydin University, Oral and Maxillofacial Surgery, ISTANBUL, Turkey*

*<sup>2</sup>Suleyman Demirel University, Oral and Maxillofacial Surgery, Isparta, Turkey*

*<sup>3</sup>Suleyman Demirel University, Orthodontics, Isparta, Turkey*

Objective: Morphological changes in patients subjected to surgical treatment to correct occlusal discrepancies may lead to various functional changes. The aim of the present study was to evaluate changes in lip closing force after surgically assisted rapid maxillary expansion in skeletally mature patients.

Methods: The study involved 7 female and 7 male patients treated with surgically assisted rapid maxillary expansion. Maximum and minimum lip pressures of patients were measured with Lip De CumLDC-110R. The intercanine distance and incisors angulations were measured preoperatively (T0), at the end of the expansion (T1), at the end of the third month of retention (T2), and at the end of the sixth month of retention (T3).

Results: The greatest values of maximum and the minimum lip closing force were observed at the end of the expansion period significantly. The intercanine distance and inclinations of incisors measured at the third and sixth months showed a significant decrease.

Conclusions: The present study demonstrated that, following surgically assisted rapid palatal expansion, both the maximum and the minimum lip closing force increases had a tendency to revert to their initial values 6 months after surgery.

## ORAL SESSION 8: RECONSTRUCTION & TMJ MRI FLOW QUANTIFICATION OF HEAD AND NECK ARTERIES

*B. Jérémie<sup>1</sup>, G. Pagé<sup>2</sup>, O. Balédent<sup>2</sup>, J.M. Constans<sup>3</sup>, S. Dakpé<sup>1</sup>, S. Testelin<sup>1</sup>, B. Devauchelle<sup>1</sup>*

<sup>1</sup>Amiens University Medical center, maxillo-facial surgery, Amiens, France

<sup>2</sup>UPJV Université de Picardie Jules Verne, Bio Flow Image, Amiens, France

<sup>3</sup>Amiens University Medical center, neuroradiology, Amiens, France

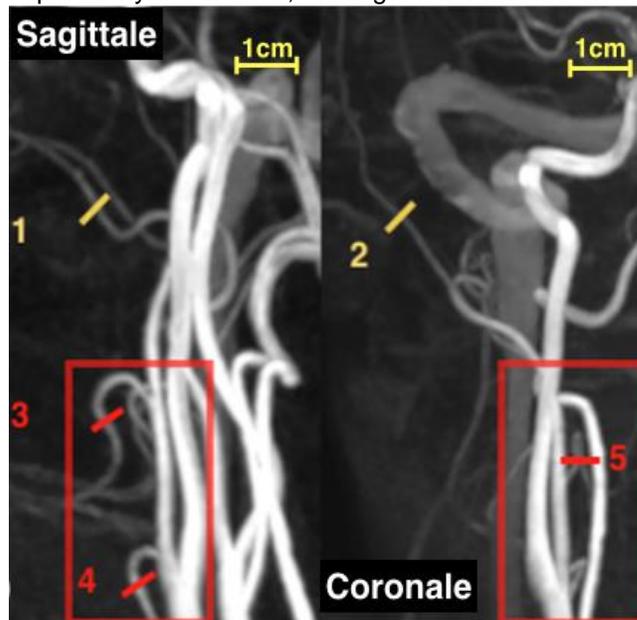
### Purpose

Anatomical dissection studies show the different head and neck vascular areas. It does not exist hemodynamics data in normal and pathologic in vivo situations. Phase-Contrast MRI (PC-MRI) can provide **without injection** blood flow hemodynamics and morphological informations. The aim of this study is to create the first database of the blood flow quantification in the external carotid tree.

### Materials and methods

After optimization and validation of Phase Contrast sequences on a bifurcation phantom (error percentage less than 3%), 30 healthy volunteers (14 women and 16 men) placed inside a MRI scanner, 3T Achieva dStream Philips.

32 head coil channels and 47 diameter microscopy coil are used, with 3D PC-MRI angiography sequence (figure 1) we located external carotid branches. And we applied 2D CINE PC-MRI sequence perpendicular to the internal maxillary, the superficial temporal arteries, the superior thyroid arteries, the lingual arteries and the facial arteries.



(figure 1)

### Results

98% of interest arteries were identified (whether 285 arteries) of an average diameter of the order of 2mm.

Median of blood flow average for each artery is (figure 2):

- 17mL/min in superior thyroid artery
- 16,5mL/min in lingual artery
- 30,5mL/min in facial artery
- 23,5mL/min in internal maxillary artery
- 21,5mL/min in superficial temporal artery

**Conclusions** This study shows the feasibility of MRI hemodynamics analysis in the external carotid branches. Blood flow quantification data in face and neck arteries can be used as reference to help the surgeon to choose the recipient vessels in microsurgery reconstruction and to understand different vascular pathologies (osteoradionecrosis or venous arterial malformation).

**ORAL SESSION 8: RECONSTRUCTION & TMJ**  
**VASCULAR PREPARATION FIRST: A RELIABLE APPROACH FOR HARVESTING ALT**  
**FREE FLAPS**

*J. Megias Barrera*<sup>1</sup>, *C.Y.Y. Loh*<sup>2</sup>, *N.F. A.L. Deek*<sup>1</sup>, *C.K. Tsao*<sup>1</sup>

<sup>1</sup>*Chang Gung Memorial Hospital, Plastic and Reconstructive Surgery, Taoyuan County, Taiwan*

<sup>2</sup>*Chang Gung Memorial Hospital, Center for Vascularized Composite Allotransplantation-  
Department of Plastic Surgery- Chang Gung Memorial Hospital- Taiwan- College of Medicine-  
Chang Gung University, Taoyuan County, Taiwan*

Since Song<sup>1</sup> introduced the free anterolateral thigh (ALT) perforator flap, it has become a workhorse flap in head and neck reconstruction. Its constant perforator source, comfortable position for harvest, large stock of soft tissue and the possibility of flap chimerism makes this flap one of the most preferred flaps among head and neck reconstructive surgeons. Despite its broad applications and its multiple advantages, variation in the perforator size, position and most importantly, the vascular anatomy make this flap a technically demanding flap. There is often a steep learning curve compared to other perforator flaps. ALT flaps are the most commonly used flaps in our institution which performs one of the highest number of microsurgical procedures in the world. It is the most commonly performed flap amongst residents and fellows. After Doppler location of perforators, multiple ways of harvesting ALT are possible. However, we have developed a vascular-oriented approach that allows the trainee surgeon to rapidly acquire the skills in harvesting this demanding flap with improved safety and reliability. This simple strategy and change in flap harvesting technique does not usually require any preoperative imaging or additional cost.

1. Song Y-G, Chen G-Z, Song Y-L. *The free thigh flap: a new free flap concept based on the septocutaneous artery.* British Journal of Plastic Surgery. 1984;37(2):149-159. doi:10.1016/0007-1226(84)90002-X.

**ORAL SESSION 8: RECONSTRUCTION & TMJ  
USE OF POSTERIO-MEDIAL THIGH PROFUNDA ARTERY PERFORATOR (PPAP) FLAP IN  
HEAD AND NECK RECONSTRUCTION**

*J. Megias Barrera<sup>1</sup>, C.Y.Y. Loh<sup>2</sup>, J. Hung<sup>1</sup>, C.K. Tsao<sup>1</sup>*

*<sup>1</sup>Chang Gung Memorial Hospital, Plastic and Reconstructive Surgery, Taoyuan County, Taiwan*

*<sup>2</sup>Chang Gung Memorial Hospital, Center for Vascularized Composite Allotransplantation-  
Department of Plastic Surgery- Chang Gung Memorial Hospital- Taiwan- College of Medicine-  
Chang Gung University, Taoyuan County, Taiwan*

Perforator flaps have become a workhorse in reconstructive microsurgery. In 1989 Koshima and Soeda described the use of a perforator flap for the first time<sup>1</sup>. Due to their reliability and minimal donor-site morbidity, perforator flaps have gained popularity amongst plastic surgeons and have extensively increased their use in reconstructive procedures.

The inner thigh is a versatile source for soft tissue flaps, and since 2012, Allen<sup>2</sup> described the profunda artery perforator (PAP) flap for breast reconstruction. Since then, the multiple perforators of the profunda femoris artery have become a reliable source for perforator flaps in the posteromedial thigh. It is now used in head and neck reconstructions and has been termed the 'inner thigh ALT'. It offers multiple and constant perforators, soft and pliable skin, an adequate pedicle length up to 12cm and the added benefit of a hidden scar. The posteromedial thigh perforator flap arising from the profunda femoris artery system (PPAP flaps) hence has increased in popularity among reconstructive surgeons. We present a series of head and neck carcinomas cases reconstructed using posteriomedial profunda artery perforator (PPAP) flaps as well as surgical pearls and postoperative outcomes.

1. Koshima I, Soeda S. *Inferior epigastric artery skin flaps without rectus abdominis muscle*. British Journal of Plastic Surgery. 1989;42(6):645-648.
2. Allen RJ, Haddock NT, Ahn CY, Sadeghi A. *Breast Reconstruction with the Profunda Artery Perforator Flap*. Plastic and Reconstructive Surgery. 2012;129(1):16e–23e. DOI: 10.1097/PRS.0b013e3182363d9f.

**ORAL SESSION 8: RECONSTRUCTION & TMJ  
ALLOPLASTIC RECONSTRUCTION OF BILATERAL TYPE IV TMJ ANKLYLOSIS WITH  
ZIMMER- BIOMET STOCK TMJ SYSTEMS**

*Mustafa Sancar ATAÇ<sup>1</sup>, Ergun Yuçel, Yeliz Kilinc<sup>1</sup>*

*<sup>1</sup>Oral and Maxillofacial Surgery, Gazi University, Ankara, Turkey*

**Aims**

The reconstruction of Temporomandibular joint (TMJ) total anklylosis is a challenging situation that involves the whole fusion of the mandibular condyle to the glenoid fossa, to the skull base. The current well documented concept is using TMJ prosthesis following gap arthroplasty to re establish the function.

**Methods**

The patients who have undergone bilateral type IV anklylotic TMJ treated via combination of gap arthroplasty and Zimmer- Biomet Microfixation TMJ Replacement System (stock prosthetic system) between 2009 and 2016. Demographic data, number of previous TMJ operations and complications (neurological or occlusal) and maximum interincisal opening (MIO), quality of life (QoL), were evaluated.

**Results**

A total of 30 joints in 15 patients were replaced and the follow up was 6 to 85 months. There were 5 female and 10 male patients. The mean number of previous open TMJ surgeries was 3. The occlusion was unchanged in 12 patients out of 15. In one patient occlusion worsened with less stable functional contact. QoL and MIO relevantly improved in all cases. The transient lack of function occurred on temporal branch of facial nerve due to the neurapraxis. In one patient parasthesia of the lower lip on one side observed after genioplasty.

**Conclusions**

In the era of custom made tmj replacement systems, the stock total tmj replacement system is still a good option. Although it is cheaper and ready to be used immediately, it still needs to have a topographically prepared receiving site and elongation of operation time.

**ORAL SESSION 8: RECONSTRUCTION & TMJ**  
**FACIAL ANIMATION IN CONGENITAL AND ESTABLISHED FACIAL PALSIES**

*B. Bianchi<sup>1</sup>, A. Ferri<sup>1</sup>, S. Ferrari<sup>1</sup>, A. Varazzani<sup>1</sup>, E. Sesenna<sup>1</sup>*

*<sup>1</sup>Azienda Ospedaliero Universitaria, Head Neck, Parma, Italy*

**Aims.** Facial palsy is a severely disabling condition and its correct treatment is mandatory to rehabilitate patients both functionally and socially. When congenital and established facial palsies are approached the recovery of facial mimic muscles is considered not available and facial musculature needs therefore to be substituted to ensure recovery of smile. Neuromuscular transplants have been demonstrated to be the gold standard technique and in particular gracilis muscle is nowadays worldwide considered as the most reliable flap at this purpose. The real key-point of the procedure is the selection of the motor nerve to use for gracilis re-innervation being the contralateral facial nerve (via cross-graft procedures) and the motor nerve to masseter the most used.

**Methods.** The experience of the facial nerve centre of Parma consisting in more than 150 patients treated for different kinds of facial palsies will be presented focusing on cases of gracilis neuromuscular transplantations. Indications, timing, motor nerve selection and surgical tips will be the focus of the presentation.

**Results.** Results of surgical cases will be presented and discussed with particular care to technical aspects.

**Conclusion.** In good hands and specialized centres facial animation with gracilis transplant is a safe and reliable technique that ensures optimal results. Selection of motor nerve and accurate flap inseting are the key-points of the procedure.

**ORAL SESSION 8: RECONSTRUCTION & TMJ  
FACIAL ANIMATION IN RECENT FACIAL PALSIES**

*B. Bianchi<sup>1</sup>, A. Ferri<sup>1</sup>, S. Ferrari<sup>1</sup>, A. Varazzani<sup>1</sup>, E. Sesenna<sup>1</sup>*

*<sup>1</sup>Azienda Ospedaliero Universitaria, Head Neck, Parma, Italy*

**Aims.** Facial palsy is a severely disabling condition and its correct treatment is mandatory to rehabilitate patients both functionally and socially. In cases of facial nerve branches damages or sacrifice in traumas or surgical procedures its immediate reconstruction through direct repair or nerve grafts usually ensures optimal results and is therefore recommended. When facial palsy is approached after the facial nerve damage or in case of central palsies (acoustic neuromas or other skull base tumors resections), the recovery of the mimic muscles of the face is possible within 18 months through facial nerve coaptation that can be performed according to different techniques. Among these, masseteric facial coaptation, cross facial nerve grafting and combination of these two procedures are nowadays the most used, being hypoglossal-facial nerve coaptation considered as a second-choice technique.

**Methods.** The experience of the Facial Nerve Centre of Parma (Maxillo-Facial Surgery Division) will be presented focusing on patients treated for immediate facial nerve reconstruction or facial nerve coaptation. Discussion will be focused on technique selection and timing of the procedure. Particular care will be given to ancillary procedures, in particular to botulinum toxin injection that represent a key-point of patient's rehabilitation.

**Results.** Masseteric facial coaptation and its association with cross-facial nerve grafting have been the most used techniques and results on clinical cases will be presented.

**Conclusion.** Facial nerve repair and coaptation techniques ensure mimic muscle recovery if performed within 18 months with optimal patient rehabilitation.

**ORAL SESSION 8: RECONSTRUCTION & TMJ  
THE CLINICAL APPLICATION OF DOMESTIC 3D-PRINTING CUSTOM-MADE TOTAL  
TEMPOROMANDIBULAR JOINT PROSTHESES**

*S.,Z.,J.(. Zhang<sup>2</sup>, C. Yang<sup>3</sup>*

*<sup>1</sup>Ninth People's Hospital - Shanghai Jiaotong University - School of Medicine, Oral surgery, Shanghai, China*

*<sup>2</sup>ninth people's hospital of shanghai, Department of oral surgery, shanghai, China*

*<sup>3</sup>ninth people's hospital of shanghai, Oral surgery, Shanghai, China*

**Objective** This study was to confirm the safety and effectiveness of the domestic 3D-printing custom-made total temporomandibular joint prostheses. **Methods** 2 patients with the TMJ osteoarthritis were included. The Computed tomography (CT) data for 2 patients were obtained and transformed into the Mimics 18.0 software preoperatively. The custom-made total joint prostheses were design based on the anatomy of the TMJ, respectively. The surgeries were performed with the modified preauricular approach after the success of the mechanical performance test for the prostheses were obtained. The clinical follow-up and radiography examinations were taken 1 week, 1 month, and 3 months after surgery. The postoperative CT scan was used to measure how well the postsurgical images corresponded to the images generated in the preoperative design. **Results** The test specimens yielded with an average yield strength of 3100 N. No gross failures occurred and no cracks were detected after fatigue testing. Biological examination showed the qualification of disinfection. During the operations, all prostheses were positioned smoothly, easily adapted to the bone surfaces, and fixed excellently. There were no prostheses displacement, loosening, and fracture in X-ray postoperatively. The pain, diet, and open mouth had significant improvements 3 months after surgery. The merged postoperative CT scans indicated that the mean differences between predesigned positions of prostheses and postoperative implantation sites were  $0.904\pm 0.292$  mm at the fossa and  $0.528\pm 0.198$  mm at the ramus. The total average error was  $0.878\pm 0.0259$  mm. **Conclusion** Domestic total TMJ prosthesis is safe, effective, and precise for the clinical application.

**ORAL SESSION 8: RECONSTRUCTION & TMJ**  
**THE EFFECTIVENESS OF TRANSDERMAL SODIUM DICLOFENAC GEL SPRAY FOR PAIN**  
**TREATMENT IN TMD: PRELIMINARY RESULTS OF AN OBSERVATIONAL STUDY**

*C. Fornaseri<sup>1</sup>, M. Bernardi<sup>1</sup>*

*<sup>1</sup>Azienda Ospedaliera Santa Croce e Carle Cuneo, Maxillo-Facial Surgery Unit, Cuneo, Italy*

More frequent symptom of TMD is pain in the temporomandibular joint region (TMJ), with joint stiffness and reduction of mandibular mobility.

The use of topical non-steroidal anti-inflammatory drugs compared with the assumption of the same drugs orally has been studied, and is known that the effectiveness is similar, with the advantage, for the topical use, of the absence of systemic adverse effects, in particular for gastrointestinal consequences.

Transcutaneous absorption capacity allows a rapid and effective penetration into superficial joints.

We tested a topical non-steroidal anti-inflammatory anti-rheumatic drug (Dolaut 4 % Gel Spray®) that has diclofenac sodium as active principle. The high concentration and gel-presentation should be certainly advantages in the treatment of acute and chronic temporomandibular joint pain.

Studies demonstrated, both in laboratory and in experimental models, a better tissue permeation of this gel spray compared to conventional topical formulations.

Observational clinical studies on the treatment of pain in TMD using this topical medication (Dolaut 4 % Gel Spray®) are not present in literature.

We present preliminary results on 30 TMD patients (10 acute internal derangement and locking, 10 chronic internal derangement, 10 osteoarthritis or arthrosis or outcomes of TMJ and mandibular trauma) treated with two applications of this topical drug, three times a day, for a week, with follow-up according to the criteria of the American Academy of Orofacial Pain. With this observational study we investigated the speed of action, the effectiveness and tolerability of this drug for TMD pain.

**ORAL SESSION 8: RECONSTRUCTION & TMJ**

**A NEW TECHNIQUE FOR UTILISING A PREFABRICATED SUPRA-CLAVICULAR ARTERY ISLAND FLAP (SCAIF) IN MANDIBULAR RECONSTRUCTION**

*A. Douglas<sup>1</sup>, S. Shroff<sup>1</sup>, K. Corsar<sup>1</sup>, S. Bayoumi<sup>1</sup>, W. Aleid<sup>1</sup>, A. Baldwin<sup>1</sup>, P. Kyzas<sup>1</sup>*

*<sup>1</sup>North Manchester General Hospital, Oral and Maxillofacial Surgery, Manchester, United Kingdom*

The Supra Clavicular Artery Island Flap (SCAIF) was first described in 1843. It is an axial fasciocutaneous flap based on the supraclavicular artery, a branch of either the superficial transverse cervical artery (TCA) in 93% of cases or the suprascapular artery in 7% cases. It has anatomy that can be readily assessed through Doppler ultrasound(US) pre-operatively with the distal limits being 5cm beyond the last measurable US reading.

The SCAIF is emerging as a viable alternative to the Radial Forearm Free Flap following buccal, floor of mouth and tongue ablations. We report a technique for using a pre-fabricated SCAIF in cases of osteoradionecrosis and non-union of mandibular fracture to confer progression to eventual resolution that can be considered a viable option for indicated patients.

**ORAL SESSION 8: RECONSTRUCTION & TMJ  
CLINICAL RELEVANCE OF THE 3D MOTION CAPTURE IN FACIAL MOVEMENT  
EVALUATION**

*F.R. Sarhan<sup>1</sup>, K. Ben Mansour<sup>2</sup>, C. Neiva<sup>3</sup>, C. Godard<sup>3</sup>, B. Devauchelle<sup>3</sup>, F. Marin<sup>2</sup>, S. Dakpé<sup>3</sup>*

*<sup>1</sup>CHU Amiens - Service de Médecine Physique et de Réadaptation, Sorbonne universités-  
Université de technologie de Compiègne - UMR CNRS 7338, Compiègne, France*

*<sup>2</sup>Sorbonne universités- Université de technologie de Compiègne, UMR CNRS 7338, Compiègne,  
France*

*<sup>3</sup>Centre Hospitalier Universitaire d'Amiens - Institut Faire Faces IFF, Service de chirurgie maxillo-  
faciale, Amiens, France*

The care of facial palsy is often complex and therefore requires monitoring over the long term. There are many clinical severity scores with varying levels of sensitivity to assess the deficit of facial movement, but most of them are qualitative. The number of assessment methods is an obstacle to monitor patients and treatment evaluation. We need an objective measurement tool to provide reliable measures of resting asymmetry, symmetry of voluntary movement and synkinesis.

The aim of this study is to determine if the 3D motion capture of the face is compatible with these clinical criteria.

A descriptive study using a 3-dimensional (3D) motion capture system were performed on healthy volunteers (n=30) aged from 20 to 30 years. The motion capture system consists of 17 optoelectronic cameras at a frequency of 100Hz. We captured the movements of the face on healthy volunteers.

We obtained absolute values: 3D coordinates and relative displacements. These data were free of manual measurements, and the use of 3D motion capture does not impede the facial movement. The average time of capture was less than 10minutes. The measurements are painless for subjects. Data are collected in a computer and can be easily exported.

These results show the feasibility of 3D motion capture of facial movement. The protocol used here could be standardized to be routinely relevant. It was used in an experimental study to follow up recovery of a facial transplantation. This technique could help to overcome the uncertainty caused by subjective assessment and optimize therapeutic choices.

**ORAL SESSION 9: ORTHOGNATHIC  
PREVALENCE OF COMPLICATIONS OF ORTHOGNATHIC SURGERY: A FIVE YEAR  
REVIEW**

*M. Maarouf<sup>1</sup>, K. Mukherjee<sup>1</sup>, S. Shetty<sup>1</sup>*

*<sup>1</sup>Royal Wolverhampton NHS Trust, Oral and Maxillofacial Department, Wolverhampton, United Kingdom*

**Aims**

- To identify the intra-operative and post -operative complications associated with orthognathic surgery.
  
- To assess the rates of each complication and compare these with studies in the literature.

**Methods**

The data was collected from clinical records of patients from New Cross Hospital and Walsall Manor Hospital, United Kingdom, who had orthognathic surgery between May 2010 and November 2015.

**Results**

There were a total of 100 cases between May 2010 and November 2015, which were assessed for complications. The age of the patients at the time of surgery ranged between 18-50 years, with a mean age of 24.5 years.

	<b>Number of patients</b>
Males	31
Females	69
<b>Total</b>	100

<b>Type of surgery</b>	<b>Number of patients</b>
Bimaxillary osteotomy: Le fort 1 maxillary advancement + bilateral sagittal split osteotomy (BSSO) with setback	31
BSSO with setback	11
Le fort 1 maxillary advancement	13
Le fort 1 maxillary impaction	2
BSSO with advancement	31
Bimaxillary osteotomy: Le fort 1 maxillary impaction + BSSO with advancement	12

The complications identified included:

**Intra-operative:** bad split and immediate inter-maxillary fixation (5%), nerve injury (5%).

**Post-operative:** occlusal discrepancies (7%), infections (8%), non-union (1%), plate removal (3%), temporomandibular joint pain (1%) and deviated nasal septum (2%).

- 13% of patients required a second general anaesthetic as a result of a post-operative complication.

### **Conclusion**

On comparison with the results shown in the literature, it was found that the rates of complications in this study were within the ranges stated in previous studies.

**ORAL SESSION 9: ORTHOGNATHIC  
THREE DIMENSIONAL EVALUATION OF SURGICALLY ASSISTED TOOTH-BORNE  
VERSUS BONE-BORNE RAPID MAXILLARY EXPANSION**

*W. Harzer<sup>1</sup>, E. Tausche<sup>1</sup>, M. Schneider<sup>2</sup>*

*<sup>1</sup>Universitätsklinikum C.G. Carus Dresden, Orthodontics, Dresden, Germany*

*<sup>2</sup>Universitätsklinikum C.G. Carus Dresden, Maxillo-Facial-Surgery, Dresden, Germany*

**Aim:** The purpose of this study was to evaluate 3D-changes in dental, alveolar and skeletal structures after surgically assisted tooth borne or bone-borne rapid maxillary expansion (RME).

**Methods:** 45 patients (26.5y) with severe transversal discrepancies were involved in the study. 17 patients were treated with the bone borne Dresden Distractor (group 1) and 28 patients received a tooth born hyrax appliance(group 2). Surgically assistance procedure after Glassman was applied. The hyrax screw was activated two times per day. 3D-CT-scans were taken in group 1 before RME and 6 month later. In group 2 models were measured before and after RME (Method of Brust and McNamara). For statistical analysis t-test, Chi-square and correlation analysis were used.

**Results:** In all patients the suture was separated in an anterior open V-shape because of surgically assisted RME without down fracture. The dental expansion was higher at the molars in group 2 (7.24mm) than in group 1 (5.79mm). The tipping of the alveolar process was significant higher in group 1 than in group 2 in the molar region (8.5°/5.04° p<0.05) and in the premolar region (8.36°/ 6.17°). In contrast the dental tipping in group 2 was two times higher than in group 1 (7.08°/3.46°p<0.05). In group 1 the lower molars moved cranial (1.79mm) the B-Point moved anterior (2.56 mm p<0.05) and cranial (2.41mm).

**Conclusion:** The bone-borne DD protects against teeth and bone resorption by inducing more skeletal than dental tipping. Bone borne RME should be recommended for skeletal open bite because of autorotation for the mandible.

## **ORAL SESSION 9: ORTHOGNATHIC**

### **CAN A SURGERY-FIRST ORTHOGNATHIC APPROACH REDUCE THE TOTAL TREATMENT TIME?**

*W.S. Jeong<sup>1</sup>, J.W. Choi<sup>1</sup>, Y.C. Kim<sup>1</sup>, T.S. Oh<sup>1</sup>, K.S. Koh<sup>1</sup>*

*<sup>1</sup>Asan Medical Center- University of Ulsan College of Medicine, Plastic Surgery, Seoul, Republic of Korea*

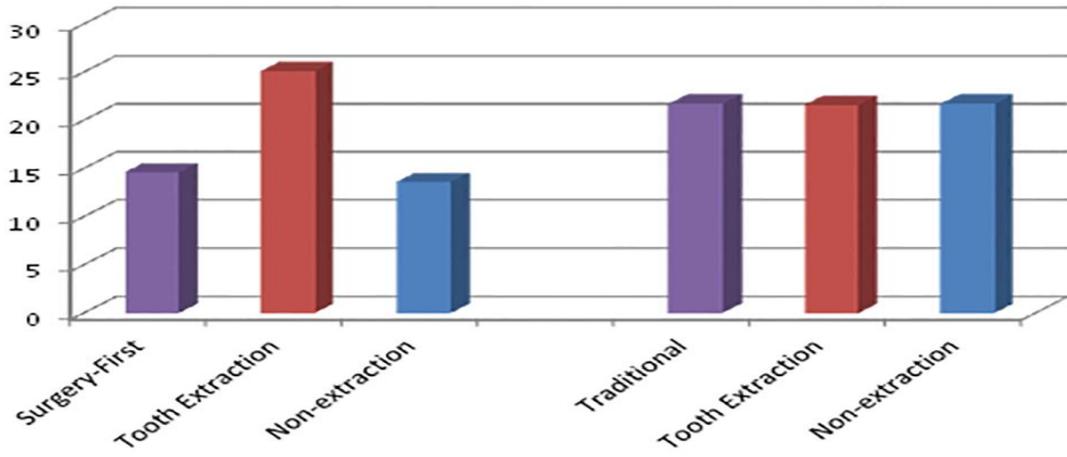
**Background:** A traditional orthognathic approach requires presurgical orthodontic treatment for an average of approximately 17 months, followed by surgery and postsurgical orthodontic treatment for approximately 6-12 months. Therefore, the total treatment time for the conventional orthognathic approach takes approximately 18-36 months. Although presurgical orthodontic treatment has been approved as an inevitable process for stable orthognathic correction before surgery, recent advances in the application of mini-screws and presurgical simulational orthodontic management skills on a dental model show that it is possible to perform a surgery-first orthognathic approach without presurgical orthodontic treatment.

**Methods:** We assessed 45 consecutive Asian patients with skeletal class III dentofacial deformities with surgery-first orthognathic surgery and 52 patients with conventional two-jaw orthognathic surgery. Using cephalometric landmark data for patients with the surgery-first approach, we analyzed postoperative changes in vertical and horizontal facial, denture, and soft tissue patterns.

**Results:** The analysis revealed that the total treatment period in the surgery-first approach averaged 14.6 months compared with 22 months in the orthodontics-first approach. The difference between the immediate postoperative and preoperative and postoperative and immediate postoperative cephalometric data revealed factors that correlated with the total treatment duration.

**Conclusions:** The surgery-first orthognathic approach can dramatically reduce the total treatment time with no major complications. By analyzing the cephalometric landmark data, we identified several possible factors affecting the total treatment time.

### Total Treatment Period (months)



**ORAL SESSION 9: ORTHOGNATHIC  
FINITE ELEMENT ANALYSIS OF OSSIFICATION PATTERNS IN MANDIBULAR  
DISTRACTION: A POPULATION STUDY**

*A. Borghi<sup>1</sup>, S. Schievano<sup>1</sup>, D. David<sup>2</sup>, K. Maarten<sup>3</sup>, B. Padwa<sup>4</sup>*

*<sup>1</sup>University College London, Institute of Child Health, London, United Kingdom*

*<sup>2</sup>Great Ormond Street Hospital, Craniofacial Unit, London, United Kingdom*

*<sup>3</sup>Erasmus MC, Department of Maxillofacial Surgery, Rotterdam, Netherlands*

*<sup>4</sup>Boston Children's Hospital, Plastic and Oral Surgery, Boston MA, USA*

Introduction

Mandibular Distraction Osteogenesis (MDO) is a common method for correcting the mandibular deformity in Craniofacial Microsomia (CFM). This is a retrospective numerical study of MDO performed on a patient population, in order to assess the effect of distraction on mandibular mechanobiology. Methods

Five patients from the Oral and Plastic Surgery Department of Boston Children's Hospital were retrospectively selected: 3D mandibular anatomies were reconstructed from computed tomography (CT) images and location of the surgical cuts was retrieved and reproduced in a finite element model. The distraction process occurring in the first 15 days was simulated considering the bone remodelling theory by Claes and Heigele in order to mimic bone ossification.

Results

Large inter-patient variability of bone formation over the first 4 days was observed, which substantially levelled afterwards with ossification patterns becoming more similar throughout the population. Ossification starts from the osteotomy boundaries towards the center of the gap, showing similar pattern to those observed in animal studies. At day 15, an ossification percentage of  $24.36\% \pm 0.81\%$  was found, close to literature data from swine studies at day 12 ( $23.80\% \pm 3.00\%$ ).

Conclusions

MDO is a routine method for CFM treatment, but the mechanobiological behavior of the distraction gap has been studied in only single cases to date. The results of this study show inter-patient variability in callus ossification at early distraction, but more consistent patterns at a later stage. Further development will investigate comparison of different distraction techniques.

**ORAL SESSION 9: ORTHOGNATHIC  
“SURGERY FIRST” VERSUS “TRADITIONAL PROTOCOL”. A QUALITATIVE ANALYSIS OF  
PATIENTS PERCEPTION OF TREATMENT AND OUTCOME**

*M.L. Beccuti<sup>1</sup>, M. Raffaini<sup>2</sup>*

*<sup>1</sup>face Surgery, Private Practice, Parma, Italy*

*<sup>2</sup>University of Florence, Maxillo-Facial Surgery, Florence, Italy*

**AIMS:**

Orthognathic patients (OP) undergo orthodontics and surgery to settle malocclusions and aesthetic defects contemporarily and begin to claim for choosing between Surgery First (SF) approach and a Traditional Sequence (TS). A qualitative research to evaluate the health experience and the patient subjective perceptions of outcome in each protocol was therefore deemed appropriate.

**METHODS:**

We conducted in-depths interviews with 75 consequently treated orthognathic patients: 50 SF and 25 TS. They had orthodontics and bimaxillary orthognathic surgery between 2013 and June 2014, with 3D surgical planning.

Inclusion criteria: Class III (28 SF, 17 TS), Class II (12 SF, 3 TS), asymmetries (22 SF, 14 TS), open bite (2 SF, 9 TS). Exclusion criteria: patients refusing interviews or disattending post treatment follow-up.

Interviews, 1 month after the completion of orthodontics, were recorded and analyzed with the 'content analysis'.

**RESULTS:**

-overall satisfaction with appearance and functional recovery (SF/TS)

-improved self-confidence and social life, shorter overall treatment time, less invasively perceived orthodontics (SF)

**CONCLUSIONS:**

This qualitative study identified a series of 'positive' health experiences that accumulate SF and TS patients, but the immediate satisfaction with appearance, the overall shorter treatment time and the less invasively perceived orthodontics could possibly be key issues for making patients prefer SF protocol. However, the final choice for a particular surgical approach should not depend exclusively on these qualitative outcomes.

**ORAL SESSION 9: ORTHOGNATHIC  
SKELETAL AND NASAL CHANGES AFTER TRANSPALATAL DISTRACTION**

*M. Bila<sup>1</sup>, E. Van de Casteele<sup>2,3</sup>, E. Franssen<sup>4</sup>, D. Joel<sup>1</sup>, L. Renier<sup>1</sup>, S. Stevens<sup>1</sup>, B. Vanassche<sup>1</sup>,  
H. Verbruggen<sup>1</sup>, J. Van De Perre<sup>1</sup>, G. Van Hemelen<sup>2</sup>, N. Nadjim<sup>2</sup>*

<sup>1</sup>AZ Monica Antwerp, Maxillofacial surgery, Antwerpen, Belgium

<sup>2</sup>AZ Monica Antwerpen, Maxillofacial Surgery, Antwerp, Belgium

<sup>3</sup>All for research VZW, /, Antwerpen, Belgium

<sup>4</sup>StatUa Center for Statistics, Center for Medical Genetics, University of Antwerp, Belgium

**Background:** Transverse maxillary discrepancy is present in 10-30% of patients eligible for combined orthodontic-surgical treatment. Surgical assisted rapid palatal expansion (SARPE) has proven to be a reliable treatment for the correction of a substantial transverse maxillary deficiency. Bone-borne expanders were introduced to provide more skeletal expansion, avoiding undesired tooth movements and preventing relapse during consolidation.

**Objectives:** The aim of this study is to assess the skeletal and nasal effects of the transpalatal distraction using a bone-borne device.

**Methods:** This retrospective clinical review comprises 141 consecutive patients undergoing maxillary distraction as part of an orthodontic-surgical treatment, followed by orthognathic surgery after 9 months. Skeletal and nasal reference points were compared using the CBCT data acquired preoperatively and after 9 months. To improve CBCT reliability, fusion of the skull base was used for reference of both consecutive scan superposition.

**Results:** Nasal alar width and nasal base width increases by 1,1mm and 2,0mm consecutively. Noretip height does not significantly alter after distraction. Molar teeth show a parallel movement of 3,5mm on average while canine teeth show a width increase of 2,2mm coronally and 4,0mm apically.

The nasal septum deviation does not significantly change after distraction nor does the height of the palate. The bone of the maxilla widens 3,6mm in the posterior region and 4,6mm in the anterior region on average. We also report a notable advancement of the maxilla.

**Conclusion:** Our results will be interpreted in light of current literature about surgically assisted rapid palatal distraction.

**ORAL SESSION 9: ORTHOGNATHIC  
STABILITY AFTER BILATERAL SAGITTAL SPLIT OSTEOTOMY WITH RIGID INTERNAL  
FIXATION IN SURGERY-FIRST APPROACH**

*J. Cho<sup>1</sup>, J.U. Park<sup>1</sup>*

*<sup>1</sup>Seoul St. Mary's Hospital - College of Medicine - The Catholic University of Kor, Dentistry, Seoul, Republic of Korea*

**Purpose:** The purpose of this study was to evaluate the stability of bilateral sagittal split ramus osteotomy(BSSO) setback with rigid internal fixation in a surgery-first approach (SFA) for patients with skeletal Class III malocclusion.

**Patients and Methods:** Twenty-seven consecutive patients with skeletal Class III malocclusion treated with BSSO with the SFA were included in the study. Lateral cephalograms were taken and traced before surgery and 1 and 6 months after surgery. Cephalometric measurements were compared using repeated-measures analysis of variance. A P value less than or equal to .05 was considered significant.

**Results:** The study included 9 men (age, 25.7 2.9 yr) and 18 women (age, 26.6 4.2 yr). Treatment time was 8.4 1.5 months. Horizontally, there were no meaningful anteroposterior changes of the pogonion and B point during the postsurgical period (0.9 and 0.6 mm, respectively). Vertically, the pogonion showed superior movement after surgery (2.4 mm) without major postsurgical change (0.6 mm). The Bpoint showed major superior movement after surgery (2.3 mm) and during the postsurgical period (1.2 mm). The inclination of the lower incisor was increased labially during the postsurgical period (2.4), although this was not statistically important.

**Conclusions:** In the present study, there was no major horizontal relapse for any variable (<1 mm). Vertically, all variables showed no meaningful changes during the postsurgical period except the B point showed 1.2 mm of superior displacement. BSSO with rigid fixation using the SFA seems to be an effective and predictable procedure in patients with skeletal Class III malocclusion.

**ORAL SESSION 9: ORTHOGNATHIC  
3D VIRTUAL PLANNING ON COMBINED CT/STEREOPHOTOGRAMMETRY DATA; THE  
ITALIAN EXPERIENCE OF A MULTICENTER STUDY**

*M. Romano<sup>1</sup>, D.S. Rossi<sup>1</sup>, G. Gerbino<sup>2</sup>, G. Ramier<sup>2</sup>, C. Baserga<sup>1</sup>, C. Di Blasio<sup>3</sup>, A. Russillo<sup>1</sup>,  
E. Sesenna<sup>3</sup>, G. Soncini<sup>1</sup>, V. Valentini<sup>4</sup>, D.M. Marco<sup>4</sup>, A. Baj<sup>1</sup>, A.B. Gianni<sup>1</sup>*

*<sup>1</sup>Fondazione IRCCS Ca' Granda- Ospedale Maggiore Policlinico di Milano, Oral and Maxillo-  
Facial Surgery, Milano, Italy*

*<sup>2</sup>Azienda Ospedaliero-*

*Universitaria Città della salute e della Scienza di Torino. Ospedale Molinette, Chirurgia Maxillo-  
Facciale, Torino, Italy*

*<sup>3</sup>Azienda Ospedaliero-Universitaria di Parma, Chirurgia Maxillo-Facciale, Parma, Italy*

*<sup>4</sup>Umberto I- Policlinico di Roma, Chirurgia Maxillo-Facciale, Roma, Italy*

3D computer-assisted orthognathic surgery has been applied to improve planning and outcome.

The purpose of the study is to evaluate the capability of PROPLAN CMF (DePuy Synthes) in improving surgical outcome in orthognathic surgery by matching 3D virtual planning to combined CT and 3D stereophotogrammetry data.

The study included 23 subjects with dentofacial deformity who underwent orthognathic surgery with BSSO of the lower jaw, associated to a maxillary LeFort I osteotomy between 2014 and 2016.

All patients have been studied with a presurgical CBCT scans and 3D stereophotogrammetry that were loaded onto ProPlan CMF to perform virtual osteotomies and soft tissue predictions.

The 3D stereophotogrammetry and CBCT acquisitions were assessed 6 month after surgery and then compared to the pre-operative data.

The reliability of the program was evaluated by comparing the three-dimensional post-operative photos and TC scan with the simulation of soft tissue and the planning obtained with PROPLAN.

In our experience, the use of the 3D photo in the virtual planning in orthognathic surgery has significantly implemented the outcomes of surgery.

The software can be considered a useful method that provides a precise and reliable prediction of facial profile after orthognathic surgery.

**ORAL SESSION 9: ORTHOGNATHIC  
INNOVATIONS IN ORTHOGNATHIC SURGERY: "SURGERY FIRST". RESULTS OF A CASE  
SERIES**

*F. Ricotta<sup>1</sup>, E. Costabile<sup>1</sup>, F. Ruggiero<sup>1</sup>, G. Badiali<sup>1</sup>, A. Bianchi<sup>1</sup>, M. Piron<sup>2</sup>, C. Marchetti<sup>1</sup>*

*<sup>1</sup>Policlinico S.Orsola Malpighi - Alma Mater Studiorum University of Bologna, Oral and Maxillo-facial Surgery, Bologna, Italy*

*<sup>2</sup>Clinica Odontoiatrica Universitaria Bologna, Orthodontics, Bologna, Italy*

"Surgery First" (SF) is an innovative procedure to correct maxillofacial anomalies, performed "before the orthodontic treatment" .

The aim of this study is to show aesthetic-functional results gained with this technique, advantages and disadvantages. Approval from the Ethics Committee of S. Orsola Malpighi University Hospital, Bologna was obtained to proceed. From 2014 to 2015, 20 patients were consecutively admitted in our Department. All the patients included, had the same diagnosis of dento-skeletal dysmorphism, with indication to combined surgical-orthodontic treatment. Each patient underwent 3D study, virtual planning, orthodontic-surgical set-up, and has been discussed by the multidisciplinary orthodontic-surgical team of the Department. The standard orthognathic treatment of dentoskeletal dysmorphism consists of 3 steps: the first of these is the pre-surgical decompensation phase and the patient usually experiences a high discomfort due to the occlusal disfigurement. On the other hand, SF consists of only 2 steps: surgery and then orthodontic treatment. The Authors aim is to show and discuss the innovative advantages and perspectives (i.e. avoiding pre-surgical aesthetic-functional worsening that occurs with standard treatment, the discussed acceleration in dental movement after surgery) the 3D virtual management and the high orthodontic expertise required. The grade of satisfaction and the aesthetic-functional results have been assessed administering the questionnaire both to professionals and patients. The results obtained with 20 consecutive patients, gave us the measure of the risks and advantages connected with SF approach. The mean treatment duration was slightly shorter. The final occlusion was correct and, aesthetic-functional results was achieved. The mean grade of satisfaction was high.

**ORAL SESSION 9: ORTHOGNATHIC  
FAST-TRACK ORTHOGNATHIC SURGERY**

*J. Joshi Otero<sup>1</sup>, M. Mommaerts<sup>1</sup>*

*<sup>1</sup>UZ Brussel, European Face Centre, Brussels, Belgium*

**Aim:** A pilot study on a fast-track protocol for orthognathic surgery.

Fast-Track Surgery (FTS) is a multidisciplinary approach where the pre, intra and post-operative management is carefully planned in order to decrease intravenous fluids, fasting time and opioid focused analgesia among other parameters. The patients pre-surgical stress and postsurgical pain is considerably shortened and hence his/her stay in the hospital.

**Methodology:** Literature review through Medline, MBASE and the Cochrane library (January 2006-December 2015) defined our protocol.

**Results:** Nausea, headache, dizziness, wound pain, readiness to leave the hospital not-related to socio-economic reasons were recorded and evaluated against historical data.

**Conclusion:** Both referral patterns and expenses within the healthcare system should be positively influenced by FTS.

**ORAL SESSION 10: MISCELLANEOUS  
ORTHOGNATHIC SURGERY: IMMUNOLOGICAL PRESPECTIVES**

*S. Soliman<sup>1</sup>, M. Dehis<sup>2</sup>, M. Ahmad<sup>2</sup>*

*<sup>1</sup>Cairo University, Oral And Maxillofacial Department, Alexandria, Egypt*

*<sup>2</sup>Cairo University, Oral And Maxillofacial Department, Cairo, Egypt*

Introduction

"Surgery is immunosuppressive" is a well-documented information fact. Orthognathic surgery as an elective surgery is considered the most convenient in the maxillofacial surgeries to study the immunological effect of surgical trauma. Several mediators have been used as markers for the evaluation of the surgical stress; recently cytokines represent the most uptrend of them. Osteoprotegerin (OPG) which is an antiresorptive cytokine and Transforming growth factor beta one (TGF- $\beta$ 1) which is a multifunctional cytokine, both calipers were found to be of value as prognostic marker of bone activity, wound healing activity and the therapeutic progress following surgery. BY understanding the mechanisms of surgery inducing immunosuppression, surgeons may undertake strategies to minimize its effect.

Patients and Methods

The study was conducted on nine patients suffering from dentofacial deformity and seeking correction by orthodontic orthognathic surgery. Patients were not suffering from systemic diseases and age ranging from 16-30. Blood samples were collected for each patient to measure TGF- $\beta$ 1 and OPG according to the following schedule; immediate pre-operative, immediate post-operative, three days, one week, two weeks, four weeks and six weeks post-operative.

Results

On studying the changes detected in TGF- $\beta$ 1 and OPG in the whole group, it was detected that there is a significant increase in both calipers throughout the predetermined periods in comparison to the preoperative level.

**Conclusion**

The immunosuppressive effect of orthognathic surgery was proved by the higher levels of OPG and TGF-  $\beta$  in the post-operative periods. Therefore reduction of the peri and post-operative immunosuppressive factors should be set into consideration.

**ORAL SESSION 10: MISCELLANEOUS  
THE EAST GRINSTEAD CONSENT COLLABORATIVE: MOTIVATORS AND BARRIERS TO  
COLLABORATE AND THE CONSENT PROCESS.**

*E. Twohig<sup>1</sup>*

*<sup>1</sup>Queen Victoria Hospital, Oral and Maxillofacial Surgery, East Grinstead, United Kingdom*

**Background**

The East Grinstead Consent Collaborative (EGCC) is a trainee collaborative project that was used to determine nationwide practices of consent for oral and maxillofacial surgery. Its early success in the recruitment of senior trainees, for the head and neck project, meant that it was rolled out to orthognathic surgery aimed at junior trainees. For trauma, we will be recruiting medical and dental students, which is also an opportunity to promote the specialty. The aim of this paper was to determine what motivates these trainees to participate in a collaborative project, what hurdles they encountered and details of the consent process itself.

**Methods**

Online questionnaires will be sent out to determine the reasons for collaborating including the desire to improve patient treatment with the findings of the project, gaining a citable publication and abstracts, and having the opportunity to present the data both locally and nationally. We also consider whether fulfilling trainee audit and governance requirements is a motivator for collaboration.

**Results**

We have recruited 55 senior and 45 junior trainees so far. We have received data for 3000 patient's from 29 units and expect 2000 patients per subspecialty from 45 units in total. Given this high degree of motivation by participants we expect a high response rate to our survey.

**Discussion**

Determining what motivates a trainee to participate a collaborative projects will help us better understand how to develop future projects. By getting the formula right, we have the potential of running highly effective projects that benefit trainees, clinicians, and most importantly our patients.

**ORAL SESSION 10: MISCELLANEOUS  
EFFECTIVENESS OF CADAVERIC SURGICAL STIMULATION AS PERCEIVED BY  
PARTICIPATING ORAL AND MAXILLOFACIAL SURGERY TRAINEES**

*N. Mahon<sup>1</sup>, M. Virdi<sup>1</sup>, N. Thanabalan<sup>1</sup>, L. Hanu-Cernat<sup>1</sup>*

*<sup>1</sup>University Hospitals Coventry and Warwickshire NHS Trust, Oral and Maxillofacial Surgery, Coventry, United Kingdom*

Introduction

Cadaveric dissection courses are increasingly used for surgical simulation in postgraduate surgical training. Fresh frozen cadavers bear the most resemblance to living human tissue.

Methods

The aim of this study was to evaluate the effect of surgical cadaveric simulation on OMFS trainees' technical skills and determine trainee satisfaction with this type of training modality. Participating delegates from two surgical simulation workshops were included in this study. Results from candidates who completed pre and post course questionnaires were evaluated. The delegates were asked to rate their confidence in performing each surgical procedure before and after the surgical simulation workshop. The visual analog scale ranged from 0 (not confident) to 10 (very confident). Candidates were grouped into junior trainees (year 1-3) and senior trainees (year 4 & 5) for the purposes of comparison.

Results

41 candidates completed 78 questionnaires. Senior delegates most commonly improved by 3 points, whilst junior delegates most commonly improved by 4 points. Non-dissecting delegates showed no improvement between pre and post questionnaires. When UK trainees were matched in terms of their year of training to international trainees, they ranked higher in confidence and experience levels. All candidates expressed satisfaction with the dissection course.

Conclusion

Fresh cadaver surgical simulation is a valuable tool in surgical training. All trainee grades expressed satisfaction with this training modality and felt they gained significant experience. The junior trainees felt they gained the most from it. Simply observing the simulated procedures had no perceived impact on experience.

## **ORAL SESSION 10: MISCELLANEOUS SCREENING FOR COMMON MENTAL HEALTH CONDITIONS IN PATIENTS FOLLOWING FACIAL TRAUMA**

*E. Yeung<sup>1</sup>, A. Collinson<sup>1</sup>, K. Fan<sup>1</sup>*

*<sup>1</sup>King's College Hospital, Oral and Maxillofacial Surgery, London, United Kingdom*

### Introduction

Mental health is an integral part of overall wellbeing. Patients who suffer facial trauma may be at high risk of a mental health condition or developing Post-Traumatic Stress Disorder (PTSD) that if left unrecognised may have important negative implications for their recovery.

In the current financial climate a clinical psychologist in all clinics is unlikely but often non-specialist clinicians are uncomfortable making a mental health diagnosis. A simple electronic screening tool can aid the identification of patients who may benefit from psychological assessment and allow timely referral for patients who suffer from anxiety, depression or PTSD.

### Method

This was a prospective, qualitative cohort study. Patients attending outpatient clinic following facial trauma completed a composite questionnaire of validated screening tools for anxiety, depression and PTSD. Data collection and analysis were achieved on a tablet using the pioneering IMPARTS (Integrating Mental and Physical: Research Training and Services) system that linked into the electronic records. Results were reviewed immediately alongside a treatment suggestion – this may include referral to psychiatry or a recommendation to their General Practitioner.

### Results

139 patients were included in the study. 12.8% (n=18) screened positively for major depressive disorder, 10.1% (n=14) for generalised anxiety disorder. 24.1% (n=33) of patients screened positively for probable PTSD and may warrant further investigation.

### Discussion

A quick and simple patient-completed electronic screening tool can allow identification and referral for patients who may benefit from further psychological assessment. Clear protocols aids the clinician risk-stratify common mental health conditions and make appropriate referral.

## **ORAL SESSION 10: MISCELLANEOUS**

### **LOCAL USE OF THE NANO-ANTIOXIDATIVE GEL IN THE TREATMENT OF SOFT TISSUE WOUNDS IN THE ORAL CAVITY**

*A. Benedetti<sup>1</sup>, J. Fidoski<sup>2</sup>, A. Stamatovski<sup>3</sup>, V. Mitrovski<sup>4</sup>, R. Mitrovski<sup>5</sup>, D. Baftijari<sup>6</sup>, A. Vasilev<sup>7</sup>, E. Gjorgievska<sup>8</sup>, B. Kapusevska<sup>9</sup>, R. Feka<sup>10</sup>*

*<sup>1</sup>University Clinic for Maxillofacial Surgery, University Clinic for Maxillofacial Surgery, University Clinic for Maxillofacial Surgery, FYR Macedonia*

*<sup>2</sup>Private Dental Office, Nano-bio-fusion gel office, Skopje, FYR Macedonia*

*<sup>3</sup>Private Dental Office, Private Dental Office- postgraduate student, Tetovo, FYR Macedonia*

*<sup>4</sup>Private Dental Office, Private Dental Office, Skopje, FYR Macedonia*

*<sup>5</sup>Dental Office, Dental office polyclinic Bitpazar, Skopje, FYR Macedonia*

*<sup>6</sup>Private Dental Office, Polyclinic Vita Dent, Tetovo, FYR Macedonia*

*<sup>7</sup>Dental Office, Dental office, Skopje, FYR Macedonia*

*<sup>8</sup>University Clinic, Pediatric and Preventive Dentistry, Skopje, FYR Macedonia*

*<sup>9</sup>University Clinic, Prosthodontics, Skopje, FYR Macedonia*

*<sup>10</sup>Private Dental Office, Dental Office Endodontia, Ferizaj, Kosovo*

## **AIM**

To analyze and evaluate the effects of the local use of nano-bio fusion (NBF) gel in healing process of soft tissue wounds in surgical procedures in the oral cavity.

## **METHODS**

The study was performed in ninety patients divided in three different groups according to the type of treatment with surgical removal of benign tumor changes, preprosthetic surgery, extraction of impacted teeth and fenulectomy.

Patients were divided and analyzed into three groups in 2 years period. After suturing, nano-emulsion gel was applied 3 times daily in a thin film enough to overlap the wound with a gentle massage for a period of 2 minutes

First group was treated with NBF gel containing vitamin C, E and propolis, second with nano gel propolis less and third with placebo treatment.

We have done descriptive analyzes evaluating the results on third and seventh day of the each patients treatment in these free different groups.

The healing effect of this gel was evaluated by determination of wound healing parameters with index score of Landry, Turnbull and Howley.

Controls of surgical wounds were followed up three times postoperatively, after surgery procedure and on the 3<sup>th</sup> and 7<sup>th</sup> day.

## **RESULTS**

During the follow up period we used clinical approach and photographs to objective tissue healing or possible ulceration and infections.

Good healing of the wounds was dominant in first group of patients with using of NBF gel.

## **CONCLUSIONS**

These results suggested that local using of NBF gel gives antibacterial, anti-inflammatory and good healing aesthetic effects to patients having oral surgical procedure.

**ORAL SESSION 10: MISCELLANEOUS  
RELEVANCE OF POSITIONAL CRANIAL DEFORMITY AND THERAPEUTIC NEED  
EVALUATED BY LAYMEN**

*S. Kluba<sup>1</sup>, S. Höpfl<sup>1</sup>, W. Kraut<sup>1</sup>, J.P. Peters<sup>1</sup>, B. Calgeer<sup>1</sup>, S. Reinert<sup>1</sup>, M. Kimmel<sup>1</sup>*

*<sup>1</sup>University of Tübingen -Center of Dentistry - Oral Medicine - Maxillofacial Surg,  
Department of Oral and Maxillofacial Surgery, Tübingen, Germany*

**Aim:**

The relevance of positional cranial deformity is still controversially discussed. While many specialists support therapeutic interventions with a helmet for severe cases, some are convinced that the fears are exaggerated and helmets superfluous. We therefore asked unaffected people for their opinion.

**Method:**

395 laymen were interviewed. Standardized photos of 10 children with different degrees of positional deformity (CVAI 3.5% - 12.5%, CI 85.0% - 100%) were presented to them in a randomized order. Values from the literature (CI: 85%, CVAI: 3.5%) served as normal reference. The people were asked to evaluate, if the children looked abnormal to them and if they should be treated. The deformity was regarded as obviously abnormal when 50 % of the respondents perceived the head as conspicuous. The cut-off value for a therapeutic recommendation was set at 25%.

**Results:**

All heads above the reference values were perceived as abnormal by the great majority of laymen independently of the severity of deformity (plagiocephaly: 93.9% - 95.7%, brachycephaly: 87.3% - 93.2%, combination: 77%). In all abnormal infant heads laymen saw the need to treat (plagiocephaly: 51.1% - 72.9%, brachycephaly: 59.5% - 62.0%, combination: 37.2%). The lower border of confidence intervals exceeded the cut-off value of 25% in all cases.

**Conclusion:**

Our results confirmed the existing normal values. As already very mild deformities were perceived as conspicuous and worth to treat by the laymen, the problem is clinically relevant and should not be underestimated. A social stigmatization cannot be excluded when untreated. Therefore treatment should be offered regularly.

**ORAL SESSION 10: MISCELLANEOUS  
EVALUATION OF THE EFFECTIVENESS OF THE LIP –CHEEK- TONGUE- TRAINER OF THE  
OROFACIAL MUSCLES- A PILOT STUDY**

*J. von Jackowski<sup>1</sup>, S. Streff<sup>1</sup>, S. Codoni<sup>1</sup>, N. Eckstein<sup>1</sup>, H.F. Zeilhofer<sup>1</sup>, I.B. Berg<sup>1</sup>*

*<sup>1</sup>University Hospital, Cranio-Maxillofacial-Departement, Basel, Switzerland*

**Aims/ Introduction**

The aim of this pilot study was to evaluate a new lip-cheek-tongue-trainer (LWZT). The hypothesis of the study was to assess whether the effectiveness of this new intraoral assemblies trainer is suitable for adults.

**Material and Methods**

15 healthy female probands (28-59y, average age 43y). agreed to participate. Exclusion criterias were: recent orthodontic treatment, speech therapy, myofunctional treatment, diseases of the mouth and facial area, pregnancy and/or morphologically orthopedic problems. The probands carried the LWZT for 12 weeks and up to 20 minutes everyday. Before the study started and after 12 weeks, tongue pressure and position before and after treatment, orofacial muscle power (swallowing) and lip competence at rest position were assessed. A standardized questionnaire (6 questions) about wearing comfort, occlusion in relation to the bite webs, subjective lip competence, handling, material and form matters was completed by the participants.

**Results**

All of the 15 healthy probands showed an anterior swallowing pattern, or a general positive effect. A negative outcome was not observed in any of the participants.

**ORAL SESSION 10: MISCELLANEOUS**  
**DIFFERENTIAL DIAGNOSIS OF CERVICAL LYMPHADENOPATHIES IN A PORTUGUESE ADULT POPULATION: A RETROSPECTIVE STUDY IN A REFERRAL CENTER**

*I. Pinto de Matos<sup>1</sup>, A.R. Costa<sup>1</sup>, A. Barbosa Silva<sup>1</sup>, C.M. da Mata Carracha<sup>1</sup>, A.S. Furtado<sup>2</sup>, S. Sousa<sup>1</sup>, P. Valejo Coelho<sup>1</sup>*

<sup>1</sup>Central Lisbon Hospital Center, Maxillofacial Surgery, Lisbon, Portugal

<sup>2</sup>Central Lisbon Hospital Center, Internal Medicine, Lisbon, Portugal

*Introduction:*

Cervical lymphadenopathies are a frequent cause of neck masses. The main cause of peripheral lymphadenopathy is non-specific reactive hyperplasia and the prevalence of malignancy in referral centers is about 17% and up to 40–60% in patients referred with a high suspicion. However, tuberculosis may be important to consider in Portugal where it is highly prevalent. As excisional biopsy (lymphadenectomy) remains the gold standard for the diagnosis, oral and maxillofacial surgeons are frequently involved in the management of patients with cervical lymphadenopathies.

*Objectives:*

To determine the most frequent causes of cervical lymphadenopathies in a portuguese referral center adult population presenting with a neck mass.

*Methods:*

A retrospective study of cervical lymph node biopsy specimens was conducted. Cases were selected from the Maxillofacial Department database, in a Central Hospital in Portugal, between January 2011 and February 2016. Those codified with ICD-9 codes for cervical lymphadenectomy were included, except for codification errors. Procedures corresponding to neck dissection were excluded.

*Results:*

A total of 57 cervical lymph node biopsies from 19 males (33.3%) and 38 females (66.7%) were analyzed. In average patients were 49.2 years-old. Twenty three patients (40.4%) had a histological malignant finding. The distribution of the most common pathological conditions was as follows: lymphoma n=19 (33.3%), non-specific reactive hyperplasia n=17 (29.8%), tuberculosis n=9 (15.8%) and metastatic disease n=3 (5.3%). The majority of cases of tuberculosis were from foreign origin.

*Conclusions*

Lymphoma was the main cause of cervical lymphadenopathy in a portuguese referral center adult population presenting with a neck mass, followed by non-specific reactive hyperplasia and tuberculosis.

## **ORAL SESSION 10: MISCELLANEOUS DENTAL CARIES AS A SIGN OF CHILD ABUSE**

*H. Sillevius Smitt<sup>1</sup>, T. de Vries<sup>2</sup>*

*<sup>1</sup>Medisch Centrum Leeuwarden, Maxillofacial Surgery, Leeuwarden, Netherlands*

*<sup>2</sup>Medisch Centrum Leeuwarden, Pediatrics, Leeuwarden, Netherlands*

### **Foreword:**

In 2010 there were 118.000 children and adolescents in the age of 0 till 18 years in the Netherlands that fell victim of some kind of child abuse.

It is plausible to assume that the victims of child abuse will have less perfect teeth than the children who are not victims. Conversely, dental caries in a child could be a sign of child abuse.

### **Materials and methods**

To test this thesis a group of children under the age of 18 years were identified in the province Friesland, where in 2005 and in 2006 one or multiple teeth were extracted by a maxillofacial surgeon due to dental caries under general anaesthesia. This group of children was cross checked with data of the child protection Friesland in 2015.

### **Results**

In 2005 en 2006 there were 205 children in Friesland which had one or multiple teeth removed under general anaesthesia due to dental caries. From these 205 children 56 children (27 percent) were also present in the database of child protection in 2015: 9 (4 percent) because of neurodevelopmental disorders and 47 (23 percent) because of child abuse. It appeared that the treatment date was in 27 children (13 percent) before the date of registration in child protection.

### **Conclusion**

Children who need to get removed one or multiple teeth due to dental caries under general anaesthesia are frequently known at child protection.

The maxillofacial surgeon needs to be aware of the relatively high prevalence of child abuse in this group of patients.

## **ORAL SESSION 11: CLEFT**

### **PALATOPLASTY WITH INTRAVELAR VELOPLASTY AND ELONGATION BY UNION OF THE POSTERIOR TONSILLAR PILLARS: SPEECH OUTCOMES.**

*N.E. Sierra<sup>1</sup>, B. Salazar-perez<sup>2</sup>, T. Puignou<sup>3</sup>, E. Quiroga-marsinach<sup>3</sup>, V. M Mercedes<sup>3</sup>, A. Nivaldo<sup>4</sup>*

*<sup>1</sup>Hospital Vall D'hebron, Oral And Maxillofacial Surgery, Barcelona, Spain*

*<sup>2</sup>Hospital Vall D'hebron, Otolaryngology, Barcelona, Spain*

*<sup>3</sup>Hospital Vall D'hebron, Speech Therapy Unit. Physical Medicine And Rehabilitation Department, Barcelona, Spain*

*<sup>4</sup>Hospital Das Clinicas - University Of Sao Paulo, Plastic Surgery- Cranio-maxillo-facial Surgery Unit, Sao Paulo, Brazil*

#### **Aims**

To assess the speech outcomes and complications following primary cleft palate repair using a palatoplasty technique with intravelar-veloplasty and elongation by union of the posterior tonsillar pillars.

#### **Methods**

The speech outcomes and complications of a series of (>35\*) non-syndromic cleft-palate patients, who underwent palatoplasty at 9-12 months of age, by the same Senior Surgeon, were analyzed. Standardized speech evaluations were performed, by two speech therapists, in all patients older than 6 years to score the severity of hypernasality, nasal scape, articulation errors, velopharyngeal insufficiency (VPI) and intelligibility. The kappa statistic was used to assess the inter-judge and intra-judge reliability. Additionally, a fibronasoscopy was also performed in each patient to visually assess the velopharyngeal (VP) movements and rule-out the presence of VP gap.

#### **Results**

The mean age at evaluation was XX years. Of the >35\* patients, XX% had no evidence of hypernasality, XX% had no presence of nasal scape, and XX% had no articulation errors. Overall, XX% of patients had no evidence of VPI and XX% had no alterations of intelligibility. The presence of a VP gap was confirmed in XX% of patients with clinical evidence of VPI.

#### **Conclusions (Hypothesis)**

The palatoplasty with intravelar-veloplasty and elongation by union of the posterior tonsillar pillars offers excellent speech outcomes with minimal and acceptable rates of VPI.

\* Data is currently been collected. Preliminary results are consistent with the conclusions.

**ORAL SESSION 11: CLEFT  
SURGICAL TREATMENT OF VELOPHARYNGEAL INSUFFICIENCY: ALGORITHM  
PROPOSAL**

L. Autelitano<sup>1</sup>

<sup>1</sup>*Ospedale San Paolo, Maxillofacial surgery, milan, Italy*

**Background:** The purpose of this study was to review the appropriateness of surgical protocols used to treat VPI in cleft palate patients.

**Material and methods:** The sample consisted of 83 patients operated for correction of VPI between 2006 and 2015. All subjects were evaluated preoperatively and postoperatively by experienced speech-and-language pathologists using a standardized scale according to the GOS.SP.ASS-98 protocol. Parameters assessed were hypernasality, nasal emission, nasal turbulence, grimace, intelligibility and acceptability. The preoperative instrumental evaluation consisted of both videofluoroscopy and a nasopharyngocopy. The most suitable surgical technique was proposed, choosing among six procedures graded into a scale of increasing invasiveness. Preoperative and postoperative speech ratings were compared and stratified by surgical technique, syndromic association and hospital where the first procedure of palatoplasty was performed. The benefit achieved by surgery was estimated in three ways: final outcome, classified as improved, worsened or unchanged; success rate, defined as the proportion of subject who achieved complete resolution of the preoperative symptom; and margin of improvement, defined as the average difference between the preoperative and postoperative scores.

**Results:** An improvement of the preoperative score was detected in approximately 76% of subjects and a complete resolution was obtained in almost 45%. Surgery was found to improve by 1.5 points the preoperative score. No subject had a worsening of speech after surgery.

**Conclusions:** A decisional protocol based on the systematic melding of perceptual and instrumental evaluation helps the cleft surgeon to choose the surgical technique that allows for a good speech outcome while reducing aggressiveness

## **ORAL SESSION 11: CLEFT**

### **FREQUENCY OF VELOPHARYNGOPLASTY, DENTOALVEOLAR ANOMALIES AND SPEECH DISORDERS IN CHILDREN HAVING SUBMUCOUS CLEFT PALATE**

*J.H. Dr. Lenz<sup>1</sup>, A. Dr. Dieckmann<sup>1</sup>, H.E. Dr. Bernd<sup>2</sup>, B. PD Dr. Koos<sup>3</sup>, B. Prof. Dr. Dr. Frerich<sup>1</sup>*

*<sup>1</sup>University of Rostock, Oral and Maxillofacial Plastic Surgery, Rostock, Germany*

*<sup>2</sup>University of Rostock, Ear- Nose and Throat, Rostock, Germany*

*<sup>3</sup>University of Rostock, Orthodontics, Rostock, Germany*

#### **Objective**

Delayed detection of submucous clefts often results in speech disorders. Improved interdisciplinary treatment could be necessary to support delayed speech development in that patients.

#### **Methods**

Retrospective one center study; 26 patients with submucous clefts (age 8-13y,): Speech development, dentoalveolar relationships, surgical history/postoperative surgical results were analyzed. Speech pathologists have reported primary/secondary functions and cleft-type symptoms pre-/postoperatively. Speech were observed using voice samples (HEIDTMANN), A-I-probe (GUTZMANN): Even swallowing was evaluated (Payne-technique). Nasal perfilation (functional tonometry, THIELE) and phonematic hearing evaluation (BREUER/WEUFFEN) were performed. Velopharyngeal competence was controlled endoscopically, respiration, breathing types/tube ventilation were observed by ENT specialists. Orthodontists observed dentoalveolar relationships analyzing 8yrs. dental cast using a digital model scanning. Individual variance, anterior/posterior dimensions and occlusal relationships were analyzed. Overjet, overbite, crossbites were determined. Results were compared regarding 2 different surgical techniques (Veloplasty (KRIENS), VPP (Sanvenero-Rosselli)) and postop. surgical outcome. Statistics: Chi-Square (significance  $p < 0.05$ )

#### **Results**

Preop. significant dysfunctions were found in many children: Rhinophonia aperta (90%), breathing insufficiencies (79%), disorders of tuba auditiva (61% of patients). 15 patients showed speech development disorders. Postop. observations revealed rhinophonia aperta (19%), breathing insufficiencies (46%), disorders of the tuba auditiva (38%) without significance.

In 4 patients primary VPP were performed, in 18 intravelar veloplasty-2 patients had no surgical therapy, 3 patients have underwent secondary VPP following to veloplasty (VPI/rhinophonia aperta ( $p > 0.05$ )). Postop. orthodontic results showed no significance in growth disturbances (transversal crossbites (19%); Angle Class III anomalies (7%)) and no correlation between primary as well as secondary VPP and dentoalveolar development.

#### **Conclusions**

Early diagnosis is important for patients with submucous clefts. Whilst velopharyngeal incompetence is leading to voice and breathing disorders the outcome of surgery is important for good functional rehabilitation. In this study VPP has no negative influence on dentoalveolar development in submucous cleft palate.

## **ORAL SESSION 11: CLEFT**

### **TRANSORAL ROBOTIC CLEFT PALATE SURGERY (TORCS) AS A HYBRID PROCEDURE**

*N. Nadjmi<sup>1,2</sup>*

<sup>1</sup>*Antwerp University Hospital / AZ MONICA Antwerp, Department of Cranio-Maxillofacial Surgery, Antwerpen, Belgium*

<sup>2</sup>*University of Antwerp, Antwerpen, Belgium*

**Background:** To assess the safety and feasibility of transoral robotic surgery in the reconstruction of soft palatal cleft.

**Methods:** An experimental soft palatal dissection was performed on a cadaver. Application of transoral robotic surgery for soft palate muscle reconstruction was attempted on 37 cleft patients.

The da Vinci Surgical Robot was used on a cadaver and assessed for the optimal positioning of the patient and robot, the introduction of the videoscope and 2 of the 8 mm endeffectors of the robotic system as well as the dexterity, precision, and depth perception that it allowed the surgeon during trans-oral soft palate surgery.

The da Vinci Surgical Robot was used through a transoral approach to attempt reconstruction of palatal muscles in ten patients with palatal cleft under general anesthesia. Procedures were documented with video and still photography.

**Results:** Use of the surgical robot on cadaver provided great dexterity and precision, delicate tissue handling, excellent 3-dimensional depth perception, and relatively easy transoral suturing. The transoral access proved to be efficient and safe for precise dissection, reorientation and suturing of palatal muscles.

**Conclusions:** A Surgical robotic approach can be used safely for palatal surgery.

We believe that the precise dissection of the palatal muscles provided by robotic system might reduce the chance of damaging vascularization and innervation of these muscles, as well as damage to mucosal surfaces resulting in fistula formation, and might improve palatal function and Eustachian tube function in cleft patients.

**ORAL SESSION 11: CLEFT  
COMPARISON OF THE EFFECTS OF ONE-STAGE AND TWO-STAGE PALATOPLASTIES  
FOR UNILATERAL CLEFT LIP AND PALATE ON MAXILLARY GROWTH**

*S. Ketoff<sup>1</sup>, R.H. Khonsari<sup>1</sup>, F. Girinon<sup>2</sup>, S. Touzet<sup>3</sup>, V. Soupre<sup>1</sup>, N. Kadlub<sup>1</sup>, C. Tomat<sup>1</sup>, B. Vifane<sup>1</sup>, A. Picard<sup>1</sup>*

*<sup>1</sup>Necker-Enfants Malades University Hospital, Service de chirurgie maxillo-faciale et plastique, Paris, France*

*<sup>2</sup>Arts et Métiers ParisTech, Laboratoire de biomécanique, Paris, France*

*<sup>3</sup>Centre Hospitalier Universitaire de Lille, Service de stomatologie et chirurgie maxillo-faciale, Lille, France*

**Aims**

The scarring of the palatal mucosa during cleft palate closure is considered to be an important factor in sagittal and transversal maxillary growth. Two different methods of cleft palate surgery have been sequentially used in our department. Here we intend to compare the outcome of these methods in terms of palatal growth at the time of the alveolar cleft closure.

**Methods**

We included 30 CBCTs performed before alveolar cleft repair and after orthodontic maxillary expansion, from patients (mean age 6.3) with non-syndromic unilateral cleft lip and palate. Ten patients had been operated using a one-stage procedure with the translation of large lateral mucosal flaps and 10 patients had benefited from a two-step procedure without the exposure of palatal bare bone; 10 unaffected controls were also considered. We performed 3D cephalometrics on the maxilla and analysed the palatal shape using geometric morphometrics.

**Results**

The sagittal and transversal dimensions of the maxilla were significantly reduced in the group with the one-stage procedure. The analysis of the palatal shape allowed to map the growth restriction zones on the palatal surface.

**Discussions**

Two-stage palatoplasty with minimal displacement of the mucosa seems to favour maxillary growth. Nevertheless, our study is limited by the orthodontic expansion for which the two groups could potentially have different tissular responses. These results provides a scientific basis for one of the steps of the functional protocol applied in most French cleft centers.

**ORAL SESSION 11: CLEFT  
AN ANATOMICAL APPROACH TO ENHANCE THE AESTHETICS OF CLEFT LIP AND NOSE  
RECONSTRUCTION**

*N. Nadjmi<sup>1,2</sup>*

*<sup>1</sup>Antwerp University Hospital / AZ MONICA Antwerp, Department of Cranio-Maxillofacial Surgery, Antwerpen, Belgium*

*<sup>2</sup>University of Antwerp, Faculty of Medicine & Health Sciences, Antwerpen, Belgium*

Introduction and Objectives:

The method of choice in the primary correction of cleft lip and associated nasal deformity has been the subject of controversy in the past decades. Although the objectives are identical, up to this point of time the cleft surgeons have failed to make a concession on the method of choice.

Material and Methods:

A modified Millard cleft lip repair together with a primary correction of the nasal tip deformity is discussed. This technique has been used in our department since 2000.

In this presentation a step-by-step description of the final cleft lip and nose repair is discussed in detail. Our technique is based on a three dimensional anatomical approach, where the displaced anatomical entities are recognized by a detailed 3D imaging. A puzzle consisting of detached and precisely dissected tissue entities are then created and finally reoriented and reconstructed in an anatomical fashion.

Results:

This method proved to guaranty mid long term esthetic and functional results.

Conclusions:

Although the clinical follow up of our patients shows a promising aesthetic and functional results, the long term influence on the mid facial growth is yet to be seen.

## **ORAL SESSION 11: CLEFT**

### **FACIAL AVERAGENESS INDEX AS A MEASURE OF FACIAL ATTRACTIVENESS IN EVALUATING SEQUENCES OF SECONDARY CLEFT SURGERIES**

*A. Chadha<sup>1</sup>, P. Georg<sup>2</sup>, D. Wertheim<sup>3</sup>, P. Haers<sup>4</sup>*

*<sup>1</sup>King's College London, South Thames Cleft Service, LONDON, United Kingdom*

*<sup>2</sup>St. Thomas Hospital, South Thames Cleft Service, London, United Kingdom*

*<sup>3</sup>Kingston University, Computer Science and Mathematics, London, United Kingdom*

*<sup>4</sup>St. Thomas Hospital, London, United Kingdom*

#### **Introduction**

Progress in the surgical treatment of cleft lip requires a satisfactory means of describing the 3D morphometry of the defect to enable the objective measurement of surgical outcomes, particularly facial appearance. One method for assessing facial attractiveness is to measure by how much facial features approximate the mean of a normal population. This information can be extracted from 3D photographs and used to evaluate the final outcome of cleft surgeries by way of a "Facial Averageness Index"(FAI). The aim of this study was to evaluate a sequence of secondary cleft surgeries in terms of the FAI.

#### **Materials & Method**

The post-operative images of 50 non-syndromic adult cleft patients undergoing secondary corrective surgeries were analysed for their approximation to the facial average with respect to their pre- secondary surgery images. A method based on Farkas' proportion indices was facilitated by Vultus ® software to enable anthropometric analysis. Values were compared to mean proportion indices of a control sample. The baseline FAI was then correlated to the number and type of secondary surgeries undertaken in each case.

#### **Results & Statistics**

There was a strong correlation between successive surgical interventions and approximation to the facial average. The greatest improvement in FAI was achieved through orthognathic surgery. Ethnicity is a significant confounder in the value and interpretation of FAI.

#### **Conclusions**

These results are encouraging to suggest a role for FAI as a tool to evaluate the results of secondary cleft surgeries using 3D photography as the data acquisition method. Application of Principal Component Analysis will further increase utility.

**ORAL SESSION 11: CLEFT  
FACIAL SYMMETRY INDEX AS A POST-OPERATIVE EVALUATION MEASURE IN  
COMPLETE UNILATERAL CLEFT LIP PATIENTS IMAGED USING 3D PHOTOGRAPHY**

*A. Chadha<sup>1</sup>, P. Georg<sup>2</sup>, P. Haers<sup>2</sup>*

*<sup>1</sup>King's College London, South Thames Cleft Service, London, United Kingdom*

*<sup>2</sup>St. Thomas' Hospital, South Thames Cleft Service, London, United Kingdom*

**Aims:**

Objectifying the 3D outcome of cleft surgery is essential to provide a tool for quality assessment that can influence surgical protocols. This requires a reliable and meaningful method of facial analysis. We present a method of facial analysis termed the facial symmetry index (FSI) by which to evaluate the results of complete Unilateral Cleft Lip (UCL) repair and compare this to the unoperated baseline for each patient. In addition we introduce a specific, customised cleft template designed to crop the region of interest and minimise errors.

**Method:**

This was a retrospective cohort study using patient level data collected from a 3D photographic database (3dMD) at the South Thames Cleft Centre. The pre- and post-operative images of non-syndromic UCL patients undergoing primary repair of their lip with/out alveolar bone grafting were analysed at specific time points and evaluated with respect to an index of facial asymmetry. A corrective factor was used to account for patient growth. 34 patients with pre- and post-op images were analysed and 69 post-operative images five years post-op were also analysed. Specifically we evaluated the change in facial asymmetry with respect to pre-operative severity and the effect of growth.

**Results:**

1. All patients who underwent repair of the UCL demonstrated an improvement in facial symmetry index.
2. There was a strong correlation between facial symmetry index and clinical assessment of improvement through surgery
3. There was good photographic repeatability.

**Conclusions:**

These results are encouraging in suggesting a role for "facial symmetry index" as a tool to evaluate the results of UCL repair

**ORAL SESSION 11: CLEFT  
A MORPHABLE PROFILE MODEL OF THE HUMAN HEAD AS AN OUTCOME TOOL FOR  
CRANIOSYNOSTOSIS SURGERY**

*P. Bujtár<sup>1</sup>*

*<sup>1</sup>Craniofacial fellow / Oral and maxillofacial surgeon,  
Alder Hey Hospital for Children / Liverpool and Great Ormond Street Hospital for Children /  
London, Leicester, United Kingdom*

Analysis in craniosynostosis surgery relies on anthropometric measurement, qualitative analysis of photography or patient reported outcome. Quantifiable morphable models of the human face and head has not been available lack of appropriate tools. We present a morphable profile model, which includes an average, and demonstrate proposals for its use in outcomes analysis following craniosynostosis surgery.

The 'Headspace Project' was a public partnership data gathering in Liverpool between September 2013 and January 2014. Specific photographic protocols were adhered to and consent was obtained from volunteers. Appropriate 3D images were imported into Matlab and compiled to produce a cross-sectional model of head shape, comprising of a mean profile and the profile's modes of variation. The extracted profile's of two groups of scaphocephaly patients who underwent different operations patients were then compared with this model.

Images of 1523 individuals were collected, 752 males, 770 females and 1 transgender. Age ranges were categorised according to 10 year brackets and included 111 below 10 years, 196 10-20 year olds. Details of facial or head trauma or surgery were collected. A preliminary profile model was used to demonstrate that an operative protocol for scaphocephaly delivered normalised aesthetics compared with pre-operative appearance in patients undergoing strip craniectomy, micro barrel staving and total calvarial remodelling.

There were logistic and technical challenges which will be discussed, but we developed a morphable profile and full model of the human head. Aesthetic outcomes derived by comparison of pre-operative and postoperative 3dMD photos of scaphocephaly patients with the defined norm can be produced.

**ORAL SESSION 11: CLEFT**

**THE USE OF AUTOLOGOUS FAT GRAFTING FOR TREATING THE MILD VELOPHARYNGEAL INSUFFICIENCY: OUR PROTOCOL AND LITERATURE REVIEW**

*B. Apellaniz<sup>1</sup>, E. Gomez<sup>1</sup>, J.M. Muñoz<sup>1</sup>, M. Martin<sup>1</sup>, J. Noguera<sup>1</sup>, E. Alonso<sup>1</sup>, P.M. Losa<sup>1</sup>, M. Burgueño<sup>1</sup>*

*<sup>1</sup>Hospital Universitario La Paz, CMFX, Madrid, Spain*

The velopharyngeal insufficiency (VPI) is a common complication after primary palatoplasty. A wide range of surgical techniques have been described to treat it. However, many can be too aggressive involving high risk and potential morbidity.

The treatment of mild to moderate insufficiency is controversial, since classical techniques can be considered an overtreatment. Recently, the use of autologous fat grafting has expanded due to its simplicity, few complication incidence and minimal morbidity. Those cases with a mild VPI can improve their competence when this technique is applied.

In La Paz University Hospital, the autologous fat grafting technique has been used since 2013.

Fifteen patients with a mild insufficiency have been treated. After a phoniatric assessment, those cases with mild VPI are selected. Surgery was performed under general anesthesia and the fat graft was performed with the Coleman technique. All patients were discharged after 24h.

In our experience, as well as in the literature, the insufficiency symptoms improve, with less hypernasal speech and better word articulation. With videonasopharyngoscopy, a decrease of the velopharyngeal gap was objectified. No complications were observed, neither a worsening of their previous condition. All patients pointed out that they have a perception of an easier speech articulation. This could be related with the regenerative potential of the stem cells grafted with the fat, that could improve the elasticity and vascular supply of the scar tissue.

The autologous fat grafting is a minimally invasive technique, with a low complication and morbidity incidence. The patient selection is essential to reach good results.

**ORAL SESSION 12: ORTHOGNATHIC  
ARE CONDYLAR MORPHOLOGICAL CHANGES ASSOCIATED WITH  
TEMPOROMANDIBULAR DISORDERS IN ORTHOGNATHIC PATIENTS?**

*Z. Catherine<sup>1</sup>, D. Courvoisier<sup>2</sup>, P. Scolozz<sup>2</sup>*

*<sup>1</sup>Centre Hospitalier Lyon Sud, Maxillo facial and Plastic Surgery, Pierre Benite, France*

*<sup>2</sup>Hôpitaux Universitaires de Genève, Maxillo facial surgery, Geneve, Switzerland*

**Objective:** To determine the association between morphological condylar changes and temporomandibular disorders (TMDs) in orthognathic patients.

**Study Design:** Data from 89 patients were analyzed. Temporomandibular disorders were classified according to Research Diagnostic Criteria for TMDs. The TMD's severity was scored according to Helkimo's indices. Calculation of the condylar area, perimeter and height was performed by using a specific computational method using panoramic radiographs.

**Results:** Sixty-five (73 %) patients had a reduction of one or more condylar parameters. Decreases in condylar perimeter and area were found to be predictors of postoperative TMDs ( $p=0.009$  and  $OR=3.66$ ) and disk displacement ( $p=0.008$  and  $OR=4.43$ ), respectively. Condylar area and height decreases were associated with worsening of TMDs ( $p=0.03$  and  $p=0.04$ ).

**Conclusion:** This study demonstrated that in orthognathic patients: 1) postoperative condylar changes are associated with postoperative TMDs as well as with the degree of TMD severity; 2) preoperative TMDs are associated with such changes.

**ORAL SESSION 12: ORTHOGNATHIC  
ALGORITHM OF COMPUTER AIDED DESIGN AND COMPUTER AIDED MANUFACTURING  
FOR CORRECTION OF BIMAXILLARY SKELETAL DEFORMITIES: A PRELIMINARY STUDY.**

*M. Ahmed<sup>1</sup>, M. Omara<sup>1</sup>, N. Askar<sup>1</sup>*

*<sup>1</sup>Faculty of Oral and Dental Medicine- Cairo University, Oral and Maxillofacial Surgery, Cairo, Egypt*

**Background:**

Orthognathic surgery is considered the principal way for correcting of bimaxillary skeletal deformities. The correct repositioning of the facial skeleton is necessary for aesthetic and functional outcomes. In conventional model surgery, intermediate and final wafers utilized extensively to reposition both maxilla and mandible. Splint fabrication requires several time-consuming manual steps that may resulted in errors. Using computer-aided design (CAD) and computer-aided manufacturing (CAM) techniques, the operator can virtually perform osteotomies and move the bony segments to the exact position (virtual model surgery) and printing stereolithographic models.

**Aim:**

The aim of this study was to verify a novel protocol in CAD-CAM technology for correction of bimaxillary skeletal deformities.

**Method:**

Ten patients with bimaxillary skeletal deformity were subjected to Computed Tomography (CT) and dental casts scanning. CT images were transformed into initial virtual models. The scanned cast models were registered over the virtual models. The composite 3D models with planned Virtual osteotomies were printed into stereolithographic models. Titanium plates were pre-bent and screw holes were marked to the models which scanned and registered over the initial virtual models for construction of surface templates to locate osteotomy lines and screw holes. Intra-operatively, the pre-bent plates were installed by placing screws in the predetermined screw holes. Surgically Planed virtual model was compared with post-operative virtual model radiographically and statistically analyzed.

**Results:**

Results showed non significant statistical difference between the surgically planned and the post-operative virtual models.

**Conclusion:**

This protocol proved efficacy of CAD/CAM technique in proper correction of bimaxillary skeletal deformities.

**ORAL SESSION 12: ORTHOGNATHIC  
ACCURACY OF THE SYNPLICITI TITANIUM 3D-PRINTED GUIDE-PLATE SYSTEM IN 80  
WAFERLESS UPPER JAW OSTEOTOMIES**

*T. Schouman<sup>1</sup>, F. Roul-Yvonne<sup>1</sup>, F. Combes<sup>1</sup>, C. Bertolus<sup>1</sup>, P. Goudot<sup>1</sup>*

*<sup>1</sup>AP-HP- Hopital Pitie-Salpetriere, Service de Stomatologie et de Chirurgie Maxillo-faciale, Paris, France*

**Aim** – To assess the accuracy of guided upper jaw repositioning using 3D-printed titanium patient specific predrilling guides and plates and to compare two successive versions of devices.

**Methods** – 80 patients having undergone upper jaw osteotomy using the SynpliciTi system (OBL, France) in our center were included. Post-operative CT-scan and planning were superimposed according to a skull base reference. An orbital meatal reference system was attributed to the models. Landmarks were placed on the planning at the mesio-buccal cusps of the first molars on each side (MV16, MV26) and at the incisor midline (I). The maxilla with its landmarks was duplicated and moved back to its position on the post-operative CT-scan to allow measure the deviations between planning and post-operative coordinates of each landmark. Total deviations were measured as well as the deviations along the X, Y and Z axes. The accuracy of the first and second version of the device was compared.

**Results** – The complete procedure was achieved using the SynpliciTi in all but 1 patient. 53 maxillary osteotomies were performed using the first version, including 10 two-pieces osteotomies. Mean total deviation was 0.55 mm [0.39;2.49] at point I, 0.53 mm [0.24;2.54] and 0.62 mm [0.38;3.28] at points MV 16 and MV26 respectively. There was no significant difference in deviation between one piece and two pieces osteotomies. Further analyses are provided for the second version of the device.

**Conclusion** – SynpliciTi is a reliable system allowing for highly accurate waferless surgical replication of the planning of upper jaw repositioning.

**ORAL SESSION 12: ORTHOGNATHIC  
COMPARISON OF THE STABILITY IN MANDIBULAR SETBACK SURGERY USING 2  
DIFFERENT FIXATION METHODS**

*J.W. Kim<sup>1</sup>, S.J. Sung<sup>2</sup>, B.H. Lim<sup>2</sup>, J.H. Lee<sup>1</sup>, J.H. Jeon<sup>1</sup>*

*<sup>1</sup>Asan Medical Center, Oral and Maxillofacial Surgery, 05505, Republic of Korea*

*<sup>2</sup>Asan Medical Center, Orthodontics, 05505, Republic of Korea*

**Objective**

To evaluate and compare the surgical relapses of mandibular setback, related to the fixation methods of mandible

**Study Design**

Data from 100 patients who had undergone bilateral sagittal split ramus osteotomy (BSSRO) for mandibular prognathism were reviewed. One group using one monocortical miniplate fixation for each side of SSRO consists of 50 patients, and the other group of 50 patients used one miniplate and one additional bicortical positional screw for mandibular fixation. Serial cephalograms were used to assess and compare the relapses over 1 year.

**Results and Conclusions**

Relapses were different according to the fixation methods of mandible after BSSRO setback. It was more stable to use one miniplate and one additional positional screw compared to one miniplate fixation method for mandibular setback surgery.

**ORAL SESSION 12: ORTHOGNATHIC  
ORTHOGNATHIC SURGERY OPTIMIZATION: THE SIMULTANEOUS RHINOPLASTY.**

*M. Raffaini<sup>1</sup>, A.S. Magr<sup>2</sup>, E. Colzan<sup>2</sup>*

*<sup>1</sup>University of Florence, Maxillo-Facial Surgery, Florence, Italy*

*<sup>2</sup>Facesurgery, Maxillo-Facial Surgery, Parma, Italy*

A well proportionate profile contour in a well balanced face is due to a correct position of the jaws and to their relationship with the nose and vice versa. The LeFort I osteotomy is usually performed to reposition the maxilla and to correct maxillary dentoskeletal deformities.

This osteotomy is carried out through the transection of the perioral and perinasal musculature and through a wide periosteal degloving producing secondary unfavorable changes of the nose and nasolabial unit. The rhinoplasty is normally deferred at least six months in order to act on a stabilized foundation.

Many Authors proposed their techniques to handle these effects with variable and unpredictable or unstable results. Applying adequate surgical techniques many undesirable secondary changes may be avoided, preserving the nose unchanged and achieving the aesthetic enhancement of the lip-nose aesthetic appearance.

A short recall of the more relevant concepts of nasal anatomy and some details on the nasomaxillary skeletal framework related to the cartilaginous and soft envelope is proposed, followed by an original technique to avoid unfavorable nasolabial changes, to prevent and improve the labial aesthetics and to manage the nasal support with predictable outcomes.

When using this technique for LeFort I, which does not affect the morphology of the nose, it is possible to evaluate existing cosmetic defects in the nose and to plan its correction with a rhinoplasty which can be performed simultaneously.

My experience in rhinoplasty simultaneous with orthognathic surgery is based on more than 1300 cases.

**ORAL SESSION 12: ORTHOGNATHIC  
CUSTOM 3D PRINTING TITANIUM FIXATION SYSTEM IN SURGICAL TREATMENT FOR  
MAXILLOFACIAL DEFORMITY-- A PRELIMINARY STUDY**

*X. Wang<sup>1</sup>, B. LI<sup>1</sup>, T. Jiang<sup>1</sup>*

*<sup>1</sup>Shanghai Ninth People's Hospital, Oral and Craniomaxillofacial Surgery, Shanghai, China*

**Aim:** The purpose of this study was to explore the indication of three-dimensional (3D) titanium printing technique in surgical treatment of maxillofacial deformity, and illustrate its feasibility and validity.

**Patients and Methods:** Twenty-five patients accepted 3D titanium printing technique assisted surgery, including 15 bimaxillary orthognathic surgery (10 skeletal class III and 5 skeletal class II patients), 5 genioplasty, 2 zygoma narrowing, and 2 costal cartilage graft for mandibular condyle and ramus reconstruction. The osteotomy and bone segments repositioning was simulated in virtual planning before the operation. The 3D printing technique was used to generate cutting guides and custom titanium fixation plates. The cutting guides were first used to predrill screw holes and guide osteotomies. The custom plates were then used to reposition and stabilize the bony segments as planned. The outcome evaluation was completed by comparing virtual plan with actual postoperative outcomes when the planned and postoperative computed tomography models were registered at the cranium.

**Results:** All surgeries were successfully completed. The preliminary result showed no statistically significant difference between virtual plan and actual result. Superimposition of the virtual plan and postoperative images revealed satisfactory result with acceptable errors. The difference ranged from 0.05 to 1.52 mm, with a mean value of 0.78 mm.

**Conclusion:** The primary results of this study demonstrated that 3D titanium printing technique is capable of assisting the surgeon to accurately and effectively transfer the computerized surgical plan to surgical field maxillofacial deformity.

## **ORAL SESSION 12: ORTHOGNATHIC**

### **SURGICAL CLOSURE OF ANTERIOR OPEN BITE: A BETTER OPTION?**

*G. Van Hemelen<sup>1</sup>, J. Jonkergouw<sup>1</sup>, E. Van de Casteele<sup>1,2</sup>, J. Defrancq<sup>1</sup>, N. Nadjmi<sup>1</sup>, L. Renier<sup>1</sup>, S. Stevens<sup>1</sup>, B. Vanassche<sup>1</sup>, J. Van de Perre<sup>1</sup>, H. Vercruyse<sup>1</sup>*

*<sup>1</sup>University of Antwerp- AZ MONICA Antwerp, Department of Cranio-Maxillofacial Surgery, Antwerpen, Belgium*

*<sup>2</sup>All for Research vzw, /, Antwerpen, Belgium*

**Aim:** The goal of this study was to retrospectively evaluate the vertical stability after transverse split maxillary osteotomy for correction of anterior open bite deformities.

**Methods:** A total of 14 patients with anterior open bite who underwent a transverse split maxillary osteotomy at our department between 2009 and 2015 were included in the study. 10 other patients are coming for follow-up in the next months. When a transverse maxillary deficiency was present, it was previously corrected by means of transpalatal distraction. The surgical treatment plan consisted of a Le Fort I osteotomy in combination with a transverse split, which will facilitate the impaction of the posterior maxilla. Stability can be enhanced by placing a bony strut and rigid fixation with plates.

All patients were followed in a standardized examination procedure based on clinical measurements and cephalometric analysis using OnyxCEPH software at 3 different time points: preoperative, immediately and long-term postoperative.

**Results:** The mean open bite before surgery was -2.7mm. At long-term follow-up, 93% of patients had a positive overbite. Most of the skeletal relapse was caused by an opening of the mandibular plane after bimaxillary surgery, while the palatal plane angle remained stable. Dentally, we found an average extrusion of the upper molar of 0.5mm and an average intrusion of the upper incisor of 0.7mm.

**Conclusion:** Transverse split maxillary osteotomy for correction of anterior open bite deformities appeared to be a stable procedure. Furthermore, patients end up with sufficient posterior facial height, natural lip closure and prominent chin projection.

**ORAL SESSION 12: ORTHOGNATHIC  
ORTHOGNATHIC SURGERY IN PATIENTS OVER 30 YEARS OLD AGE**

*I. Kacar<sup>1</sup>, T. Devel<sup>2</sup>, E. Dilaver<sup>2</sup>, S. Uckar<sup>2</sup>*

*<sup>1</sup>Istanbul Medipol University-School of Dentistry, Oral and Maxillofacial Surgery, İstanbul, Turkey*

*<sup>2</sup>Istanbul Medipol University-School of Dentistry, Oral and Maxillofacial Surgery, İstanbul, Turkey*

**Objective:**

This study aimed to evaluate the differences between two age groups according to the patients satisfaction after orthognathic surgery, the rate of surgery first and only approaches in different age groups, number of postoperative visits and amount of complications.

**Methods:**

This study was carried out with 34 patients (Group1:17 and Group2:17) who had undergone orthognathic surgery(with or without genioplasty) by using orthodonty first, surgery first and surgery only approaches for correction of dentofacial deformities in Istanbul Medipol University, School of Dentistry, Department of Oral and Maxillofacial Surgery between 2013-2016. The number of postoperative visits, lenght of hospital stay, rates of postoperative complications, patient satisfaction and the amount of surgery first and surgery only approaches in different age groups. ( Group1: under 25 years, Group2: over 30 years) were evaluated.

**Results:**

The lenght of hospital stay ,the number of postoperative visits and patient satisfaction were not significantly different between the groups. The most remarkable result of the presented study was the significantly higher rates of surgery first and surgery only approaches in the group of over 30 years of age. Although postoperative complication rate was higher, orthognathic surgery over 30 years of age is a reliable treatment modality.

**ORAL SESSION 12: ORTHOGNATHIC  
10 YEARS EXPERIENCE WITH CLINICAL PATHWAY „ORTHOGNATHIC SURGERY“ –  
USELESS BUREAUCRACY OR HELPFUL TOOL?**

*R. Bublitz<sup>1</sup>, D. Weingart<sup>1</sup>*

*<sup>1</sup>Katharinenhospital - Klinikum Stuttgart, Maxillofacial Clinic, Stuttgart, Germany*

**Aims**

Clinical Pathways are organizational tools for standardized treatments. We report our ten year experience of using a clinical pathway in orthognathic surgery.

**Methods**

Over the course of 10 years 733 patients were treated according to the clinical pathway. Three sample-groups (A-C) were analyzed. Sample A was chart-analyzed in great detail for treatment consistency with the protocol, and satisfaction levels of patients and staffs was evaluated by questionnaires. Sample B was analyzed by data from the hospital information system for their general adherence to the clinical pathway. In Sample C process costs were computed for the most recent consecutive cases and compared to national data.

**Results**

Sample A's (n=111) initially treated patients (66 female, 45 male, average age 27,9 yrs)- adhered to the path - as far as demission was concerned – in 79%. Patient and medical personal satisfaction levels were positive. Sample B data from 652 consecutive patients (396 female, 256 male, average age 28,2 yrs.) showed that over time around 70% of the patients were discharged exactly "on time". Sample C with the latest 71 consecutively treated cases (40 female, 31 male, average age 28, 4 yrs.) showed that only 30 were cost efficient, in comparison to national data where process-costs are broken down.

**Conclusion**

A clinical path proved to be useful and it demonstrates proper process management, however, it does not guarantee financial success in a hospital setting where billing is based on German Diagnosis Related Groups (GDRG's).

**ORAL SESSION 12: ORTHOGNATHIC  
AN UNUSUAL CASE OF CONDYLAR RESORPTION IN A YOUNG MALE FOLLOWING  
ORTHOGNATHIC SURGERY. A LITERATURE REVIEW AND CASE REPORT**

*A. Keshtar<sup>2</sup>, A. Rezvani<sup>4</sup>, Z. Sheriteh<sup>3</sup>, K. Shakib<sup>2</sup>*

*<sup>1</sup>Rotherham Doncaster and South Humber NHS Foundation Trust, Oral and maxillofacial surgery, Rotherham, United Kingdom*

*<sup>2</sup>Royal Free NHS Trust, Oral and maxillofacial, London, United Kingdom*

*<sup>3</sup>Royal Free NHS Trust, Orthodontics, London, United Kingdom*

*<sup>4</sup>Manchester Dental Hospital, Manchester, United Kingdom*

Idiopathic condylar resorption is a poorly understood multifactorial phenomenon that typically affects females. Risk factors of condylar resorption include: high mandibular angle, progressively retruding mandible and class III occlusion. This condition rarely develops after the age of 20 years.

We have conducted a contemporaneous literature review examining the evidence that exists for condylar resorption post-orthognathic surgery, and document an unusual case where the patient did not possess the typically associated risk factors.

This gentleman with a class 2 div 1 skeletal base underwent bilateral sagittal split osteotomy (BSSO) with 9mm mandibular advancement in November 2014, aged 25. BSSO has been used since the late 19th century for correction of dentofacial abnormalities.

Initially his occlusion was stable post surgery. However, his overjet had increased, there was deviation of the centre-line and the patient presented with crepitus of the right TMJ. The OPG taken shows unilateral right-sided condylar resorption with no abnormalities of the left condyle. At present, the result is acceptable to the patient. This case will be reviewed in 6 months with an OPG and consideration for steroid injections if signs and symptoms persist.

Although condylar resorption post orthognathic surgery has been reported on in the literature, this case highlights that low risk factor patients are still at risk of this disease process. As such, we recommend all patients should be informed of the risk of condylar resorption as part of the informed consent procedure prior to orthognathic surgery.

**ORAL SESSION 12: ORTHOGNATHIC  
ACCURACY OF COMPUTER-GUIDED ORTHOGNATHIC SURGERY: CEPHALOMETRIC  
CONSIDERATIONS**

*G. De Riu<sup>1</sup>, L. Vaira<sup>1</sup>, P. Viridis<sup>1</sup>, A. Lumbau<sup>2</sup>, G. Spano<sup>2</sup>*

*<sup>1</sup>University Hospital of Sassari, OU of Maxillofacial Surgery - Department of Surgical-  
Microsurgical and Medical Sciences, Sassari, Italy*

*<sup>2</sup>University Hospital of Sassari, School of Dentistry - Department of Surgical-  
Microsurgical and Medical Sciences, Sassari, Italy*

Computer-guided Orthognathic Surgery is based on software commercially available from less than ten years.

Since 2010, we adopted the Maxilim® software platform (Medicim, Belgium, Nobel Biocare Group) to plan all the cases of bimaxillary surgery. We therefore performed the surgical simulation on the augmented model of the skull of these patients and then obtained the intermediate acrylic wafer to guide the reposition of the jaws.

In order to check the actual accuracy of this technology, we compared the cephalometric data of the preoperative 3D simulations with the postoperative traces of a group of 66 orthognathic patients.

All of them were bimaxillary cases, presenting sagittal and vertical problems, operated moving the mandible or the maxilla first, according to the deformity.

The cephalometric data were analyzed with Dolphin® software (Dolphin Imaging & Management Solutions, Chatsworth, CA 91311 U.S.A.).

The results of this study showed an high level of accuracy of computer-guided orthognathic surgery and should encourage to further developments of this platform.

**ORAL SESSION 12: ORTHOGNATHIC  
ORTHOGNATHIC SURGERY IN THE OLDER PATIENT - ARE THE COMPLICATIONS  
HIGHER?**

*B. Gerber<sup>1</sup>, D. Dhariwal<sup>1</sup>*

*<sup>1</sup>Oxford university Hospital Foundation NHS Trust, Oral & Maxillofacial, Oxford, United Kingdom*

**Aims**

Orthognathic surgery is a well-established procedure for treatment of combined skeletal and dental abnormalities after skeletal maturity. Anecdotally we had noticed a change with older adults seeking treatment compared to our historic younger demographic group. Our aim was to establish complication rates and patient satisfaction in patients over 35 years of age underwent Orthognathic treatment over a six-year period compared with a non-age adjusted regional cohort.

**Methods**

A multicentre retrospective study of adult patients, over 35 years, treated by Orthognathic surgery in a tertiary OMFS centre was carried out. Data was collected on demographics, operating times, length of stay, pre and post-operative Orthodontic treatment, complicated splits, paraesthesia/dysaesthesia rates with resolution times, complication incidence, patient satisfaction and six month outcomes.

**Results**

Data was collected on 35 patients with a median age of 40.5 years (range 35-54yrs). 72% of patients had single jaw surgery. There was one complicated split; hardware was removed in 2 patients and one had persistent TMJ symptoms. Long-term paraesthesia occurred in 23% of patients and dysaesthesia in 4%. Average operating time was 120mins and median length of stay was 1 day. One patient with neurofibromatosis required external carotid artery ligation for intra-operative bleeding. Over 82% of patients reported good satisfaction.

**Conclusions**

Older patients requesting Orthognathic surgery are a part of everyday practice. This study shows that paraesthesia and dysaesthesia in older patients in our cohorts was higher, but the complicated split rate was similar. This data has been used to ensure informed consent in our older patients.

**ORAL SESSION 12: ORTHOGNATHIC  
STABILITY AFTER MAXILLARY SEGMENTATION FOR CORRECTION OF ANTERIOR OPEN  
BITE**

L. Rasmusson<sup>1</sup>

<sup>1</sup>*Sahlgrenska Academy, Maxillofacial Surgery, Gothenburg, Sweden*

**Background:** Facial deformities are strongly associated with syndrome patients but are also relatively common in the rest of the population. Surgical corrections of the deformities are relatively stable but relapses do occur and re-operation is sometimes necessary. The reason for relapse is not fully understood but causes such as unfavourable muscle forces, unstable dental occlusion and orthodontic relapse have been pointed out in the literature.

**Material and method:** In a retrospective cohort study, stability after Le Fort I osteotomy and multisegmentation of the maxilla for correction of anterior open bite deformities was evaluated. A total of 50 consecutive patients who underwent segmented maxillary osteotomy between 2005 and 2013 were included in the study. The majority of cases are today bimaxillary and these were excluded from the study. The mean age at surgery was 23 years (range 14-40). To be able to correctly position the premaxilla, 4 or 6-piece segmentations were performed. Rigid fixation with plates and postsurgical intermaxillary fixation for 6 weeks was applied to each patient. All patients were then followed in a standardized examination procedure 6, 12, 18 and 30 months postoperatively. Vertical and horizontal relations between the incisors were measured.

**Results and conclusion:** The main finding was that minor but statistically significant relapse was found vertically 1mm (range 0-3.1mm), whereas the sagittal relation to the mandible was unchanged over the follow-up period. Ongoing vertical relapse could be seen throughout the follow-up period in syndrome cases and further long-term follow up studies would be beneficial.

**ORAL SESSION 13: ORAL SURGERY  
COMPARATIVE INVESTIGATION OF VARIOUS DOSES LOW LEVEL LASER THERAPY  
(LLLTT) ON BONE HEALING FOLLOWING TOOTH EXTRACTION: AN EXPERIMENTAL  
ANIMAL STUDY**

*E. Çırak<sup>1</sup>, A. Özyurt<sup>2</sup>, M.N. Güngör<sup>3</sup>, T.V. Peker<sup>4</sup>, S. Ömeroğlu<sup>5</sup>*

*<sup>1</sup>Ballıpınar Private Dental Clinic, Oral and Maxillofacial Surgery, Afyon, Turkey*

*<sup>2</sup>Trakya University- Faculty of Dentistry, Department of Oral and Maxillofacial Surgery, Edirne, Turkey*

*<sup>3</sup>Gazi University- Faculty of Dentistry, Department of Oral and Maxillofacial Surgery, Ankara, Turkey*

*<sup>4</sup>Gazi University- Faculty of Medicine, Department of Anatomy, Ankara, Turkey*

*<sup>5</sup>Gazi University- Faculty of Medicine, Department of Histology and Embryology, Ankara, Turkey*

The aim of this study was to investigate the effects of Helium-Neon (He-Ne) and Gallium-Aluminum-Arsenide (GaAlAs) lasers used in low level laser therapy on bone healing following tooth extraction. For that purpose 30 female albino Wistar rats were used. Maxillary right incisor tooth of all subjects was extracted. A control group and four groups that lasers He-Ne and GaAlAs applied with energy doses 6 J/cm<sup>2</sup> and 10J/cm<sup>2</sup> were settled. Laser group rats were treated with He-Ne and GaAlAs lasers in two energy levels for 7 days following tooth extraction. At the end of 30 days after tooth extraction all subjects were sacrificed so as to observe bone healing histological, immunohistochemical and radiological. In consequence of these assessments, more organized and compact looking bone tissue formation was observed in GaAlAs laser treatment with energy dose of 10 J/cm<sup>2</sup>. The results demonstrated that the low level laser therapy is efficient application on bone healing.

**ORAL SESSION 13: ORAL SURGERY  
SUCCESS OF UPPER CANINE EXPOSURE WITH BONDING FOR ORTHODONTIC  
TRACTION: A RETROSPECTIVE AUDIT**

*J. Patel<sup>1</sup>, N. Prado<sup>1</sup>, A. Dickenson<sup>1</sup>*

*<sup>1</sup>Royal Derby Hospital, Oral and Maxillofacial Surgery, Derby, United Kingdom*

**Aims**

The impacted permanent canine tooth is a frequently encountered clinical problem.

Management of impacted permanent canines require a multidisciplinary approach and there are two techniques commonly used to expose the impacted tooth: closed technique and open technique.

This audit aims to assess the success rate of exposure and bonding techniques at Royal Derby Hospital and to identify any factors which may negatively affect this. A high failure rate may require a review of current practice.

**Methods**

A retrospective sample of 107 was taken from a log of exposure and bonding of permanent canine teeth from November 2009 to December 2012.

**Results**

10 patients were identified as a failure which is 9.3% of all cases treated.

Only 1 failure was identified due to debond of the gold chain. This shows a 0.9% failure rate of the gold chain.

The remaining 9 were identified as failures as the canines failed to erupt into the arch.

The 10 patients identified as failures underwent a second procedure. 6 patients had the gold chain rebonded, 2 patients underwent an open exposure and 2 patients consequently had the impacted canine surgically removed.

**Conclusions**

The results of the audit showed a 90.7% success rate in the alignment of canines following exposure and bonding.

Reasons for failure due to debond is most likely due to surgical factors. However failure of eruption could be complicated by patient factors.

The results of the audit showed that despite the few failures current clinical procedures are being carried out effectively.

### **ORAL SESSION 13: ORAL SURGERY**

#### **SURGICAL MANAGEMENT OF PAINFUL LESION OF THE INFERIOR ALVEOLAR NERVE**

*F. Allevi<sup>1</sup>, A. Lozza<sup>2</sup>, L. Autelitano<sup>1</sup>, M. Cucurullo<sup>1</sup>, M. Dessy<sup>1</sup>, F. Biglioli<sup>1</sup>*

*<sup>1</sup>San Paolo Hospital, Maxillofacial Surgery Department, Milan, Italy*

*<sup>2</sup>National Neurological Institute C. Mondino, Service of Neurophysiopathology, Pavia, Italy*

Oral and dental surgery procedure, more often implant placement or inferior third molarextractions, may result in inferior alveolar nerve (IAN) injuries, which are being reported with growing frequency. Nerve damage can also follow orthognathic, pre-prosthetic and salivary gland surgery, or resection of tumors, either benign or malignant. Endodontic treatment and local anaesthetic injections can also result in nerve lesion, which can reduce quality of life by affecting speech, chewing and social interaction. Patients may report either total anaesthesia or hypaesthesia. In case of associated neuropathic pain, prompt treatment is pivotal in order to prevent chronic and irreversible nerve damage. Between 2007 and 2015, 21 patients with pain in the area supplied by the IAN were referred to the Maxillo-Facial Surgery Department of San Paolo Hospital (Milan, Italy). All IAN injuries followed endodontic treatment or oral or maxillofacial surgery. All patients were treated by means of tailored IAN microsurgery. Most of patients affected by pain before surgery experienced complete or partial amelioration of symptoms. In 78.94% of cases, a significant increase in nerve function was observed. According to our data, interpositional nerve grafting represents the optimal method of reconstructing an injured IAN; pain relief and partial recovery of sensation were observed in all patients who underwent this procedure. Scar releasing, nerve decompression and nerve substitution using vein grafts are less effective. Removal of endodontic material extravasated into the mandibular canal or removal or retraction of the implant from the mandibular canal is mandatory and effective in patients experiencing severe pain.

**ORAL SESSION 13: ORAL SURGERY**  
**SPORADIC VERSUS SYNDROMIC KERATOCYSTS - CAN WE PREDICT TREATMENT**  
**OUTCOME? A REVIEW OF 102 CYSTS**

*D. Noy<sup>1</sup>, K. Zar<sup>1</sup>, O. Emodi<sup>1</sup>, A. Rachmiel<sup>1</sup>*

*<sup>1</sup>Rambam Health Care Campus, Oral and Maxillofacial Surgery, Haifa, Israel*

**Purpose:** Keratocystic Odontogenic Tumor (KCOT) demonstrates variable growth mechanisms and biologic behavior. We tried to identify the most contributing factors to predict outcome of treatment.

**Methods:** We retrospectively reviewed 118 medical files of patients who were diagnosed with KCOT with or without Nevroid Basal Cell Carcinoma Syndrome (NBCCS) from 1995 to 2015. Exclusion criteria were: missing clinical or radiographic data and follow-up of less than 6 months. Inclusion criteria were: diagnosis of KCOT with or without NBCCS, biopsy results, detailed surgical procedure, pre-surgical radiological x-ray. Data were recorded and analyzed statistically to determine the treatment-outcome correlation. KCOTs arising in NBCCS patients were termed "syndromic" and random KCOTs were termed "sporadic".

**Results:** 102 cysts from 78 patients met the inclusion criteria. 8 of them were diagnosed with NBCCS. Sporadic KCOTs were significantly larger upon diagnosis ( $p < 0.017$ ). The factors that contribute the most to post-surgical complications are older age ( $p < 0.011$ ), upper jaw location, and size of lesion  $\geq 9.5$  cm<sup>2</sup>. Sporadic KCOTs will significantly increase the chances of complications approximately 3 fold ( $p < 0.043$ ). Higher recurrence rate was significant in syndromic cysts (47%) compared to sporadic cysts (20%) ( $p < 0.009$ ). Recurrence time was 3 years on average.

**Conclusions:** The results of this study suggest that post-surgical complications may be expected in older patients, upper jaw location, extensive lesions and sporadic KCOT. Most of the recurrences for KCOTs are diagnosed 3 years from treatment. Future studies will focus on histochemical understanding of the aggressive nature and recurrence profile of sporadic versus syndromic KCOTs.

**ORAL SESSION 13: ORAL SURGERY**  
**DENTIGEROUS CYSTS ASSOCIATED WITH IMPACTED THIRD MOLAR IN ADULTS:**  
**PROSPECTIVE INVESTIGATION OF DECOMPRESSION AS A DEFINITIVE TREATMENT**  
**OPTION**

*G. Lizio<sup>1</sup>, L. Tomaselli<sup>1</sup>, L. Landini<sup>1</sup>, C. Marchetti<sup>1</sup>*

*<sup>1</sup>Alma Mater Studiorum Universtà di Bologna, Biomedical & Neuromotor Sciences, Bologna, Italy*

**Aims:** To investigate decompression of dentigerous cysts associated with an impacted third molar in adult patients as a definitive treatment alternative to high-risk enucleation.

**Methods:** Fourteen dentigerous cysts associated with an impacted third molar in 14 patients (mean age, 46 years; range, 19–68 years) were prospectively monitored after surgical decompression for a mean follow-up duration of 22 months (range, 9–48 months). Preoperative and 4- and 8-month postoperative cone beam computed tomography was performed, and the volumes were correlated with the treatment duration, initial volume, and patient age.

**Results:** The mean (standard deviation) volume reduction in the first 8 months was 70.5% (14.19%), with a monthly reduction rate of 8.81%. The total volume decrease (a) and the monthly reduction rate (b) were significantly associated ( $P < 0.01$ ) and linearly correlated with the duration of decompression [ $r(a) = -0.89$ ,  $r(b) = -0.61$ ] and initial volume [ $r(a) = r(b) = 0.92$ ], but not with patient age ( $P > 0.01$ ) [ $r(a) = r(b) = 0.04$ ]. Progressive radiological reduction occurred with disappearance in five patients. A minimal epithelial slit remained open in all patients.

**Conclusions:** Our favorable results were correlated with the decompression duration and initial volume, confirming the effectiveness of this treatment in achieving complete resolution.

**ORAL SESSION 13: ORAL SURGERY**  
**DENOSUMAB MAY BE A TREATMENT ALTERNATIVE FOR LARGE GIANT CELL GRANULOMAS. A SUGGESTED TREATMENT PROTOCOL.**

*M. Bredell<sup>1</sup>, D. Zweifel<sup>1</sup>, P. Schumann<sup>1</sup>, T. Rordorf<sup>1</sup>*

*<sup>1</sup>University Hospital of Zürich, Department of Cranio-Maxillofacial and Oral Surgery, Zürich, Switzerland*

**Introduction:**

Monoclonal antibody therapies such as the RANKLN inhibitors have been described as a treatment alternative for giant cell tumors. In the facial skeleton giant cell granulomas (GCG) can be seen as comparative lesions and remains a therapeutic challenge, often leading to teeth and bone loss. Experience with the use of Denosumab is very rare and therefore the purpose of this paper is to present five cases of GCG with variable clinical features that have all been successfully treated with Denosumab.

**Patients and Methods:**

An eight-year-old boy suffering from a rare case of osteoglophonic dysplasia with expanding giant cell granulomas in both maxillae and the mandible, The other four patients were three young females, one with a lesion in the maxilla and two with mandibular lesions and a male patient with a lesion peripherally in the mandible. All patients received Denosumab subcutaneously for at least one year. All adult patients had follow up with PET CT to verify metabolic activity.

**Results:**

All patients tolerated the therapy well. Clinical examination and radiographs showed rapid cortical thickening, but slow medullary recovery with histological proven granuloma persistence in two cases after early cessation of treatment. The two female patients with central lesions complained of pressure pain in the jaw during the first few months of treatment that caused some discomfort. After one year of treatment all patients showed adequate mineralisation or cessation of metabolic activity.

**Conclusion:**

Long term results are still being awaited, but complete tissue preservation seems to be possible with Denosumab treatment of GCG lesions of the jaws.

**ORAL SESSION 13: ORAL SURGERY**  
**POSTOPERATIVE BLEEDING RISK OF MAXILLOFACIAL SURGICAL PROCEDURES**  
**UNDER CONTINUED ANTICOAGULANT AND ANTIPLATELET THERAPY**

*W. Eichhorn<sup>1</sup>, J. Wikner<sup>1</sup>, R. Smeets<sup>1</sup>, M. Heiland<sup>1</sup>, M. Haase<sup>1</sup>, H. Hanken<sup>1</sup>, A. Gröbe<sup>1</sup>*

*<sup>1</sup>University Medical Center Hamburg-Eppendorf, Department of Oral and Maxillofacial Surgery, Hamburg, Germany*

**Introduction**

When patients under anticoagulant therapy need surgery, the surgeon is confronted with the choice of interrupting the therapy, which increases the risks of thromboembolic complications, or continuing the medication, which on the other hand increases the risk of hemorrhage. This affects patients with classic- and novel oral anticoagulant therapy (NOAC) or antiplatelet medication. The purpose of this study was to assess the risk of postoperative bleeding in patients with continued anticoagulant and antiplatelet therapy compared to patients without any anticoagulant or antiplatelet medication.

**Materials and Methods**

Within four studies (Phenprocumon, ASS, Clopidogrel, NOAC) a total of 1375 oral procedures were performed on 887 Patients (591 Male and 296 Female). Within the control group, consisting of 645 Patients (311 Male, 334 Female), a total of 1494 oral procedures were performed.

Cutaneous surgery procedures were examined within three studies (Phenprocumon, Clopidogrel, ASS) and 553 procedures in 180 Patients (121 Male, 59 Female). The control group here consisted of 259 Patients and a total of 947 procedures. All interventions were performed as an outpatient treatment under local anaesthesia.

**Results**

The risk of hemorrhage in oral procedures under continued oral anticoagulant treatment amounted 7,4% (Phenprocumon), 11,5% (NOAC), 1,7% (ASS) 1,6% (Clopidogrel) and 0,6% within the control group. In cutaneous surgery interventions the risk of hemorrhage revealed to be 9% (Phenprocumon), 4,9% (Clopidogrel), 4% (ASS) and 3% within the control group.

**Conclusion**

According to our data patients with continuous anticoagulant or antiplatelet therapy postoperative bleeding events were manageable with local means.

**ORAL SESSION 13: ORAL SURGERY**  
**KERATOCYSTIC ODONTOGENIC TUMOUR - EVALUATION OF RECURRENCE RATES**  
**ACCORDING TO SURGICAL PROCEDURE -**

*L. Cohrs<sup>1</sup>, P. Sieg<sup>1</sup>, J. Wiltfang<sup>2</sup>, T. Görger<sup>2</sup>, H. Wieker<sup>2</sup>*

*<sup>1</sup>University Hospital of Lübeck- UKSH, Department of Maxillofacial Surgery, Lübeck, Germany*

*<sup>2</sup>University Hospital of Kiel- UKSH, Department of Maxillofacial Surgery, Kiel, Germany*

**Aims:**

The Keratocystic Odontogenic Tumour (KCOT) has become reclassified as a benign tumour growing locally aggressive with high rates of recurrence after treatment. It may appear as a solitary lesion or occur multilocularly. Regarding radicalness there is still no consensus in treatment of KCOT. This retrospective study aims to analyse the outcome of different surgical procedures in two centres with regard to recurrence rates of the KCOT.

**Methods:**

This is a retrospective study including patients treated between 1996 and 2014 in two units. In both centres a number of 142 patients could be identified preliminarily. Further research included age, gender, existence of a Gorlin-Goltz syndrome, location of KCOT, procedure performed, histopathological findings, recurrence rate.

**Results:**

KCOT mostly occurred in the mandibular angle. The maxilla was rarely affected. Both units used different modalities of treatment in terms of radicalness varying from enucleation with or without peripheral ostectomy to continuity resection of the mandible. Reconstruction was performed according to the defect ranging from alloplastic material up to microsurgical techniques. Especially patients presenting with a recurrent KCOT showed high rates of reoccurrence after repeated therapy.

**Conclusions:**

The KCOT remains a challenging tumour entity for the surgeon as well as the pathologist being difficult to distinguish from similar cystic lesions. According to size and location treatment procedures differ in radicalness as well as in the rate of recurrence. Therefore long-term follow-up including clinical and radiological features is of crucial importance.

**ORAL SESSION 13: ORAL SURGERY**  
**RADICAL TREATMENT OF BENIGN ODONTOGENIC TUMORS**

*V. Shavlokhova<sup>1</sup>, J. Bodem<sup>1</sup>, K. Freier<sup>1</sup>, J. Hoffmann<sup>1</sup>*

*<sup>1</sup>Heidelberg University Hospital, Oral and Maxillofacial Surgery, Heidelberg, Germany*

**Aims**

There is no consensus on the optimal treatment modality for benign odontogenic tumors. Because of high recurrence rate after conservative procedures, the wide radical resection and primary or secondary reconstruction with vascularized bone graft remains the most definitive option. However it is also associated with the highest postoperative morbidity. The aim of this study was to evaluate the morbidity of donor and recipient sites after radical treatment and definitive reconstruction of benign odontogenic lesions of the jaw.

**Methods**

We studied the occurrence of donor and recipient site morbidity in 32 patients undergoing radical resection and bone harvesting surgery. The functional assessment of the donor site was performed with international orthopedic scores: the Kitaoka, the Larson (IOWA) and the Constant-Murray scores. On the recipient site the sensory assessments for the inferior alveolar nerve, the lingual nerve and infraorbital nerves were conducted with a standardized neurosensory test.

**Results**

The mean follow-up period was 28.7 months. The most common lesion type was keratocystic odontogenic tumor, followed by ameloblastoma. Two patients showed recurrence. Ninety-three percent of the patients had successful reconstruction. Functionally, 93 percent of patients returned to their preoperative level of ambulatory activity. Long-term morbidities included pain, ankle instability, decreased arm mobility and anesthesia. Most of patients at our follow-up received dental implants and prosthetic treatment.

**Conclusions**

Treatment of benign pathology of the jaw with radical resection and primary or secondary reconstruction with vascularized bone graft was associated with small morbidity and provided good function and long-term stability.

**ORAL SESSION 13: ORAL SURGERY**  
**CLINIC EVALUATION OF EFFICACY OF transcortical ANESTHESIA FOR**  
**EXTRACTION OF IMPACTED MANDIBULAR THIRD MOLARS**

*E. Demir<sup>1</sup>, H. Ataoğlu<sup>1</sup>*

*<sup>1</sup>university of Selçuk, Department of OMFS, Konya, Turkey*

**Aim:** The aim of this study is to compare pain levels during anesthesia and efficacy of Quicksleeper intraosseous (IO) injection system and conventional inferior alveolar nerve block (IANB) in impacted mandibular third molars surgery.

**Method:** This prospective randomized controlled clinical trial included thirty patients (16 female, 14 male) with bilateral symmetrical impacted mandibular third molars. Thirty subjects randomly received IO injection or conventional IANB at 2 successive appointments. A split-mouth design was adopted in which each patient underwent treatment of a tooth with one of the techniques, and treatment of the homologous contralateral tooth with the other technique. We recorded demographic data, pain levels during anesthesia application, tooth extractions and mouth opening on postoperative first, third and seventh days, latency and duration of the anesthetic effect, operation duration.

**Results:** 30 patients with the mean age 23 were included in this study. IO injection caused statistically significantly less pain with less soft tissue numbness and quick onset of anesthesia as well as lingual anesthesia with single needle penetration. 19 out of 30 patients (63%) preferred transcortical anesthesia. Mouth opening on postoperative first day was significantly better in intraosseous injection ( $p=0,013$ ). Duration of anesthetic effect last significantly shorter in IO injection method.

**Conclusion:** Although IO injection is a useful technique commonly used during various treatments in dentistry, there are complications such as the duration of injection takes longer than conventional techniques, there is a possibility of obstruction at the needle tip, and, the duration of the anesthetic effect is inadequate for prolonged surgical procedures.

**ORAL SESSION 13: ORAL SURGERY  
PREVALENCE OF UNKNOWN DIABETES MELLITUS IN PATIENTS HOSPITALIZED FOR  
ODONTOGENIC ABSCESSSES**

*M. Ermer<sup>1</sup>, P. Voss<sup>1</sup>, M. Metzger<sup>1</sup>, J.E. Otten<sup>1</sup>, R. Schmelzeisen<sup>1</sup>*

*<sup>1</sup>University Medical Center Freiburg, Oral and Maxillofacial Surgery, Freiburg, Germany*

**Background:** Prevalence data for diabetes mellitus (DM) suggest that approximately 9% of the adult (20-79 years) EU population is diabetic. Prevalence data for diabetes mellitus (DM) range from 5 to 8% and estimates for occult diabetes range from 2 to 5%. Aim of this study was to assess the prevalence of known and occult DM in patients hospitalized for odontogenic infections.

**Materials and method:** A retrospective study over 4 years includes all patients hospitalized for genuine odontogenic abscesses in a single institution. Patients were characterized by sex, age, body-mass-index (BMI), serum glucose level and HbA1c level. Post-surgical infections and salivary gland infections were excluded.

**Results:** 487 patients (58% male) with a mean age of 56.3 years (16 - 99) were included. Median HbA1c was 6.2%, median glucose level 138 mg/dl, median BMI 26.1. In 92 (19%) patients, DM was known (median HbA1c 7.4%; median BMI 30.5). In 48 (9%) patients, elevated HbA1c or glucose levels suggested a pathologic glucose tolerance and presence of occult DM.

**Conclusion:** Prevalence of diabetic patients in our cohort was higher than in estimates for the general public (19% vs. 9%). Indicators for an occult DM were found in 9% of patients in contrast to <5% in general estimates. We implemented routine screening of HbA1c levels in patients with odontogenic infections admitted to our department to ensure early detection and therapy of unknown DM.

**ORAL SESSION 13: ORAL SURGERY  
RETROSPECTIVE AUDIT TO REVIEW THE SUCCESS RATE OF CORONECTOMIES FOR  
LOWER THIRD MOLAR TEETH AT PINDERFIELDS GENERAL HOSPITAL**

*H. Cashman<sup>1</sup>, A. Dalghous<sup>1</sup>, Z. Rizvi<sup>1</sup>*

*<sup>1</sup>Pinderfields Hospital, Oral and Maxillofacial Surgery, Wakefield, United Kingdom*

**Introduction**

Coronectomies are used in the management of third molars which require extraction and appear closely associated with the inferior dental and lingual nerve. The aim of the procedure is to reduce the risk of damage to these nerves. Within our department there is currently no data that demonstrates the success of coronectomies in the management of high risk lower third molars.

**Aims**

To establish local rates of successful coronectomies and evaluate the incidence of intra and post-operative failure. in the management of lower third molars and also the incidence of complications.

**Methods**

A data collection tool was created, patients were identified retrospectively from hospital records and operating lists. Patients were identified from Jan 2015-Feb 2016.

**Results**

The results from this audit showed a success rate of 64%. 80% of the failed coronectomies were intra-operative and 20% were post-operative failure. The main reason for intra-operative failure was due to roots becoming mobile. We also found that 21% of patients attended with post-operative infection requiring antibiotics and of these, 2 out of the 3 patients were smokers. Of the successful coronectomies there 33.3% had an envelope flap design which was the most common type of flap used. There was a slightly higher incidence of post-operative infection in the patients who had successful coronectomies.

**Conclusions**

This has shown that coronectomies remain a viable treatment modality for third molar removal however there is a high risk of failure but a low incidence of altered sensation to inferior dental or lingual nerve.

**ORAL SESSION 14: CLEFT**

**CLINICAL RESEARCH ON RESTORATION OF BONE DEFECT IN CLEFT ALVEOLAR WITH B-TRICALCIUM PHOSPHATE**

*C. Renji*<sup>1</sup>

<sup>1</sup>*Beijing Stomatological Hospital, Oral and Maxillofacial Surgery, Beijing, China*

**Objective:** To evaluate the feasibility of using  $\beta$ -tricalcium phosphate ( $\beta$ -TCP) to repair bone defects of patients with alveolar cleft. To search for ideal artificial material as a substitution of autogenous iliac cancellous bone to repair alveolar cleft.

**Materials and methods:** Twenty-four patients with alveolar cleft were chosen from oral and maxillofacial department of Beijing Stomatological Hospital. They were divided into two groups: group A (10 cases) and group B (14 cases). In group A, autogenous iliac cancellous bone was transplanted to repair alveolar cleft, and in group B,  $\beta$ -TCP was transplanted. Observe the coalesced condition of the both groups one week after the operation. Compare the formation of the new bone between the two groups through the images of cone beam computer tomography (CBCT) and three-dimensional reconstruction taking pre-operation and 4-6 months post-operation.

**Results:** All the 24 patients achieved well primary-healing without infection, dehiscence or rejection one week post-operation except one case in Group A. CBCT and three-dimensional reconstruction 4-6 months after operation showed new bone formations and the succession of alveolar being well or partly recovered. The clinical success rate is the same in both groups.

**Conclusion:** There is no significant difference between  $\beta$ -TCP and autogenous iliac cancellous bone in the formation of the new bone. As an ideal artificial material,  $\beta$ -TCP can be used to repair the bone defect of alveolar cleft.

**ORAL SESSION 14: CLEFT  
POST-OPERATIVE COMPLICATIONS FOLLOWING LEFORT 1 MAXILLARY ADVANCEMENT  
SURGERY IN CLEFT LIP AND PALATE PATIENTS: A 5-YEAR RETROSPECTIVE STUDY**

*I. Moran<sup>1</sup>, S. Virdee<sup>4</sup>, I. Sharp<sup>2</sup>, J. Such<sup>3</sup>*

*<sup>1</sup>Northwick Park Hospital, Oral and Maxillofacial Surgery, London, United Kingdom*

*<sup>2</sup>University Hospitals Birmingham, Oral and Maxillofacial Surgery, Birmingham, United Kingdom*

*<sup>3</sup>Royal Free London, Oral and Maxillofacial Surgery, London, United Kingdom*

*<sup>4</sup>Queen Elizabeth Hospital, Birmingham, United Kingdom*

**Introduction**

LeFort1 maxillary advancement surgery in cleft lip and palate (CL/P) patients is undertaken to improve function and aesthetics but may be associated with significant post-operative complications.

Current research on the frequency of complications is based on series with limited patient numbers.

**Aim**

This study aims to establish the nature and frequency of post-operative complications associated with LeFort 1 maxillary advancement surgery in CL/P patients.

**Method**

A retrospective case note review of all CL/P patients with maxillary hypoplasia treated surgically with a LeFort 1 osteotomy and maxillary advancement in a regional cleft centre. All cases were performed by a single maxillofacial consultant between 2010-2015.

**Results**

93 patients met the inclusion criteria.

Maxillary advancements ranged from 2.0mm-18.0mm.

13 different post-operative complications were identified.

Temporary paraesthesia of the infraorbital nerve (ION) was the most common complication (39%) followed by speech deterioration (34%).

Other complications included maxillary instability (5%), infection (5%), bony dehiscence (4%), nasal obstruction (4%), tooth mobility (3%), permanent paraesthesia of the ION (3%), necrosis of the maxilla (2%), persistent sinusitis (2%), temporomandibular joint pain (2%), loss of tooth vitality (2%).

**Discussion**

The findings of this study will be discussed in the context of the adult cleft patient pathway and compared with the benefits, which are gained, by this type of intervention in dealing with residual adult stigmata of clefting.

### **Conclusions**

LeFort 1 maxillary advancement surgery in CL/P is associated with a wide range of post-operative complications, most commonly temporary paraesthesia of the ION.

Informative consent is essential prior to surgery.

**ORAL SESSION 14: CLEFT**

**RECONSTRUCTION OF MAXILLARY CLEFT DEFECT OF UNILATERAL CLEFT LIP AND PALATE(UCLP) WITH ONE STAGE REPAIR INCLUDING PRIMARY ALVEOLAR BONE GRAFTING(PABG) AND GINGIVOMUCOPERIOSTEAL FLAP(GMPF)**

*K. Torikai<sup>1</sup>, M. Yamamoto<sup>2</sup>, T. Kijima<sup>3</sup>, K. Yasumura<sup>4</sup>, H. Naganishi<sup>4</sup>, K. Fujita<sup>5</sup>, S. Omura<sup>5</sup>, K. Hirotsu<sup>4</sup>, T. Satake<sup>4</sup>*

*<sup>1</sup>Fureai Yokohama Hospital, Plastic and Reconstructive Surgery, Yokohama, Japan*

*<sup>2</sup>Kawasaki Medical School Hospital, Pediatric Surgery, Kurashiki, Japan*

*<sup>3</sup>Tokyo Nishi Tokushukai Hospital, Oral and Maxillofacial Surgery, Akishima, Japan*

*<sup>4</sup>Yokohama City University Medical Center, Plastic and Reconstructive Surgery, Yokohama, Japan*

*<sup>5</sup>Yokohama City University Medical Center, Oral and Maxillofacial surgery, Yokohama, Japan*

**INTRODUCTION:** The current cares for unilateral cleft lip and palate include gingivoperiosteoplasty(GPP) and nasoalveolar molding(NAM). They narrow alveolar defect in order to close alveolar cleft. However, narrowing the defect too much may have an adverse effect on maxillary growth. We have been performing reconstruction of maxillary defect in unilateral cleft lip and palate (UCLP) not narrowing the alveolar cleft too much with one stage repair including primary alveolar bone grafting(PABG) and gingivomucoperiosteal flap(GMPF).

**METHODS:** Between June 1998 and December 2011, a total 214 patients with UCLP underwent one stage repair at age between 3 and 9 months. The donor site of PABG is the inferior nasal concha and the hard palate. If alveolar cleft width was between 2 and 5 mm, it was closed using GMPF. If that was over 6 mm, it was closed using GMPF and corticotomy of the premaxilla together. The corticotomy was performed in greenstick fracture fashion. The cleft lip and palate was closed simultaneously.

**Results:** All the clefts could be closed without marked maxillary growth impairment or velopharyngeal incompetence or oronasal fistula. So far, only one case required secondary alveolar bone grafting (SABG).

**Discussion:** One of the traditional concepts of cleft surgery is closing alveolar cleft as narrow as possible preoperatively. But that may result in maxillary growth impairment. Our concept is not so much as closing the cleft as reconstructing the defect using PABG and GMPF.

**Conclusion:** Our one stage repair is advantageous because it does not require narrowing the alveolar cleft.

#### **ORAL SESSION 14: CLEFT**

#### **WHARTON 'S JELLY IN VIVO CAPACITY OF BONE FORMATION (POTENTIAL APPLICATIONS FOR MAXILLO FACIAL SURGERY).**

*A. Caula<sup>1</sup>, M. Naudot<sup>1</sup>, A. Mueller<sup>2</sup>, S. Dakpe<sup>1</sup>, S. Le Ricousse<sup>1</sup>, B. Devauchelle<sup>1</sup>*

*<sup>1</sup>CHU Amiens Sud, Maxillo Facial Surgery, Amiens, France*

*<sup>2</sup>Bale Hospital, Maxillo Facial Surgery, Bale, Switzerland*

Introduction: Tissue engineering is a research path in bone formation for treatment of cleft palate, which is the most common cranial malformation. Thanks to ultrasound, ante natal early diagnosis can be done. The surgical treatment usually results in closing the oro nasal communication but without substituting the bone part. In our study, we propose to induce bone formation by using Wharton 's jelly mesenchymal stem cells in an autologous system. The aim of our study is to evaluate bone formation in an *in vivo* experimental study.

Material and Methods: Wharton 's Jelly mesenchymal stem cells were isolated, expanded and cultivated in an osteoblastic differentiation medium during 3 weeks. Different genic expressions of osteodifferentiated cells were tested. Cells were included in hydroxyapatite granule-fibrin samples and then implanted with both subcutaneous and intramuscular methods on immunoincompetent mice for 2 months. Histological analysis could be then realised.

Results: Mesenchymal stem cells are coming from four donors. Genic expression of RunX2, BMP2, PAL and OPN is globally more important in differentiated stem cell group but results are inhomogeneous. The macroscopic and histological analysis show better vascularisation in intramuscular samples than samples without cells; Furthermore the matrix density seems to be more important in cellularized samples.

Conclusion: These preliminary results seems to confirm that there is an *in vivo* Wharton 's Jelly osteodifferentiation capacity. The difference could be explained by the implants location. This would lead us to develop an orthotropic model by creating a bone defect to test our samples.

**ORAL SESSION 14: CLEFT  
ORTHOPAEDIC TREATMENT WITH PRESURGICAL NASOALVEOLAR MOULDING IN  
CLEFT LIP AND PALATE**

*V. Nunez Vera<sup>1</sup>, T. Creo Martinez<sup>1</sup>, S. Budino Carbonero<sup>1</sup>, F.J. Ruiz Montero<sup>1</sup>,  
G. Jimenez Beato<sup>1</sup>, J.A. Rodriguez Ruiz<sup>1</sup>, M. Sanchez Sanchez<sup>1</sup>*

*<sup>1</sup>Hospital Puerta del Mar, Ora And Maxillofacial Surgery, Cádiz, Spain*

**Introduction**

Cleft lip and palates (CLP) is one of the most frequent congenital malformations that affect the maxillofacial complex and require presurgical orthopedics to achieve the normal alignment of the cleft maxillary segments prior to Primary Cheiloplasty.

**Aims**

To indicate that Applying the Grayson technique we achieve a tension reduction of soft tissues and of the width of the alveolar cleft palate minimizing surgical complications, and improving breastfeeding and child feeding.

**Methods**

Grayson et al. designed an orthodontic plate where they added a nasal extension for simultaneous nasal and alveolar molding (NAM). The device is applied as early as possible after birth and nasal extension is set when the distance between the alveolar cleft segments is less than 5 mm.

After being valorated by the Multidisciplinary Team of Puerta del Mar University Hospital, 10??? patients with CLP from 1 to 3 months with great separation in alveolar segments and important nasal deformity carried NAM until the lip surgery.

**Results**

Orthopedic treatment duration was from 2 to 3.5 months before corrective surgery lip, with a decrease from 16 mm to 0 in alveolar fissure, better shape and symmetry of the nose with a columella increased from 1 to 4 mm and remained stable several months after surgery.

**Conclusions**

NAM is part of the care protocol of CLP child. It is an important element to close the defect and relocating soft tissues with better surgical results, reduces the need for surgical reconstruction of the columella, and also contributes to facilitate feeding.

## **ORAL SESSION 14: CLEFT**

### **DOES NAM CAUSE ADDITIONAL STRESS FOR PARENTS OF CLEFT LIP PALATE PATIENTS? A RETROSPECTIVE PSYCHOLOGICAL SURVEY**

*A. Rau<sup>1</sup>, M. Roth<sup>1</sup>, L. Ritschl<sup>1</sup>, F. Güll<sup>1</sup>, T. Mücke<sup>1</sup>, P. Herschbach<sup>2</sup>, K.D. Wolff<sup>1</sup>, D. Loeffelbein<sup>1</sup>*

*<sup>1</sup>Technical University Munich- Klinikum rechts der isar, Cranio-Maxillo-Facial-Surgery, München, Germany*

*<sup>2</sup>Technical University Munich- Klinikum rechts der isar, Psychosomatic Medicine, München, Germany*

Nasoalveolar Molding (NAM) has become an important treatment strategy to presurgically improve nasal shape and reduce cleft width in order to optimize final outcomes of surgical cleft lip and palate repair. Despite its major advantages, this therapy is often argued to overburden patients and their parents with stress and effort.

Questionnaires were sent to the parents of 119 CLP patients subdivided into NAM and traditional treatment groups (noNAM). Likert scales were used to assess agreement or disagreement to 29 standardized items covering the topics of feeding, social reactions, organizational and personal effort, personal fears and NAM-specific issues.

Differences between the NAM and traditional treatment groups could be identified only for incomplete clefts. Overall, parents were highly convinced and satisfied by the NAM therapy. Results of mothers and fathers differed only slightly.

Although NAM is a time-intensive CLP treatment modality, results show that parents seem highly convinced by this strategy. As opposed to common opinion, NAM has proven to be not significantly more stressful for parents than traditional cleft treatment without NAM. Predominantly, parents regard NAM as a help and not as a burden for them and their baby.

**ORAL SESSION 14: CLEFT**

**SECONDARY CLEFT RHINOPLASTY: CONSIDERATIONS ON TREATMENT PLANS AFTER A PROTOCOL CHANGE IN A FRENCH CENTER**

*A. Picard<sup>1</sup>, N. Kadlub<sup>1</sup>, P. Diner<sup>1</sup>, F. Zazurca<sup>1</sup>, C. Neiva-vaz<sup>1</sup>, E. Galliani<sup>1</sup>, M. Mitrofanoff<sup>1</sup>, R. Khonsari<sup>1</sup>, M.P. Vazquez<sup>1</sup>*

*<sup>1</sup>Hopital Necker, Maxillofacial and Plastic Surgery, Paris, France*

Most current French treatment protocols used in cleft centres nationwide are focused on an early re-establishment of nasal breathing: primary surgery is performed at 6 months of age and involves a rhino-septoplasty. Two cleft centres in Paris merged in 2013 into a single department. Different treatment plans were applied in these 2 centres before the fusion. We compared the two protocols in terms of indications for early secondary rhinoplasty

The two protocols considered in this study were: lip closure without rhinoplasty at 1 month of age and one-step palate closure at 7-8 months or lip closure with extensive rhino-septoplasty and soft palate closure with intra-velar veloplasty at 6 months of age and hard palate closure at 18 months of age. Fifteen consecutive patients operated using each protocol were included into the study and followed up from birth until 18 years of age. Data on the demands regarding rhinoplasty and the surgical techniques that were used were collected.

An extensive rhino-septoplasty during primary surgery significantly lowered the demand for early secondary rhinoplasty before 10 years of age.

A functional protocol focused on the intimate inter-relationships between the structure of the nose, the naso-labial muscles and early nasal breathing significantly reduces the demand of children for early secondary rhinoplasty before 10 years of age. The understanding of the interdependence of the lip and the nose also indicates that secondary rhinoplasty at later ages should involve an extensive dissection of the lip and the nasal cartilages inspired by the techniques used for primary closure.

**ORAL SESSION 14: CLEFT**

**RISK FACTOR ANALYSIS OF BONE RESORPTION FOLLOWING SECONDARY ALVEOLAR BONE GRAFTING USING THREE-DIMENSIONAL COMPUTED TOMOGRAPHY**

*T.S. Oh<sup>1</sup>, K.S. Koh<sup>1</sup>*

*<sup>1</sup>Asan Medical Center, Plastic Surgery, Seoul, Republic of Korea*

**Background:** The purpose of this study is to analyze the risk factors for bone resorption following secondary bone grafting in the alveolar cleft, using three-dimensional computed tomography based on surgical simulation software (SimPlant OMS, Materialise, Leuven, Belgium).

**Methods:** We reviewed the secondary alveolar bone grafts performed by a single surgeon between January 2005 and January 2014. Forty patients with unilateral alveolar cleft were included in this study. The grafted alveolar bone was measured using surgical simulation software. To validate the measurement, each data set was measured by three, different analysts, and interobserver and intra-observer variability were calculated. Eight risk factors for grafted bone survival, including patient age, sex, BMI, palatal fistula, amount of grafted bone, dental appliance, canine or incisor eruption, and pre-operative upper respiratory infection were evaluated using the linear mixed model and Mann-Whitney test.

**Results:** The average alveolar defect size was 4.98 cc and the average graft survival was 67.5 %. The interobserver and intra-observer variability of simulation software were 0.758 and 0.915, respectively. Among the risk factors, only a dental appliance ( $p=0.02$ ) and canine eruption ( $p=0.041$ ) were significantly correlated with graft survival. Other risk factors, including the amount of grafted bone, did not show a significant relationship with graft survival.

**Conclusion:** Measurement of an alveolar bone defect using a simulation program based on three-dimensional CT is a reliable and reproducible. Secondary bone-grafting survival was significantly correlated with canine eruption and a dental appliance in the alveolar cleft.

## **ORAL SESSION 14: CLEFT**

### **DELEARE APPROACH FOR CLEFT LIP AND PALATE OUR EXPERIENCE**

*A. Duque<sup>1,2,3</sup>, A. Jimenez<sup>4</sup>*

*<sup>1</sup>Roosevelt Institute Bogota Colombia, Cleft Craneomaxillofacial Department, Bogota, Colombia*

*<sup>2</sup>Colombian Air Force Reserve, Cleft Lip And Palate Program, Bogota, Colombia*

*<sup>3</sup>Meissen Hospital, Oral And Maxillofacial Surgery Department, Bogota, Colombia*

*<sup>4</sup>Roosevelt Institute Bogota Colombia, Cleft Craniomaxillofacial Surgery, Bogota, Colombia*

Cleft lip and palate (CLP) is one of the most common congenital facial deformities, in Colombia the overall incidence is 1.28 per 1000 new born<sup>7</sup>. Historically many techniques have been used but the ideal continues to be controversial, in general primary surgery must be seen as the most important opportunity to the patient for a better or worse quality of life, the knowledge of all growth process, developmental physiology and the expertise of the surgeon can make the difference. Professor Jean Delaire establish several positions to understand the roll of growth and function in the repair of CLP, muscles of the three facial and pharyngeal sphincters need to be reorientaded to their normal position, growth centers need to be respect and all involved structures need to be treated not as separate elements. Deleare protocol at Craniomaxillofacial surgery department at Roosevelt Institute and Cleft lip and palate programs in Meissen Hospital and Colombian Air Force Professional Officers of Reserve (non profit) , established this philosophy since 2006 with excellent results. We present our protocol, experience and statistics using Delaire's approach for cleft lip and palate patient's.

**ORAL SESSION 14: CLEFT**

**NASALIS MUSCLE IN UNILATERAL CLEFT LIP PATIENTS: ANATOMICAL STUDY AND SURGICAL IMPLICATIONS**

*A. Elbarbary<sup>1</sup>, S. Attia<sup>1</sup>, H. Helal<sup>1</sup>, M. Awad<sup>1</sup>, M.M. Sherif<sup>1</sup>*

*<sup>1</sup>Ain-Shams University, Plastic Surgery Department, Cairo, Egypt*

This work aimed to study the abnormalities of the nasalis muscle and its effect on the postoperative nasal symmetry following its reconstruction.

**Patients & Methods:** A controlled prospective randomized study was conducted between January 2013 and January 2016 on 41 cases of unilateral complete cleft lip and palate. Patients were divided into two groups; Group I (repair of the Orbicularis muscle only), Group II was further divided into 2 subgroups: Subgroup A (repair of the orbicularis oris muscle and dissection and repair the origin of the nasalis muscle); Subgroup B (repair of the orbicularis oris muscle and dissection of both origin and insertion of the nasalis muscle and the origin was repaired). Evaluation was conducted both subjectively and objectively through cleft lip evaluation profile, nostril angles measurement and direct anthropometry.

**Results:** Nasalis muscle was found in all patients at the lower lateral limit of pyriform aperture running obliquely towards the lower lateral cartilage. Its fibres joined orbicularis at cleft edge & could be distinguished from it by its direction. Significantly better results concerning shape and symmetry of nasal tip; size and symmetry of nostrils; size, form and lateral displacement of the ala were seen in Group II patients. The closest results to the non cleft side was seen in group IIB with statistically significant difference when compared to other groups.

**Conclusion:** The results of this study demonstrate that repairing nasalis muscle produced a nasal width, columellar height, and nasal tip projection close to the normal population of the same age.

**ORAL SESSION 14: CLEFT  
THE SPECTRUM OF TREACHER-COLLINS-FRANCHESETTI SYNDROME WITH CLEFT  
PALATE (TCS/CP)**

*P. Bujtár<sup>1</sup>*

*<sup>1</sup>Craniofacial fellow / Oral and maxillofacial surgeon,  
Alder Hey Hospital for Children / Liverpool and Great Ormond Street Hospital for Children /  
London, Leicester, United Kingdom*

Treacher Collins Syndrome is a rare condition affecting 1:50.000 births with only 30% having cleft palate. TCS/cp is characterised by severe airway problems and facial dysmorphic features compared to other sequences or syndromes. This is the only study with significant number of TCS/cp participants with long term follow up data including speech outcome measures while explaining the management associated and factors involved.

The retrospective study was registered at the Great Ormond Street Hospital (GOSH) and identified twenty-eight patients over the last 30 years. The first CP repair recorded back in 15/08/1988. The first data entry is from 10/2/1987 and the collection was terminated on the 6/10/2015. The enrolled group mean age was 14.2 year ranging between 0.1 to 47.3 years consisting 15 males and 13 females. Statistic analysis was performed to identify factors affecting primarily the airway and speech.

Seven factors were identified as significantly affecting and predicting at least one of the three main domains of speech measures. Airway and speech were both found difficult to manage.

There will be a presentation of the longitudinal data on airway, feeding and hearing with explaining the predictors in TCS/cp population.

## **ORAL SESSION 14: CLEFT**

### **USE OF CALCIUM BONE SUBSTITUTES IN PRIMARY ALVEOLAR CLEFT TREATMENT**

S. Lazarou<sup>1</sup>

*Chief, Craniomaxillofacial Surgery, Iaso Pediatric Hospital, Greece*

#### Background/Purpose:

The gold standard of alveolar cleft repair is iliac crest bone graft before secondary canine eruption. We have previously shown that tooth eruption can successfully occur in synthetic calcium bone substitutes. In this long term on going prospective study we continue evaluating the effects of alveolar cleft grafting with calcium substitutes and FDBA before primary canine eruption, both in the overall well being of the child as well as on facial growth as they now complete secondary canine eruption, enter adolescence and complete their orthodontic care.

#### Methods/Description:

62 consecutive patients with at least a cleft lip, and unilateral alveolar cleft with reasonably aligned arches were grafted beginning in January 2003. Mean age at surgery was about 9 months. Radiologic evaluation of alveolar ridge is performed at the age of 4. All patients were operated on by the same surgeon using the same 'enhanced GPP' technique with placement of 1 to 3 mL of calcium substitute paste or FDBA in the pocket.

#### Results:

Healing uneventful except for 5 dehiscences of which 4 were salvaged. The majority have some class 3 irregularity in the cleft. Our first patients are now reaching adolescence and completing orthodontic treatment. Facial growth appears reasonable and unaffected adversely by the early surgery.

#### Conclusions:

Primary Alveolar Cleft treatment with calcium bone substitutes or FDBA appears promising. Advantages include lack of donor site deformity, no fistula, high parental enthusiasm, no untreatable problems with facial growth, no recollection by patient, reduced expenses, limited need for reoperation.

**ORAL SESSION 15: IMPLANTS AND RELATED SURGERY**  
**ORIGINAL TECHNIQUE FOR MANDIBULAR TRANSVERSAL SURGICAL EXPANSION VIA A TOOTH-BORNE LINGUAL DEVICE**

*F. Carlino<sup>1</sup>, A. Cortese<sup>2</sup>*

*<sup>1</sup>C.d.C. Villa dei Pini, Maxillo-Facial Surgery, Civitanova Marche, Italy*

*<sup>2</sup>AOU San Giovanni e Ruggi - University of Salerno, Maxillo-Facial Surgery, Salerno, Italy*

**Aims**

Transversal mandibular distraction-osteogenesis is usually performed with bone-borne devices, which are bulky, emerge from the buccal soft tissue and need a second surgery for removal.

Tooth borne lingual devices are small, but they are not enough stiff to prevent the two mandible halves to move, pulled by muscular forces.

This work presents a new concept to fix the mandible during transversal distraction via lingual tooth-borne devices, preventing unwanted movements of the bone.

**Methods**

A mandibular expansion appliance is positioned on four orthodontic bands.

A vertical symphysiotomy is performed from alveolar process to mandibular inferior border.

The mobilized mandibular halves are spread from each other inferiorly. A mini-plate is fixed near the inferior border with one screw on each osteotomy side, to hold the two mandibular halves in place, but permitting them to rotate laterally.

After one week latency, the lingual screw is activated. The two mandibular halves spread from each other at the dental level, rotating on the two mini-plate screws, producing transversal expansion.

The distraction procedure continues, following the usual distraction-osteogenesis modalities.

**Results**

The technique has been performed on 20 patients in the last 3 years.

No undesired dislocation of the two mandibular halves took place and the distraction proceeded until the desired amount.

## **Conclusions**

The procedure allows a transversal mandibular expansion with a not-cumbersome lingual device, without risk of mandibular unwanted dislocations.

The device does not need a supplementary procedure for removal, is activated by the patient himself and has the cost of a normal orthodontic device.

**ORAL SESSION 15: IMPLANTS AND RELATED SURGERY  
RECONSTRUCTION OF THE POSTERIOR MANDIBLE WITH ONLAY CRANIAL GRAFTS  
BEFORE IMPLANT PLACEMENT. A PERSONAL EXPERIENCE OF 172 CASES OPERATED  
IN 18 YEARS**

*J. Guiol<sup>1</sup>, J.F. Tulasne<sup>2</sup>*

*<sup>1</sup>CHU de Nantes, Maxillofacial Surgery, Nantes, France*

*<sup>2</sup>Private practice, Maxillofacial Surgery, Paris, France*

Introduction:

The purpose of this study is to present the protocol and results of pre-implant reconstruction of the posterior mandible with cranial bone graft apposition from 1997 to the present.

Methods:

One hundred and seventy-two cases of bone resorption were grafted over a period of 18 years. Onlay bone grafting was used for horizontal resorption. For vertical resorption, a framework was made of cortical bone filled with bone marrow particles. Pre and post-operative scans were taken and used to measure the bone augmentation and results. All patients were recalled for radiographs to assess the peri-implant resorption and implant long-term survival in the grafted bone.

Results:

The results showed an average bone augmentation of 7.8 mm in cases of vertical resorption and 7.2 mm in cases of horizontal resorption. In cases of mixed resorption results showed average bone augmentation of 6.67 mm vertically and 8.1 mm horizontally. Complications included lip and chin hypoesthesia in 6.4%, bone graft exposure in 2.7% and partial, or complete, resorption of the grafts in 5.2%.

The interval between the graft and the placement of bridges was 13.3 months. The success rate of implants was 86.6%, while the rate of implant survival was 97.7%. The radiographic mean follow-up of patients was 52 months (4.3 years).

Conclusion:

The results of this study suggest that the onlay graft technique, except for rare cases of very low occlusal space, is possible in all situations and has many benefits and very good results for bone augmentation and implant placement.

**ORAL SESSION 15: IMPLANTS AND RELATED SURGERY**  
**ANTERIOR MANDIBULAR BONE GRAFTS BY SUB-MENTAL APPROACH**

*J. Guiol<sup>1</sup>, J.F. Tulasne<sup>2</sup>*

*<sup>1</sup>CHU de Nantes, Maxillofacial Surgery, Nantes, France*

*<sup>2</sup>Private Practice, Maxillofacial Surgery, Paris, France*

Introduction: Some cases of totally edentulous mandibles are associated with extreme osseous resorption which do not allow the placement of dental implants, even in the symphysis area. In these cases, bone reconstruction techniques are limited by the risk of gingival tear and graft exposure.

Methods: We report 6 cases operated with this technique with long term results (7 to 170 months of follow up). Bone grafting with a submental approach avoids an intraoral break and the risk of graft exposure or infection. The reconstruction was done with calvarian bone apposition in the mandibular interforaminal region. The graft was generally placed on the upper surface of the symphysis and occasionally on the underside. The scar was hidden in the submental fold.

Discussion: We believe this surgical technique is mainly indicated for cases with extreme bone resorption. It allows the reconstruction of the mandibular symphysis, without an intraoral approach. The post-operative courses are uneventful thanks to the cranial bone harvesting technique. This approach can also be indicated for elderly patients who complain about ill-fitting dentures.

**ORAL SESSION 15: IMPLANTS AND RELATED SURGERY  
TREATMENT OF ATROFIED EDENTULOUS PREMAXILLA VIA OSTEO-DISTRACTION WITH  
DENTAL/ IMPLANT - BORNE DEVICE**

*F. Carlino<sup>1</sup>, G. Villan<sup>2</sup>, A. Berti<sup>3</sup>, A. Cortese<sup>4</sup>*

*<sup>1</sup>C.d.C. Villa dei Pini, Maxillo-Facial Surgery, Civitanova Marche, Italy*

*<sup>2</sup>Private Practice, Orthodontics, Bologna, Italy*

*<sup>3</sup>Private Practice, General Dentistry and Orthodontics, Faenza, Italy*

*<sup>4</sup>AOU San Giovanni e Ruggi- university of Salerno, Maxillo-Facial Surgery, Salerno, Italy*

**Aim**

Bone atrophy in aesthetically important sites is still an unsolved problem. Large bone grafts heal with difficulty and often get exposed, because of suture dehiscence or mucosa atrophy. In other cases the graft loses part of his volume, making rehabilitation difficult, because even a small lost of vertical height can make prosthetic crowns unacceptably over-sized.

Bone distraction gives good results, but bone-borne devices are space-occupying and uncomfortable.

This work presents treatment of sagittal/vertical bone atrophy in aesthetical sites via tooth/implant-borne distraction devices.

**Methods**

After alveolar bone osteotomy, a distraction device with an orthodontic screw is anchored to the dental arch, applying force on teeth or implants located in the distraction fragment. After vertical overcorrection and retention, the bone block is fixed in the new position with orthodontic ligatures, then distraction device is removed. Implants are subsequently inserted. A vestibuloplasty procedure is often needed later to restore attached mucosa.

**Results**

In the last 5 years 10 osteo-distractions on edentulous premaxilla were performed.

No complications were registered and the bone fragment could always be transported to the desired position. In cases of simultaneous severe transversal atrophy, homologous bone graft was sometimes inserted.

Final prosthetic rehabilitation was always judged acceptable by patients and referent dentists.

## **Conclusions**

The main problem in edentulous alveolar bone distraction is always the anchorage of the distractor on the residual, fragile alveolar bone.

The anchorage to residual teeth, that are doomed to be extracted later, or to pre-existing implants, makes possible to use not-cumbersome and more comfortable distraction devices.

**ORAL SESSION 15: IMPLANTS AND RELATED SURGERY**  
**OSTEOMYELITIS OF THE JAW ASSOCIATED WITH DENTAL IMPLANTS**

*A. Wolff<sup>1</sup>, O. Emodj<sup>1</sup>, S. Akrish<sup>2</sup>, G. Semel<sup>1</sup>, A. Rachmiel<sup>1</sup>*

*<sup>1</sup>Rambam Medical Center, Maxillo facial, Haifa, Israel*

*<sup>2</sup>Rambam Medical Center, Pathology, Haifa, Israel*

**PURPOSE:** to reveal the link between dental implant placements to the development of osteomyelitis. Clinical, radiographic, histopathological characteristics and treatment process are presented.

**MATERIALS AND METHODS:** Five new cases of osteomyelitis emerging in dental implant sites are present. In three cases, the clinical sign and symptoms of osteomyelitis occurred almost immediately following implant insertion and in two cases the signs and symptoms developed late.

**RESULTS:** All cases were in the mandible in patients with controlled medical background. There were three females and two men in their six to seventh decay of life. All cases were symptomatic prior to surgery despite long term antibiotic treatment.

All cases underwent progressive surgical treatment including corticotomy, saucerization, sequestrectomy and drainage. Two cases had spreading of bone infection in the mandible which required segmental mandibulectomy. A minimal follow-up of one year revealed complete resolution of the infection and symptoms.

**CONCLUSION:** Osteomyelitis related dental implant is a rare catastrophic consequence. The development of the disease can occur both early and late phase following implant placement.

Aggressive surgical treatment is the treatment of choice with antibiotics being an adjuvant therapy. Treating osteomyelitis in this fashion should result in full recovery.

Although dental implant surgery is a routine and safe procedure in the dental office it can lead to high morbidity outcome. Increase the awareness among therapists and maintaining correct surgical principles is essential in order to reduce the risk for possible implant failure and osteomyelitis.

**ORAL SESSION 15: IMPLANTS AND RELATED SURGERY**  
**COMPARISON OF THE MAGNITUDE AND DISTRIBUTION PATTERN OF BONE STRESS-  
STRAIN IN EDENTULOUS JAW REHABILITATION BY TILTED DISTAL IMPLANTS**

*M. Talebi Ardekani<sup>1</sup>, M.R. Abrishami<sup>2</sup>, N. Keshavarz Valian<sup>3</sup>, S.S. Shafiei<sup>4</sup>*

*<sup>1</sup>Shahid Beheshti University of Medical Sciences, Associate Professor- Dept. of Periodontics-  
Dental School, Tehran, Iran*

*<sup>2</sup>Shahid Beheshti University of Medical Sciences, Assistance Professor- Dept. of Periodontics-  
Dental School, Tehran, Iran*

*<sup>3</sup>Shahid Beheshti University of Medical Sciences, Dept. of Periodontics- Dental School, Tehran,  
Iran*

*<sup>4</sup>Shahid Beheshti University of Medical Sciences, Oral and Maxillofacial Surgery Department-  
Shahid Beheshti Dental School, Tehran, Iran*

**Aim:** Using 4 implants for full rehabilitation of maxilla has been suggested. Furthermore; tilted short implants to be placed in the maxilla has been proposed as an alternative for the bone graft although with possibly higher stress concentrations. The present study compared stress and strain of the surrounding bone on two models of full rehabilitation of the edentulous jaw using 4 and 6 implants with the tilted distal implants by finite element analysis.

**Materials and Methods:** In this experimental trial, 4 and 6-implants designs were modeled with the 30° tilted distal implants using Catia software while the finite element analysis for the assessment of strain and stress was done by ANSYS® software. The implant was 10mm length and 4mm diameter. Vertical and inclined(30°) loads were applied on the assembly and the stress-strain values were determined.

**Results:** Stress values increased in the 4-implant design than 6-implant design to some degree, however; the increases did not reached the implant or bone yield strength values. The maximum stress concentrated on the different structures increased together with the increased applied loads from 100N to 300N. Applying inclined loads had little effect to increase the stresses of tilted distal implant in the 6-implant design compared to the vertical loads. In 4-implant design; applying inclined forces slightly decreased the stress of the tilted distal implants than vertical loads.

**Conclusion:** Although with slightly increased stresses; 4-implant design had similar results to 6-implant design about stress distribution pattern. Furthermore; tilted distal implants did not increased stress values significantly.

**ORAL SESSION 15: IMPLANTS AND RELATED SURGERY  
PROSTHETICALLY GUIDED MAXILLOFACIAL AND IMPLANT SURGERY FOR ORAL  
REHABILITATION OF MAXILLECTOMY PATIENTS**

*L. Ciocca<sup>1</sup>, A. Tarsitano<sup>1</sup>, C. Marchetti<sup>1</sup>, R. Scotti<sup>1</sup>*

*<sup>1</sup>University of Bologna, Department of Biomedical and Neuromotor Science, Bologna, Italy*

*Aims:* To propose a novel CAD-CAM methodology for restoring large defects in the maxillofacial region with subsequent intra-oral discrepancies between the maxillary arches, using a fibula free flap and titanium plate, and implant supported oral rehabilitation.

*Methods:* The protocol involved five steps: surgical planning of the bony resections; CAD and rapid prototyping of cutting guides, titanium mesh and bone plate; maxillofacial surgery; oral implant surgery; prosthetic rehabilitation. CAD-CAM technology was used for each step, to design and prototype the surgical guides and the bone plate; to make the impression of implants; and to prototype the framework of the final prosthetic rehabilitation.

*Results:* With respect to the maxillofacial surgery, to evaluate the margins of the bone cuts, the planes of the postoperative cuts were compared with those planned in the virtual environment and the accuracy of the rapid prototyping and intraoperative surgical positioning protocol was evaluated as acceptable. With regard to implants and prosthetic rehabilitation, the prototyped framework confirmed a passive fit on implants using the Sheffield test, and occlusal and interproximal points of contact resulted clinically as virtually projected.

*Conclusions:* Prosthetically Guided Maxillofacial and Implant Surgery is a viable method to reproduce the correct anatomy of the maxillary arches in relation to the prosthetic needs of rehabilitation. Moreover, this protocol offers some adjunctive benefits, such as time and cost saving and ideal aesthetic facial contouring.

**ORAL SESSION 15: IMPLANTS AND RELATED SURGERY**  
**IMPLANTS PLACEMENT IN IRRADIATED BONE AFTER FAILURE OF PRIOR IMPLANTS:**  
**OUR EXPERIENCE**

*M. Peña<sup>1</sup>, S. Ochandiano<sup>1</sup>, S. Bacián<sup>1</sup>, A. García Sevilla<sup>1</sup>, C. Navarro Cuéllar<sup>1</sup>, C. Navarro Vila<sup>1</sup>*  
*<sup>1</sup>Gregorio Marañón University Hospital, Oral and Maxillofacial Surgery Department, Madrid, Spain*

**INTRODUCTION**

The implant prosthetic rehabilitation is the only valid alternative to retrieve aesthetics and function.

Radiation treatment produces a permanent tissue damage that compromises the osseointegration, even considered an absolute contraindication for the placement of these.

**MATERIALS AND METHODS**

We present 9 patients treated at our center with tumor resection and subsequent microsurgical flap reconstruction with bone component, in which pre or postrradioterapia implants were placed, and after a variable time, there was the need to withdraw them by failure of osseointegration .

Once healing and bone regeneration occurred without the use of hyperbaric oxygen in eight of them, 47 new implants were placed. In two patients after failure of mandibular implants hyperbaric oxygen was administered and new implants were placed.

**RESULTS**

A success rate of 91.5% was obtained, with a ruling of 4 of 47 implants. With the remaining 43 implants a stable osseointegration was achieved and all support a dental prosthesis.

The failures were solved by removing the implant. Only in one case we had a minor complication, one orocervical fistula in relation to the apex of a non osseointegrated implant, that improve with curettage and removal of the implant. No major complications or episodes of osteoradionecrosis in relation to the second placement of implants in irradiated bone were described.

**CONCLUSIONS**

Today is feasible to achieve good results in the placement of implants in irradiated bone after failure of prior implants without severe complications, so this should not be an impediment to it.

**ORAL SESSION 15: IMPLANTS AND RELATED SURGERY**  
**ALVEOLAR RIDGE SPLITTING VS. AUTOGENOUS ONLAY BONE GRAFTING IN PATIENTS WITH ATROPHIC JAW BONES TO ENABLE IMPLANT PLACEMENT**

G. Gürler<sup>1</sup>, Ç. Delilbaşı<sup>1</sup>, H. Garip<sup>2</sup>, Ş. Tüfekçioğlu<sup>1</sup>

<sup>1</sup>*Istanbul Medipol University, Oral and Maxillofacial Surgery, İstanbul, Turkey*

<sup>2</sup>*Marmara University, Oral and Maxillofacial Surgery, İstanbul, Turkey*

**Aims:** Placement of dental implants requires sufficient amount of bone; however, in some cases it is challenging to plan implant treatment due to bone deficiency. Different bone augmentation techniques have been described to reconstruct atrophic bones. The aim of this study was to compare surgical outcomes of the alveolar ridge splitting (ARS) vs. autogenous onlay bone grafting (AOBG) in patients with atrophic jaw bone. **Methods:** Forty patients with atrophic alveolar bone requiring dental implant treatment were included in this study. Bone thickness of the recipient site was measured from three different reference points with cone beam computed tomography (CBCT). Patients were allocated into ARS (n=17) and AOBG (n=23) groups considering ridge thickness and shape. ARS group has undergone ridge splitting using xenograft. AOBG group has undergone onlay bone augmentation with symphysis bone graft. Follow-up CBCT measurements to assess horizontal bone gain were repeated 4-6 months post-augmentation prior to implant placement. The diameters of implants were recorded. Intraoperative and postoperative complications regarding augmentation and implantation were also evaluated.

**Results:** The mean bone gain in the AOBG group was statistically significant than that of the ARS group (p=0.029). Forty-four implants were inserted in the AOBG group, whereas 33 implants were inserted in the ARS group. There was no statistically significant difference regarding implant diameter between the groups (p=0.092). Bad split, implant fail and wound dehiscence were the major surgical complications.

**Conclusions:** More horizontal bone can be gained by autogenous bone grafting than bone splitting although the former is preferred in narrower bones.

**ORAL SESSION 16: TMJ**

**APPLICATION OF COMPUTER-ASSISTED SURGICAL SIMULATION FOR TEMPOROMANDIBULAR JOINT RECONSTRUCTION WITH COSTOCHONDRAL GRAFT**

J. Zheng<sup>1</sup>, Z. ShanYong<sup>1</sup>, Y. Chi<sup>1</sup>

<sup>1</sup>Ninth People's Hospital - Shanghai Jiaotong University - School of Medicine, Oral surgery, Shanghai, China

**Objective:** To introduce the application of computer-assisted surgical simulation (CASS) for temporomandibular joint (TMJ) reconstruction with costochondral graft (CCG).

**Methods:** Consecutive patients who underwent TMJ reconstruction with CCG from November 2013 to March 2015 were included in this study. Before surgery, the cranial-maxillofacial and chest computed tomography (CT) scans were performed and imported into the Mimics software for virtual positioning and osteotomy planning to guide the selection and placement of the rib and bone trimming of the condyle and ramus intraoperatively. Clinical and radiographic parameters were used to assess the efficacy of CASS guided CCG.

**Results:** 7 consecutive patients (9 joints) who underwent CCG utilizing CASS were included in the study. There were 5 female and 2 male patients with a mean age of 30.2 years. There were 5 patients with unilateral affected joints and 2 patients with bilateral joints. In 7 joint reconstructions, the 6<sup>th</sup> rib was selected, while the 7<sup>th</sup> rib was selected in 2 joints. All the grafted ribs were not trimmed or contoured intraoperatively. There were significant improvements of the MIO and VAS at 6 months after surgery ( $P < 0.001$ ). All patients had successful reconstructions of the mandibular condyle with the CCG using CASS. Proper positions of the grafts were documented by postoperative CT.

**Conclusion:** CASS can accurately select a suitable rib matching with the lateral surface of the ramus, guide the bone osteotomy and trimming required for placement, help the fixation of the rib in the desired locations, and avoid the damage to inferior alveolar neurovascular bundle.

## **ORAL SESSION 16: TMJ**

### **TMJ INVOLVEMENT IN PATIENTS AFFECTED BY FIBROMYALGIA SYNDROME: CLINICAL FEATURES**

*S. Mandrioli<sup>1</sup>, M. Galiè<sup>1</sup>, L. Valente<sup>1</sup>, L. Clauser<sup>1</sup>*

*<sup>1</sup>Unit of Cranio Maxillo Facial Surgery- St Anna Hospital and University, Dept. of Specialistic Surgeries, Ferrara, Italy*

**Aims:** to investigate signs and symptoms of temporomandibular disorders (TMD) in patients with fibromyalgia (FM) and verify their correlation.

**Methods:** 20 patients with FM, fulfilling 2010 ACR criteria, presenting almost one subjective symptom for TMD consecutively attended a joint Rheumatologic-Maxillofacial outpatient clinic from March to August 2015 were evaluated. A control group with no FM was recruited. Subjective symptoms for TMD were assessed using the questionnaire developed by Conti et al. All patients were examined by Maxillofacial Surgeon for TMD diagnosis using RDC/TMD criteria.

**Results:** the test group consisted of 20 women with FM, 49,5 ±12.6 mean age, compared to a control group of 20 health subjects. Subjective symptoms from FM group were: facial pain (70%), headache (60%), noises (55%), chewing difficulty (35%), tinnitus (20%), bruxism (10%). Objective symptoms in FM group were: masticatory muscles pain (90%), TMJ pain (40%), functional limitations (35%), noises (30%). 95% of FM group patients received DTM diagnosis, 70% of these related to muscles disorder. The 25% of control group presented almost one DTM subjective symptom but no clinical sign.

**Conclusions:** our findings confirm an high correlation between signs and symptoms of TMD in FM patients with a high prevalence of myofascial TMD even in mildly symptomatic subjects, indicating the need of an integrated diagnosis and treatment.

## **ORAL SESSION 16: TMJ**

### **OUTCOME OF STOCK TOTAL TEMPOROMANDIBULAR JOINT PROSTHESIS IN TMJ ANKYLOSIS PATIENTS.**

*A. Roychoudhury<sup>1</sup>, O. Bhutia<sup>1</sup>, R. Yadav<sup>1</sup>, D. Gowswam<sup>2</sup>, D.K. Baidya<sup>2</sup>, B. Agarwal<sup>1</sup>*

*<sup>1</sup>All India institute of Medical Sciences, Oral & Maxillofacial Surgery, New Delhi, India*

*<sup>2</sup>All India institute of Medical Sciences, Anaesthesia & Intensive Care, New Delhi, India*

**Aim:** To report the outcome of the stock total temporomandibular joint replacement in TMJ ankylosis patients.

**Methods:** Prospective study, eight patients with TMJ ankylosis underwent single stage osteoarthrectomy and total TMJ replacement using a Biomet Stock Prosthesis. 3D printed models were used for planning. Mouth opening, occlusion and recurrence were evaluated. Challenges with stock prosthesis were segregated for fossa and condyle component.

**Results:** Total of 12 joints were replaced in 08 patients (male = 4, female = 4), 3 had bilateral TMJ ankylosis and 5 had unilateral ankylosis. Maximum Interincisal opening (MIO) ranged from 0.0 mm to 5.0 mm with a mean of 4.25 mm. Post operative MIO ranged from 31 to 38mm with a mean of 34mm. Maximal incisal opening increased from 4.25 mm to 35mm ( $p = 0.011$ ). All the joints have provide satisfactory results with smooth mouth opening, unchanged occlusion and no early signs of recurrence over the follow up period ranging from 8 to 16 months (mean 12 months) There was temporary temporal nerve weakness in 4 patients and temporary marginal mandibular nerve weakness in 2 patients. 1 patient had permanent temporal nerve paresis.

**Conclusions:** TMJ reconstruction using Biomet Stock total Joint is a lasting option for the management of TMJ ankylosis when coupled with proper planning and 3D modeling.

#### **Reference:**

Gerbino G, Zavattero E, Berrone S, Ramieri G. One stage treatment of temporomandibular joint complete bony ankylosis using total joint replacement. J Cranio maxillofac Surg; <http://dx.doi.org/10.1016/j.jcms.2016.01.003>

**ORAL SESSION 16: TMJ**

**PROSPECTIVE STUDY: ELECTROMYOGRAPHIC AND ULTRASONOGRAPHIC ANALYSIS BEFORE AND AFTER INFITRACION WITH BOTULINUM TOXIN FOR MYOFASCIAL SYNDROME IN MASTICATORY MUSCLES.**

*I. Martínez Padilla<sup>1</sup>, O. De la Sen<sup>1</sup>, E. Varela Reyes<sup>1</sup>, N. Naranjo Aspas<sup>1</sup>, F. Falahat<sup>1</sup>, M. De Pedro<sup>1</sup>*

*<sup>1</sup>Hospital Clinico San Carlos, Servicio de Cirugia Oral y Maxilofacial, Madrid, Spain*

Myofascial syndrome of the masticatory muscles is present in most of patients with alterations in the temporomandibular complex, and is defined by muscular pain. Treatment is initially conservative, but in some cases refractory to these measures, and intramuscular injection with botulinum toxin is presented as a therapeutic option for pain relief. The objective of this prospective study is to assess the subjective pain perceived by the patient and an electromyographic and ultrasonographic analysis pre- and post-infiltration of botox in patients with myofascial syndrome of the masticatory muscles. All selected patients presented predominant muscle pain clinic without response to conservative treatment. Oral opening range, mandibular protrusion and lateralization, and degree of pain by visual analogue scale (VAS), and masseter electromyography and ultrasound studies were performed before and after infiltration of botulinum toxin into the masseter muscle. In a significant proportion of patients during the first week presented aggravation of pain and contracture. However, posterior controls showed significant improvement in subjective pain evidenced with a decrease in the level of the EVA and a slight increase of mandibular mobility. Electromyographic studies showed a decrease in wave amplitude ranges and improvement in their previous clinical dysfunction indices, and ultrasound studies showed the presence of trigger points, and a slightly increased masseteric thickness in prior ultrasound, and a normalization of these values after infiltration. Botulinum toxin is presented as an effective alternative in principle the short term, primarily for the improvement of subjective pain and mandibular mobility as clinically and objectively evidenced.

## **ORAL SESSION 16: TMJ**

### **TMJ INVOLVEMENT IN PATIENTS AFFECTED BY FIBROMYALGIA SYNDROME: ULTRASONOGRAPHIC FEATURES**

*S. Mandrioli<sup>1</sup>, L. Valente<sup>1</sup>*

*<sup>1</sup>Unit of Cranio Maxillo Facial Surgery- St Anna Hospital and University,  
Dept. of Specialistic Surgeries, Ferrara, Italy*

**Aims:** to assess the presence of TMJ ultrasonographic (US) findings in patients with fibromyalgia (FM) presenting subjective symptoms of DTM.

To compare clinical and US findings in order to identify a different sensibility in defining TMJ alterations.

**Methods:** patients with FM, fulfilling 2010 ACR criteria, presenting almost one subjective symptom for TMD consecutively attended a joint Rheumatologic-Maxillofacial outpatient clinic from March to August 2015, were included. A control group with no FM was recruited. Subjective symptoms for TMD were assessed using the questionnaire developed by Conti et al. A double blind examination was performed by Maxillofacial Surgeon for TMD diagnosis using RDC/TMD criteria, and Rheumatologist for TMJ US with power doppler (PD).

**Results:** the test group consisted of 20 women with FM,  $49.5 \pm 12.6$  mean age, compared to a control group of 20 health subjects. 95% of FM group patients received DTM diagnosis, 70% of these related to muscles disorder. The 25% of control group patients presented almost one DTM subjective symptom but no clinical sign. Almost one TMJ-US alteration were identified in all FM patients: joint space narrowing (75%), cortical bone irregularities (55%), intra-articular effusion (45%), synovial hypertrophy (10%), disc displacement (5%), calcifications (15%), echogenicity and thickness disc alteration (45%), intrarticular PD signal (15%). No erosion was founded. Control group showed TMJ-US alterations in 25% ( $p < 0.05$ )

**Conclusions:** in FM patients TMJ-US study can support clinical examination for early diagnosis of articular changes due to muscle disorders in order to establish a proper treatment.

**ORAL SESSION 16: TMJ  
INTEGRATING MENTAL HEALTH SCREENING WITH MANAGEMENT OF TEMPORO-  
MANDIBULAR JOINT DYSFUNCTION**

*E. Yeung<sup>1</sup>, A. Abo-Foul<sup>1</sup>, A. Collinson<sup>1</sup>, K. Fan<sup>1</sup>*

*<sup>1</sup>King's College Hospital, Oral and Maxillofacial Surgery, London, United Kingdom*

Introduction

Anxiety and/or depression are reported in up to 50% patients who suffer from Temporomandibular Joint Dysfunction (TMJD) against 2-12% in the general population. Failure to recognise these common mental health conditions may be detrimental to the management of TMJD but often clinicians do not feel comfortable making a diagnosis. Screening tools have been reported with respect to TMJD, but these are often in paper form and require clinician assessment and later analysis of data.

We present our findings of a new electronic patient-completed IMPARTS (Integrating Mental and Physical: Research Training and Services) system that allows the clinician to use validated tools to easily identify patients who may benefit alongside treatment protocols and TMJD progress

Method

Patients with symptoms of TMJD were prospectively enrolled on attending outpatient clinic and completed a composite questionnaire via a tablet. Validated tools for anxiety, depression, chronic pain and quality of life allowed screening and treatment monitoring. Data collection and analysis linked directly into the electronic record. Results were reviewed immediately with a treatment suggestion – this may include referral to psychiatry or recommendations to their General Practitioner.

Results

154 patients were included. Average age 37.5 years with female:male ratio of 4.3:1. 14.5% (n=22) screened positively for depressive disorder and 16% (n=25) for anxiety requiring onward referral. 1.5% (n=2) were identified as high risk of suicide/self-harm and were immediately further assessed.

Discussion

A patient-completed electronic screening tool can aid management of TMJD through quick and simple identification, risk-stratification and referral of patients with mental health conditions.

**ORAL SESSION 16: TMJ  
CORELATION BETWEEN CLINICAL ANTITIES AND MAGNETIC RESONENCE IMAGING  
(MRI) IN PATIENTS WITH TEMPOROMANDIBULAR JOINT (TMJ) INTERNAL  
DERANGEMENT**

*G. Yildiran<sup>1</sup>, O. Akdag<sup>1</sup>, C. Isik<sup>1</sup>, M. Karamese<sup>1</sup>, Z. Tosun<sup>1</sup>*

*<sup>1</sup>Selcuk University, Plastic- Reconstructive and Aesthetic Surgery, Konya, Turkey*

**AIM**

TMJ disorders are clinical conditions that reduce the life quality due to pain and restriction of joint. Not only the pain itself, but some antities other than pain could help the clinician for diagnosis and treatment. The purpose of this study is to clarify which complaints are more sensitive to predict the TMJ disc dislocations.

**MATERIAL AND METHODS**

Between 2010 and 2015, 164 patients who were admitted with TMJ complaints were evaluated prospectively with a questionnaire and MRI.

In the questionnaire, patients were asked their age, pain level, joint sound, etiology (depressive mood, bruxism, tough foods, have a tooth out or tooth treatment), duration of complaints and pain laterality. All MRI findings were evaluated by the same radiologist.

**RESULTS**

Patients who have longer duration of complaints are more likely to have an irreduced disc displacement. On the contrary, patients who don't have pain more than 3 months are more likely to have reduced disc displacements.

Patients who have an anamnesis of tough foods and tooth therapy have more likely to have a disc displacement. (reduced or irreduced) Bruxism is found to be a significant reason for irreduced disc displacement. Patients who have depressive mood don't have correlation between disc dislocation and MRI.

Age, pain level and pain laterality didn't corelate with MRI.

**CONCLUSION**

Patient anamnesis is partially decisive to predict the TMJ internal derangement. Especially the etiology of pain itself is likely to determine the displacement even being reduced or irreduced.

## **ORAL SESSION 16: TMJ**

### **ASSESSMENT OF THE EFFECTS OF TEMPOROMANDIBULAR JOINT ARTHROCENTESIS ON MIDDLE EAR PRESSURE AND AUDIOMETRIC VALUES**

*M. Demirkol<sup>1</sup>, B. Ege<sup>2</sup>, S. Gülsen<sup>3</sup>, M.H. Aras<sup>1</sup>, C. Durucu<sup>4</sup>*

<sup>1</sup>*Gaziantep University- Faculty of Dentistry, Oral and Maxillofacial Surgery, Gaziantep, Turkey*

<sup>2</sup>*Adiyaman University- Faculty of Dentistry, Oral and Maxillofacial Surgery, Adiyaman, Turkey*

<sup>3</sup>*Dr. Ersin Arslan State Hospital, Otolaryngology-Head and Neck Surgery, Gaziantep, Turkey*

<sup>4</sup>*Gaziantep University- Faculty of Medicine, Otolaryngology-Head and Neck Surgery, Gaziantep, Turkey*

**Aims:** The conservative treatment of temporomandibular joint disorders (TMD) has positive clinical effects in reducing subjective otologic symptoms associated with TMD. However, the outcomes of TMD treatments on otologic values are still not documented in the literature. To investigate the possible changes on middle ear pressure and audiometric values in patients without any otologic symptoms after temporomandibular joint (TMJ) arthrocentesis.

**Methods:** This study comprised 14 joints of 13 patients (12 females, 1 males; age range, 18 to 43, mean,  $24.38 \pm 6.70$  years) with symptoms of TMJ internal derangement. All joints were evaluated by three otologic tests including pure tone audiometry (hearing loss  $> 20$ dB), stapedius muscle reflex (present/absent), and tympanometry for middle ear pressure (type A; normal, range in  $-100$  daPa to  $+50$  daPa, type B; increased pressure or tympanic membrane perforation, type C; negative pressure,  $< -200$ daPa). Audiometric evaluations were evaluated at the preoperative, immediately following arthrocentesis, 1, and 4 weeks after lysis and lavage. All TMJ arthrocentesis without supplement were performed by same surgeon (M.D.).  $P < 0.05$  was considered statistically significant.

**Results:** The mean pure tone audiometry values were 13.9 dB, 15.8 dB, 12.5 dB and 16 dB at preop-, immediate postop-, 1 and 4 weeks after arthrocentesis, respectively. There are no statistically significant differences in pure tone audiometry, stapedius muscle reflex and tympanometry tests from preoperatively to the end of the follow-up period.

**Conclusions:** The results of present preliminary study proved that the audiometric and middle ear pressure values have not been affected by TMJ arthrocentesis.

**ORAL SESSION 16: TMJ  
RADIOLOGICAL CORRELATION IN TMJ DYSFUNCTION**

*I. Zylberberg<sup>1</sup>, B. Marko<sup>1</sup>, B. Philip<sup>1</sup>, D. Susan<sup>1</sup>, M. Mario<sup>1</sup>*

*<sup>1</sup>Hospital Universitario La Princesa, Cirugía Maxilofacial, Madrid, Spain*

Introduction

TMJ dysfunction is frequently a diagnostic challenge given the variety of the nosologic entities that affect this area. Physical examination, in combination with imaging tests, is of utter importance for a correct diagnosis of these patients. With this report we intend to study the relationship between the articular and meniscal changes observed on magnetic resonance and symptoms of pain and jaw locking, with the diagnosis of TMJ dysfunction. We also intend to give a descriptive analysis of our experience with the 151 patients in our center.

Materials and Methods

151 patients with TMJ dysfunction, verified clinically and on MRI, that needed at least one TMJ arthroscopy because of this dysfunction. Symptoms of pain, measured using a visual analog scale, and maximum mouth opening, measured in millimeters, were documented, as well as radiologic meniscal and bone changes observed on MRI. The patients were subdivided into six different groups according to the characteristics of the articular disc of both temporomandibular joints; these being normal, disc displacement without reduction, disc displacement with reduction, and the combination of these possibilities. In turn, articular changes were documented. Subsequently, the correspondent statistic analysis was done.

Conclusions

The results obtained were in accordance with information found in medical literature to date. This demonstrates an intimate relationship between bone and meniscal changes seen on MRI and the development of the disease. The most advanced bone changes, were found only in those patients that had at least one joint with disc displacement without reduction.

**ORAL SESSION 16: TMJ  
EARLY EXPERIENCE WITH THE CEREZEN DEVICE FOR THE TREATMENT OF TMJD  
RELATED FACIAL PAIN.**

*P. Ramsay-Baggs<sup>1</sup>, A. O'Mahony<sup>2</sup>*

*<sup>1</sup>NorthernIreland Maxillofacial Service, Oral & Maxillofacial Surgery, Belfast, United Kingdom*

*<sup>2</sup>St James Hospital, Dept of Restorative Dentistry Prosthodontics, Dublin, Ireland*

The Cerezen device is a small, hollow, custom made appliance which is inserted into the auditory canal. It is believed to work by exerting pressure against the anterior auditory canal and inducing the patient to open their mouth, preventing clenching.

With only one randomized trial there is little in the literature to confirm the efficacy of these devices.

This paper presents the early experience of two clinicians using these devices.

35 patients with varying degrees of TMJD related facial pain have been treated with encouraging results.

We believe that there is a need for further research into the mechanism and effectiveness of these devices which may offer an effective management tool for some patients with TMJD related pain

## **ORAL SESSION 17: ORAL PATHOLOGY**

### **LSD1: A NOVEL ONCOGENE AND THERAPEUTIC TARGET IN ORAL CANCER**

*W. Yanling<sup>1</sup>, J. Cheng<sup>1</sup>*

*<sup>1</sup>Nanjing Medical University, Department of Oral and Maxillofacial Surgery, Nanjing, China*

**Aims:** The histone demethylase LSD1 specially demethylates histone H3 lysine 4 or 9 (H3K4, H3K9) and functions as a key pro-oncogene and therapeutic target in human cancer. However, there is little information to date as to its biological roles in oral squamous cell carcinoma (OSCC) nor whether it represents a viable therapeutic target.

**Methods:** The oncogenic roles of LSD1 in OSCC initiation and progression as well as therapeutic intervention were interrogated by integrating chemical-induced OSCC model, genetic and pharmacologic loss-of function approaches.

**Results:** Aberrant LSD1 overexpression was found in OSCC and its upregulation significantly associated with cervical lymph node metastasis, advanced clinical stage, and shorter overall survival. Increased abundance of LSD1 was detected along with disease progression in DMBA- or 4NQO-induced OSCC animal models. Moreover, LSD1 depletion via siRNA-mediated knockdown in OSCC cells resulted in impaired cell proliferation, migration/invasion, tumorsphere formation as well as reduced xenograft growth while inducing cell apoptosis and chemosensitivity to 5-FU. Noticeably, two small-molecule chemical inhibitors of LSD1, Pargyline (PG) and Tranylcypromine (TCP) treatments induced LSD1 protein reduction probably via enhanced protein degradation and produced similar phenotypic changes resembling LSD1 silencing in OSCC cells. Importantly, pharmacologic inhibition of LSD1 by intraperitoneal delivery of PG or TCP resulted in significantly impaired xenograft overgrowth in vivo.

**Conclusions:** Our data reveal the tumorigenic roles of LSD1 during oral cancer initiation and progression, and identify LSD1 as a novel biomarker with diagnostic and prognostic significance. Our findings further establish that targeting LSD1 by chemical inhibitors is a viable therapeutic strategy against OSCC.

**ORAL SESSION 17: ORAL PATHOLOGY**  
**CARCINOMA ARISING FROM MINOR SALIVARY GLAND: PROGNOSTIC FACTORS AND TREATMENT MODALITIES**

*V. Popovski<sup>1</sup>, V. Janevska<sup>2</sup>, A. Bendetti<sup>1</sup>*

*<sup>1</sup>University Clinic for Maxillofacial Surgery, Oncological Maxillofacial Surgery, Skopje, FYR Macedonia*

*<sup>2</sup>Institute of Pathology, Faculty of Medicine- University st.Cyril and Methodius, Skopje, FYR Macedonia*

**Aims:** Minor salivary gland carcinoma occurs infrequently but may pose a diagnostic and therapeutic dilemma. The purpose of this study was to contribute for determining treatment protocol and predictors of survival in this kind of malignancy.

**Material and methods:** The clinical course of 39 consecutive patients with minor salivary gland carcinomas surgically treated on our clinic in ten year period was evaluated for the study. Comparison was created with relevant information concerning patient, disease, diagnostics and treatment distinctiveness. The efficiency of surgical resections and postoperative radiotherapy, were compared with recurrence, histology, grade, stage and local and distant metastases, as a prognostic factors.

**Results:** Prevailing of mucoepidermoid (37,5%) and adenoid cystic (34.8%) carcinoma was revealed with palate as a commonest site. Lymph node metastases were confirmed in 17% while in 36% neck dissections were concomitant. 18 patients underwent planned postoperative radiation therapy. Multivariate analysis on the lesions showed that histology grade ( $P < 0.01$ ), tumor size ( $P < 0.01$ ), bone extension ( $P = 0.017$ ), margin status and stage were associated with decreased survival. The recurrence rate at the primary site was significantly higher for adenoid cystic carcinoma than for other histology's ( $P < 0.005$ ). The average cumulative survival rate in five year follow up was 84%. Immunohistology was effective in distinguishing type and grade amongst adenocarcinomas, mucoepidermoid carcinomas and adenoid cystic carcinomas.

**Conclusion:** Exact preoperative assessment, staging and radical primary surgery irrespective of site and histological type are crucial to achieve best survival and loco-regional control for minor salivary gland carcinoma.

## **ORAL SESSION 17: ORAL PATHOLOGY**

### **THE LIQUID BIOPSY: A PILOT STUDY ON DETECTION OF TP53 MUTATIONS IN PLASMA OF ORAL SQUAMOUS CELL CARCINOMA PATIENTS**

*J. van Ginkel<sup>1</sup>, M. Huibers<sup>2</sup>, R. de Bree<sup>3</sup>, S. Willems<sup>2</sup>, R. van Es<sup>4</sup>*

<sup>1</sup>*UMC Utrecht, Oral and Maxillofacial Surgery and Pathology, Utrecht, Netherlands*

<sup>2</sup>*UMC Utrecht, Pathology, Utrecht, Netherlands*

<sup>3</sup>*UMC Utrecht, Head and Neck Surgical Oncology, Utrecht, Netherlands*

<sup>4</sup>*UMC Utrecht, Oral and Maxillofacial Surgery and Head and Neck Surgical Oncology, Utrecht, Netherlands*

**Aims:** Early detection of deep recurrences after treatment of advanced head and neck squamous cell carcinoma (HNSCC) can be difficult with imaging. Early driver *TP53* mutations in free circulating tumor DNA (ctDNA) may serve as biomarkers in minimally invasive monitoring of post treatment tumor activity. In this pilot study, we investigated whether low level ctDNA in plasma of head and neck cancer patients can be detected.

**Methods:** *TP53* mutations were determined in surgically resected primary tumor samples from 5 previously diagnosed oral squamous cell carcinoma (OSCC) patients. Subsequently, mutation specific assays were designed for mutation detection by droplet digital PCR (ddPCR). Presurgical plasma samples (stored at -80°C) from the same patients were isolated (2 ml) and examined (18 ul) on the presence of ctDNA by ddPCR using the predesigned assays. PCR results were evaluated alongside clinicopathological data.

**Results:** All patients had moderately to poorly differentiated OSCC without distant metastases. All plasma samples were found positive for targeted *TP53* mutations in varying degrees (absolute quantification of 0.6 – 7.6 mutational copies/ul). Mutations were detected within a wild type *TP53* background of 317 – 2855 copies/ul.

**Conclusions:** We were able to detect tumor specific *TP53* mutations in low level ctDNA from presurgical OSCC patients using this mutation specific ddPCR. These results imply the potential utility of ctDNA as diagnostic biomarkers in the post treatment surveillance of OSCC patients.

**ORAL SESSION 17: ORAL PATHOLOGY**  
**ACCURACY OF INTERPRETATION OF NECK LEVELS IN PATHOLOGICAL SPECIMENS BY SURGEONS AND PATHOLOGISTS**

*T. Howe<sup>1</sup>, I. Varley<sup>2</sup>, K. Hunter<sup>1</sup>, A. Smith<sup>3</sup>*

*<sup>1</sup>University of Sheffield, Department of Oral Pathology, Sheffield, United Kingdom*

*<sup>2</sup>University of Sheffield, Academic Division of Oral & Maxillofacial Surgery, Sheffield, United Kingdom*

*<sup>3</sup>Sheffield Teaching Hospitals NHS Foundation Trust, Department of Oral & Maxillofacial Surgery, Sheffield, United Kingdom*

**Aims**

Accurate orientation of pathological specimens is of fundamental importance. The American Head and Neck Society recommend immediate division of the specimen in theatre, but this practice is not widespread, and numerous adjuncts to orientation have been described including templates, acetate overlays and markers. We sought to evaluate the accuracy of interpretation of specimens prepared according to our local protocol.

**Methods**

During a selective neck dissection of levels I, IIA, III and IV, boundaries between neck levels were marked with surgical staples. The resection specimen was secured to a grid for fixation and photographed. Staples were removed and the specimen photographed again. Consultants and senior trainees in maxillofacial surgery and oral pathology were shown a life-size colour photograph of the unmarked specimen and asked to mark where they believed boundaries between levels to fall on a template.

**Results**

Few participants were able to accurately identify the boundaries between levels, with several significant errors where a level as marked would contain none of the relevant anatomical tissue. Errors were greatest at level I, and decreased towards level IV. Significant errors were made by both pathologists and surgeons.

**Conclusions**

Post-operative division of neck specimens is likely to prove unreliable, whether carried out by a surgeon or a pathologist. Division of the specimen at the time of surgery, as suggested by the American Head and Neck Society, is recommended. Studies that evaluate nodal spread which do not describe division of specimens at the time of operation should be interpreted with caution.

**ORAL SESSION 17: ORAL PATHOLOGY**  
**IS TUFTELIN PROTEIN INVOLVED IN CANCER DEVELOPMENT?**

*D. Shilo<sup>1</sup>, A. Rachmiel<sup>1</sup>, Y. Leiser<sup>1</sup>, A. Blumenfeld<sup>2</sup>, D. Deutsch<sup>2</sup>*

*<sup>1</sup>Rambam Health Care Center, Oral&maxillofacial surgery, Haifa, Israel*

*<sup>2</sup>Hebrew University – Hadassah, Faculty of Dental Medicine, Jerusalem, Israel*

**Aims:** Tuftelin was originally identified in the enamel extracellular matrix.

Very little is known about tuftelin's function; tuftelin does not belong to any known protein family and no clear function emerges from the protein structure.

We have previously showed tuftelin plays a role during adaptation to hypoxia. We also showed tuftelin is expressed throughout craniofacial development in different tissues perhaps due to its role in the adaptive mechanisms in response to hypoxia. Tuftelin induction during hypoxia and involvement in several cancers, as indicated by cancer profiling arrays, drove us to study tuftelin's expression also in human cancerous tissues. **Methods:** Tuftelin protein expression in human oral squamous cell carcinoma, ameloblastoma, verrucous carcinoma and sarcoma was examined using immunohistochemistry assays on formalin-fixed paraffin-embedded tissues. Real-time PCR was used to measure tuftelin mRNA expression in oral squamous cell carcinoma, verrucous carcinoma and sarcomas following RNA extraction and reverse transcription.

**Results:** Immunohistochemistry assays revealed strong tuftelin expression in the cancerous tissues as compared to the control. Real-time PCR showed a significant elevation of tuftelin mRNA expression in cancerous tissues as opposed to control samples from the same individuals.

**Conclusions:** Tuftelin upregulation observed may be explained by taking a possible part in the protective mechanisms during hypoxia in cancer tissues. Another possible explanation may relay on preliminary results of our lab, in which tuftelin is shown to be involved in cell proliferation. Tuftelin's involvement in cancer progression needs to be further investigated. Tuftelin should also be investigated as a possible marker for different cancers.

**ORAL SESSION 17: ORAL PATHOLOGY**  
**DIAGNOSTIC AND THERAPEUTIC IMPLICATIONS OF NEW MOLECULAR MARKERS IN**  
**HEAD AND NECK SQUAMOUS CELL CANCERS**

*U. Riccelli<sup>1</sup>, C. Copelli<sup>1</sup>, L. Muscarella<sup>1</sup>, S. Catanzaro<sup>1</sup>, A. Manfuso<sup>1</sup>, K. Tewfik<sup>1</sup>, N. Pederneschi<sup>1</sup>,  
L. Cassano<sup>1</sup>, R. Cocchi<sup>1</sup>*

*<sup>1</sup>Casa sollievo della sofferenza, chirurgia maxillo facciale, san giovanni rotondo, Italy*

Head and neck squamous cell carcinoma is an heterogeneous group of neoplasms whose multimodal treatment involves surgery, chemotherapy and radiotherapy. Treatment response and prognosis, in terms of disease control and survival rate, are strongly related to factors such as anatomic location, TNM stage and histological grade. However there is no indicators that will predict us the actual response to treatment. For this reason, in recent years it has become more urgent the need to classify this neoplasms with an immunophenotypic and molecular basis pattern, in order to identify new predictive markers of disease.

The activation of the modulated signal of cell growth factors tyrosine-kinase activity are at the basis of neoplastic transformation, has been widely reported in correlation to the onset and progression of various solid tumors. Always increasing evidence show such as the inhibition of the EGFR and FGFR-mediated signal results in an antiproliferative effect and / or proapoptotic role, confirming the validity of the main proteins involved in these molecular cascades as potential target therapy.

The authors present preliminary results, of a study carried out retrospectively on patients treated for head and neck squamous cell carcinoma from 2011 , at the Maxillofacial Surgery Unit of the IRCCS "Casa Sollievo della Sofferenza" in San Giovanni Rotondo. The goal of the proposed study is to increase knowledge and to test markers related to growth factors for tyrosine kinase activity and related to oxidative stress, as prognostic factors in combination with the most common clinical and pathological parameters.

**ORAL SESSION 17: ORAL PATHOLOGY**  
**EXPRESSION PATTERNS OF TRANSCRIPTION FACTORS PAX9, SOX2 AND SOX9 IN**  
**OROPHARYNGEAL SQUAMOUS CELL CARCINOMA**

*J. Higginson<sup>1</sup>, H. Sathasivam<sup>2</sup>, B. Cosway<sup>3</sup>, M. Robinson<sup>2</sup>, R. Kis<sup>2</sup>*

*<sup>1</sup>Sunderland Royal Hospital, Oral and Facial Surgery, Sunderland, United Kingdom*

*<sup>2</sup>Newcastle University, Centre for Oral Health Research, Newcastle, United Kingdom*

*<sup>3</sup>Newcastle University, Institute of Cellular Medicine, Newcastle, United Kingdom*

Oropharyngeal squamous cell carcinomas (OPSCC) are a clinicopathologically distinct subset of head and neck cancers and are strongly linked to human papillomavirus (HPV) infection. HPV-positive OPSCC is associated with better clinical outcome and a different epidemiological and molecular profile than HPV-negative OPSCC. Therefore, investigation of the underlying biological differences could be utilised to develop novel biomarkers for further OPSCC patient stratification.

Members of the PAX and SOX gene families of transcription factors are important regulators of organogenesis and have previously been implicated in cancer.

Using immunohistochemical staining, we analysed the protein expression patterns of three relevant members, PAX9, SOX2 and SOX9, in a total of 183 HPV-positive and HPV-negative OPSCC tissue microarray samples. The resulting modified H-scores were correlated with HPV status using the Wilcoxon signed-rank test. HPV status was determined using p16 staining and high-risk HPV DNA-in-situ-hybridisation.

Our preliminary data suggest that PAX9 ( $p < 0.001$ ) and SOX2 ( $p < 0.001$ ) protein levels are significantly increased in HPV-positive OPSCC whereas SOX9 ( $p = 0.64$ ) is not correlated with HPV status. Correlation of expression patterns with overall disease survival is currently being investigated and results will be presented at the meeting. In accordance with their roles in other types of epithelial cancer, we suggest that PAX9 and SOX2 could be useful candidate biomarkers for further investigations into the biology of OPSCC.

## **ORAL SESSION 17: ORAL PATHOLOGY**

### **HUMAN TELOMERASE REVERSE TRANSCRIPTASE (hTERT) EXPRESSION IN THE ORAL SQUAMOUS CELL CARCINOMA (OSCC) REGARDING TO CLINICAL PARAMETERS- PRELIMINARY STUDY**

*D. Lyko- Morawska<sup>1</sup>, I. Niedzielska<sup>1</sup>, M. Zalewska-Ziob<sup>2</sup>, B. Adamek<sup>3</sup>, K. Biernacki<sup>4</sup>*

*<sup>1</sup>Silesian Medical University, Department of Cranio- Maxillo- Facial and Oral Surgery, Katowice, Poland*

*<sup>2</sup>Silesian Medical University, Department of General and Molecular Biology, Zabrze, Poland*

*<sup>3</sup>Silesian Medical University, Department of Nutrition Dependent Diseases, Bytom, Poland*

*<sup>4</sup>Silesian University of Technology, Faculty of Automatic Control, Gliwice, Poland*

#### **Introduction:**

Telomeres are protective caps at the ends of chromosomes, thought to be essential regulators of cell life span and chromosomal integrity. Telomerase is an enzyme complex responsible for their synthesis, having essential components as an RNA subunit, human telomerase reverse transcriptase (hTERT) and additional associated proteins. Telomerase activity has been detected in germ cells and most cancer cells, whereas most normal somatic cells reveal no clearly detectable telomerase activity.

#### **Objective:**

The aim of the study was the *hTERT* gene expression evaluation in the oral cancer and macroscopically unchanged tissues regarding to the anamnestic data, risk factors, TNM scale, tumor pre- and postoperating grading and differentiation.

#### **Material and Methods:**

The preliminary study population comprised 11 patients with histologically confirmed diagnosis of oral squamous cell carcinoma. During surgery tissue samples were taken from cancer tissue and opposite located healthy mucosa. From every sample RNA was isolated and subsequently transcribed into cDNA. For the *hTERT* gene expression the Q-RT-PCR was performed with *GAPDH* as an endogenous control using  $\Delta C_t$  method. The results were correlated with clinical data.

#### **Results:**

In 7 (64%) patients N stage <sup>3</sup>1 was revealed. There was a significant positive correlation between the level of *hTERT* expression in cancer tissue and the advancement of the process of metastasis to regional lymph nodes. The *hTERT* expression shown no important differences according to other clinical data.

#### **Conclusion:**

The level of *hTERT* expression could be helpful in assessing the OSCC metastasis potency to regional lymph nodes.

**ORAL SESSION 17: ORAL PATHOLOGY**

**DECREASE OF MIR-320A PROMOTES INVASION AND METASTASIS OF TUMOR BUDDING CELLS IN TONGUE SQUAMOUS CELL CARCINOMA**

*C. Wang<sup>1</sup>, N. Xie<sup>2</sup>, J. Hou<sup>1</sup>, X. Liu<sup>1</sup>, Z. Zhuang<sup>1</sup>, H. Liu<sup>1</sup>, H. Huang<sup>1</sup>*

*<sup>1</sup>Hospital of Stomatology- School of Stomatology- Sun Yat-sen University, Department of Oral and Maxillofacial Surgery, Guangzhou, China*

*<sup>2</sup>Hospital of Stomatology- School of Stomatology- Sun Yat-sen University, Department of Oral Pathology, Guangzhou, China*

**Aims:** To explore the miRNA signature of tumor budding cells and investigate the potential mechanism of miRNA governing tumor budding phenotype in tongue squamous cell carcinoma (TSCC).

**Methods:** Tumor budding, paired center tumors and lymph node metastatic cancer cells were collected with laser capture microdissection and examined using Agilent miRNA microarray. The miRNA signature of tumor budding were identified with qRT-PCR and in situ hybridization. The effects of miR-320a on invasion and migration and the regulation of Suz12 by miR-320a was assessed by a series experiments in vitro. Tumor xenografts models were established to assess the effect of miR-320a on metastasis in vivo. Tumor budding, miR-320a and Suz12 expression were examined in 100 TSCC patients and their prognostic value was evaluated.

**Results:** Tumor budding showed a specific miRNA signature when compared with cells from the cancer center and lymph node metastasis, especially, miR-320a expression was decreased in tumor budding cells. Knockdown of miR-320a enhanced migration and invasion in TSCC cells, whereas the upregulation of miR-320a exhibited an inverse effect. Moreover, Suz12 was identified to be a direct target of miR-320a, and simultaneous silencing of Suz12 partially recapitulated the effect of miR-320a inhibitors. Similar results were also observed in vivo. Furthermore, miR-320a expression was inversely correlated with Suz12 expression in TSCC. Multivariate analysis showed miR-320a is an independent prognostic factor. Kaplan–Meier analysis demonstrated decrease of miR-320a and high intensity of tumor budding indicated poor 5-year survival.

**Conclusions:** Decrease of miR-320a promotes invasion and metastasis of tumor budding cells by targeting Suz12 in TSCC.

## **ORAL SESSION 17: ORAL PATHOLOGY**

### **A NEW CANCER CELL PHENOTYPE: THE ROLE OF THE AMOEBOID CELL IN THE METASTASIS, AND THERAPEUTIC RESISTANCE, OF ORAL CANCER**

*N. Vig<sup>1</sup>, I. Mackenzie<sup>1</sup>*

*<sup>1</sup>Queen Mary University of London, Blizard Institute, London, United Kingdom*

#### Introduction

Cellular plasticity of cancer cells, as seen in epithelial-to-mesenchymal transition (EMT), may partly be responsible for metastasis and therapeutic failure. In addition to the epithelial and mesenchymal (EMT) tumour initiating cancer cells, we now describe in oral squamous cell carcinoma (OSCC) a third stem cell phenotype, the amoeboid, previously identified only in melanomas, sarcomas and prostate cancer.

#### Methods

The data is based upon in vitro study of normal, OSCC and cutaneous SCC cell lines, and fresh tumour specimens. Techniques employed include high-throughput invasion and migration assays, drug response assays, protein and differential gene expression profiling, fluorescence activated cell sorting, gene knockdowns and immunostaining.

#### Results

Isolated from each of 6 oral cancer cell lines, amoeboid cells are smaller than other cells and migrate at greater speeds (x10 faster compared to other phenotypes), in a manner resembling leucocytes. They have significantly greater invasive potential (x4-20 greater than mesenchymal cells) and greater resistance to drugs such as etoposide and paclitaxel. Gene analysis produces signatures significantly associated with angiogenesis and vascular development, chemoresistance, anti-apoptosis and invasion. The amoeboid cell essentially lacks keratin expression, complicating histopathological assessment of marginal tumour spread. It is plastic, allowing reversion to the other phenotypes. It also has specific drug and signalling pathway responses, and expresses amoeboid-specific markers.

#### Conclusion

We describe a new amoeboid OSCC phenotype that may confer greater ability for tumours to invade, disseminate and resist therapy. The expression of unique markers is of diagnostic interest and may permit therapeutic targeting for improved patient outcome.

**ORAL SESSION 18: IMPLANTS  
INDIVIDUALLY DESIGNED DENTAL IMPLANTS FOR IMMEDIATE PLACEMENT – CLINICAL  
RESULTS OF THE REPLICATETM SYSTEM**

*H.C. Jacobsen<sup>1</sup>, C. Weissinger<sup>2</sup>, S. Clasen<sup>3</sup>, S.G. Hakim<sup>1</sup>, P. Scherer<sup>2</sup>, P. Sieg<sup>1</sup>*

*<sup>1</sup>University of Lübeck, Maxillofacial Surgery, Lübeck, Germany*

*<sup>2</sup>Klinik am Ring, Maxillofacial Surgery, Cologne, Germany*

*<sup>3</sup>Praxis Lessingstrasse, Dentistry, Lübeck, Germany*

**Introduction:**

The attempt to form the dental implant individually in the shape of the tooth to be replaced is more than 100 years old. Modern CAD/CAM-techniques allow today the fabrication of such implants in high precision and acceptable time frame. The REPLICATE System uses 3D x-ray data to create the individual implants before extraction of the tooth so it can be placed in the empty socket at the same sitting as the provisory crown is applied. The definitive prosthetic crown is placed 6 months after insertion.

**Material and method:**

In this study 50 patients who received a REPLICATE implant 1 to 3 years after prosthetic loading were evaluated for the clinical result (bone level, inflammation, bleeding on probing), the aesthetic result and on the patients satisfaction.

**Results:**

The actual success rate in the ongoing study (5 years of reevaluation planned) is about 97.5%. In particular the aesthetic result was rated as “very good” by surgeon and patient. The perioperative complaints were minimal.

**Discussion:**

Individually manufactured REPLICATE implants may be seen as an interesting alternative to conventional enossal implants. Here the high comfort for the patient due to minimal invasive procedure, the immediate provisory prosthetic loading and the predictable good aesthetic result have to be emphasized. Up to now the indication has been limited to situations where the tooth to be replaced has a vast intact periodontium. More studies with wider range of indications have to follow this feasibility study.

**ORAL SESSION 18: IMPLANTS**  
**THE EFFECTS OF BACTERIAL CONTAMINATION ON DENTAL IMPLANTS DURING SURGERY - A SYSTEMATIC REVIEW**

*K. Johansson<sup>1</sup>, R. Jimbo<sup>1</sup>, P. Östlund<sup>2</sup>, S. Tranæus<sup>2,3</sup>, J. Becktor<sup>1</sup>*

*<sup>1</sup>Faculty of Odontology - Malmö University, Oral and Maxillofacial Surgery and Oral Medicine, Malmö, Sweden*

*<sup>2</sup>Faculty of Odontology - Malmö University, Health Technology Assessment-Odontology HTA-O, Malmö, Sweden*

*<sup>3</sup>Karolinska Institutet, Department of Dental Medicine, Stockholm, Sweden*

**Objectives:** Although it is well known that contamination during surgery negatively influences the prognosis of orthopaedic implants, it has not been proven whether contamination influences the success of dental implant treatment. The aim of this study was to conduct a systematic review to investigate whether there exists evidence in the literature that contamination of dental implants during surgery affects the osseointegration and the clinical success of dental implants.

**Methods:** Literature search was performed in Pub Med, Cochrane Library, Scopus and Embase, which had no limitations regarding language or year of publication. Primary studies and reviews regarding both clinical and pre-clinical research were eligible. When rating the summarized quality of the evidence the GRADE approach was used.

**Results:** 2046 articles remained after duplicate checking and finally, five pre-clinical studies were included. Due to the estimated high risk of bias in all included studies and extensive differences in study design between the included studies, meta-analysis was not performed. Even though no aggregated data could be extracted, the data however indicated that contaminated implants to some extent were associated with impaired osseointegration. The evidence, however, was inadequate and increased risk for implant loss could not be shown.

**Conclusions:** The results of the current systematic review suggested that the scientific evidence with regards to this specific topic is insufficient. To clarify whether contamination during surgery affects the osseointegration and the prognosis of dental implants, further controlled studies are warranted.

## **ORAL SESSION 18: IMPLANTS**

### **ORAL IMPLANT REHABILITATION AND SURGICAL COMPLICATIONS**

*V. Candotto<sup>1</sup>, M. Galìè<sup>1</sup>*

*<sup>1</sup>Unit of Cranio Maxillo Facial Surgery- St Anna Hospital and University,  
Unit of Cranio Maxillo Facial Surgery St Anna Hospital and University Ferrara- Italy, Ferrara, Italy*

**BACKGROUND** Implants have evolved from the initial excitement to a rapidly growing techniques for replace the missing teeth. The total number of implants being placed has increased significantly over the years 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 by incorrect manipulation or mishandling; by poor implant orientation or by the surgical procedure itself, which is not without risk.

The authors provide a detailed analysis of the etiology prevention and treatment of specific complications.

**PATIENTS AND METHODS** This study includes a retrospective review on patients referred for some complication due to implant placement. The patients were evaluated and baseline data collected.

**RESULTS** A different spectrum of surgical implant complication is reported. Clinical data, as data related to etiology, diagnosis and treatment planning have been collected. According to the complication patients were treated with appropriate surgical therapy. A detailed analysis of the etiology, prevention and treatment of specific complication is reported.

**CONCLUSIONS** There are several reasons for the increase number of implant complication in the last years. Intra-operative complications may be related with surgery such as hemorrhage, neurosensory alterations damage to adjacent teeth and mandibular fractures. Otherwise complication may be associated with implant placement such as absence of primary stability, fenestration or displacement into maxillary sinus. Knowledge, learning and experience are of paramount importance to reducing the number and the severity of implants surgical complications

## **ORAL SESSION 18: IMPLANTS**

### **DENTAL IMPLANT SURVIVAL IN PATIENTS WITH MICROVASCULAR MEDIAL FEMORAL CONDYLE FLAPS**

*S. Enzinger<sup>1</sup>, B. Chrisitan<sup>1</sup>, V. Sascha<sup>2</sup>, G. Alexander<sup>1</sup>, B. Gian Batista<sup>1</sup>*

*<sup>1</sup>Salzburger Landeskliniken/Paracelsus Medical University, MFC-Department, Salzburg, Austria*

*<sup>2</sup>Klinikum Klagenfurt, Department of Oral and Maxillofacial Surgery, Klagenfurt, Austria*

**Purpose:** The aim of this study was to evaluate the survival rate and peri-implant conditions in patients with dental implants placed in a medial femoral condyle (MFC) flap for reconstruction of alveolar ridge defects.

**Materials and Methods:** This retrospective study included 31 patients with MFC flap reconstructions who had received 127 dental implants from 2010 to 2015. The implants were examined clinically and radiologically 6 and 12 months after loading.

**Results:** In 122 implants (96%), healing was uneventful and the implants were loaded by means of fixed (48%) or removable superstructures (52%). Five implants in four patients did not osseointegrate. The bleeding on probing test showed 4% marginal bleeding at 6 months and 5% marginal bleeding at 12 months after implant loading. X-rays demonstrated high stability of the peri-implant bone 12 months after loading.

**Conclusion:** The MFC flap offers the advantage of three-dimensional correct reconstruction of the alveolar ridge. The thin soft tissue layer over the bone results in good peri-implant soft tissue conditions and permits the use of fixed superstructures in many cases. The implant survival rate is comparable with that of other bone flaps.

## **ORAL SESSION 18: IMPLANTS**

### **LONG-TERM TREATMENT OUTCOME OF DENTAL IMPLANTS PLACED AFTER SINUSLIFT USING ILIAC CREST GRAFT AND PLATELET-RICH PLASMA**

*S. Attia<sup>1</sup>, C. Narberhaus<sup>1</sup>, F.W. Neukam<sup>2</sup>, C. Schmitt<sup>2</sup>, H.P. Howaldt<sup>1</sup>, H. Schaaf<sup>3</sup>*

*<sup>1</sup>University Hospital Giessen, Oral and Maxillofacial Surgery, Giessen, Germany*

*<sup>2</sup>University Hospital Erlangen, Oral and Maxillofacial Surgery, Erlangen, Germany*

*<sup>3</sup>MKG am Theater, Maxillofacial Surgery, Giessen, Germany*

**BACKGROUND** The use of platelet-rich plasma (PRP) in oral implantology has been examined in studies, but the results were not proving the advantage of its use explicitly. Between 2001 and 2004, 53 patients took part in a randomised clinical trial in Gießen and Erlangen, Germany. All patients from the study group and the control group underwent autologous bone transplantation from the iliac crest for maxillary sinus augmentation and received dental implants. The study group's bone was treated with PRP additionally. Bone density was evaluated after 4 month and the implants were followed up until 6 month after insertion.

The results did not promote the use of PRP, as there were no explicit differences between the two groups.

**PURPOSE** The aim of this randomized clinical study is to analyse the long-term effects of PRP on implant success and bone loss after 11-13 years.

**MATERIAL&METHODS** Patients who participated in the previous trial are being re-examined clinically and radiographically. The follow-up examination includes the admission of implant health parameters and implant loss data. A panoramic radiograph is made and the alveolar crest height is measured to compare with results from the previous study.

**PRELIMINARY RESULTS** 16 patients (four men, 12 women) have participated in the study so far. The mean age is 62,4 years and the average follow-up time is 12,06 years. 82 implants were examined and 4 implants were lost, which indicates a survival rate of 95,35%.

## **ORAL SESSION 18: IMPLANTS**

### **NEW TECHNIQUE FOR SPLIT CREST IN ALVEOLAR BONE AUGMENTATION**

*A. Cortese<sup>1</sup>, A. Borri<sup>1</sup>, R. Barbaro<sup>2</sup>, F. Tripodi<sup>1</sup>, D. Troisi<sup>1</sup>, F. Carlino<sup>3</sup>*

*<sup>1</sup>University of Salerno, Department medicine and surgery, salerno, Italy*

*<sup>2</sup>University of Salerno, Departmet medicine and surgery, salerno, Italy*

*<sup>3</sup>Casa di cura Villa dei Pini, Department of surgery- section of Maxillofacial surgery, Civitanova Marche- MC-, Italy*

Various treatment strategies and techniques have been proposed to perform alveolar bone augmentation;. Split crest resulted to be one of the most reliable bone augmentation technique with new bone similar to native bone with better long term stability.

**AIM:** In this study, we describe a new modified split crest technique without buccal periosteal elevation on five patients to optimize the bone regeneration with implant insertion in one single stage . We also demonstrate that PRF in association with these technique can be a great aid in implant rehabilitation, especially in the elderly patients, when bone regeneration is required.

**DISCUSSION:** The main advantages of this technique consist in a single surgical stage without donor sites, vascular periosteal preservation of vestibular cortical walls, preservation of alveolar bone height avoiding bone loss after implant kit drilling, and preservation of proper cortical thickness on both sides saving periosteal nourishment on the vestibular side.. A new double level site preparation technique is described such achieving primary implant stability with proper amount of bone contact. The effectiveness of PRF is shown in promoting the healing of surgical wounds.

**Result :** All cases who have been treated have shown great results with complete osteointegration .

**Conclusion:** Indication for this technique could be extended to quite every implant insertion for alveolar height saving at drilling time, because of the dome alveolar crest shape. Currently it is a minimally invasive technique with low risks and satisfactory clinical results such preventing implant failure particularly in elderly patients for age related conditions.

## **ORAL SESSION 18: IMPLANTS**

### **A LONG-TERM FOLLOW-UP OF SIMILTANEOUS IMPLANT PLACEMENT WITH RIDGE AUGMENTATION USING BONE RING TRANSPLANT**

*M. Omara<sup>1</sup>, M. Ahmed<sup>1</sup>*

*<sup>1</sup>Faculty of Oral and Dental Medicine-Cairo University-Egypt,  
Department of Oral and Maxillofacial Surgery, Cairo, Egypt*

#### **Background:**

The severely defective socket, in which implant placement within the remaining bone will result in a significantly off-axis implant position, precludes immediate implant placement and requires bone grafting as an initial surgical intervention.

#### **Aim:**

The aim of this study was to evaluate The Success of autogenous chin bone ring augmentation technique within three years follow-up period after implant loading.

#### **Method:**

Ten patients with 12 defective sockets were included. Sockets were prepared with a trephine bur. Bone rings with a tapped implant osteotomy were harvested from the chin with a larger trephine bur. Bone rings were fitted in the prepared sockets. An implant drill was used to prepare the bone apical to the ring through its central osteotomy. Implants were screwed through the rings and the apical bone. Patients were examined clinically and radio-graphically immediately, 6 months and 3 years postoperatively. Crestal bone changes were measured and statistically evaluated.

#### **Results:**

Six-months postoperatively all grafted sockets showed bone healing with no significant crestal bone resorption and no infection; only one ring showed dehiscence, which healed during the follow-up period. All implants showed radiographic evidence of osseointegration. Three years postoperatively, all implants were maintained under function and the crestal bone changes weren't statistically significant when compared with that of 6 months postoperative changes.

#### **Conclusion:**

The autogenous chin bone ring augmentation technique was found to be a reliable alternative method for the management of severely defective sockets.

## **ORAL SESSION 18: IMPLANTS**

### **LONG TERM FOLLOW UP OF MAXILLARY SINUS FLOOR ELEVATION WITH A SPACE MAINTAINING MESH: TITANIUM VERSUS RESORBABLE**

*A. Abu Shama<sup>1</sup>*

*<sup>1</sup>Faculty of Medicine - Cairo University, Maxillofacial Surgery, Cairo, Egypt*

**Background:** The placement of dental implant in the edentulous posterior maxilla often present difficulties as a result of insufficient bone due to pneumatization of the maxillary sinus and bone resorption after extraction.

The new compartment created between floor of sinus and elevated membrane was filled with bone graft to maintain space for new bone formation.

Recently, non grafting sinus floor augmentation was established based on the concept of membrane elevation and its support either by implants or space maintaining devices have proven new bone formation both experimentally and clinically.

**Aim:** Evaluate the predictability of new bone formation at sinus floor after elevation of the membrane using a space maintaining mesh without graft material.

**Patients & Methods:** Eight patient (16 sinus lift) selected for implant placement in the edentulous posterior maxilla. Clinical examination, cast preparation, and radiographic examination (Panoramic, CBCT) was performed. Under local anesthesia, sinus membrane was elevated through lateral window technique and it was supported and maintained either with a titanium or resorbable Mesh.

Immediate post operative clinical & Radiographic examination was performed for evaluation. Six month post-operatively, core bone biopsy was performed for histological examination of the formed bone using a trephine drill at planned position of implant.

**Results:** None of the patients showed any signs of dehiscence, infection, or sinusitis. New bone formation was proven radiography, histologically and clinically during implant placement (a satisfactory initial stability) in both groups .

**Conclusion:** Both Titanium and resorbable meshes was reliable and predictable as a space maintaining devices after membrane elevation.

## **ORAL SESSION 18: IMPLANTS**

### **DYNAMIC IMPLANT VALVE APPROACH (DIVA) FOR MINIMALLY INVASIVE SINUS FLOOR ELEVATION SURGERY: FOUR YEARS' EXPERIENCE**

*A. Abu-Nimer<sup>1</sup>, O. Nahlieli<sup>1</sup>*

*<sup>1</sup>Barzilai Medical Center, Oral and Maxillofacial Surgery, Ashkelon, Israel*

**Objectives:** The aim of this study is to introduce our long-term experience using the Dynamic Implant Valve Approach (DIVA) for sinus floor elevation (SFE) as a safe and minimally invasive modification of maxillary implant surgery with subsequent subantral augmentation. Within this article the implant is reviewed as well as the surgical technique.

**Patients and Methods:** The DIVA is an implant system (Ti-6Al-4V ELI) with a dedicated central port and internal sealing screw enables gentle SFE, direct endoscopic observation during the procedure, and grafting material delivery if needed as well. Between 2012-2015, 378 DIVA implants have been performed on 172 patients (female=89, male=83, age-range 31-85 years old, mean-age 50 years old) with atrophic posterior maxilla and native vertical bone range 3-9mm (257 implants with bone level <5mm, 121 implants with bone level >5mm), using jelly alloplastic augmentation material injected subantrally via the implant port.

**Results:** Mean augmentation height was 8.8 mm (range 2-15mm). Of 378 DIVA implants placed, 21 implants (5.5%) failures were observed in nine patients without further complication, while the rest 357 implants (94.5%) were totally successful. There were no significant difference ( $p=0.32$ ) in the complication rate between implants inserted in bone level <5mm and those in bone level >5 mm.

**Conclusion:** DIVA is a predictable one-staged implant surgery technique for implantation in posterior atrophic maxilla. By which, SFE becomes less invasive and with lower morbidity, the surgical field view is optimized during the procedure, adequate bone height can be achieved with long-term stability, and high acceptance by patients.

## **ORAL SESSION 18: IMPLANTS**

### **IMPLANT STABILITY AND COMPLICATION RATES AFTER GUIDED BONE REGENERATION (GBR) WITH NON-RESORBABLE MEMBRANES VERSUS TITANIUM MESHES. A RANDOMIZED CLINICAL TRIAL.**

*A. Cucchi<sup>1</sup>, A. Napolitano<sup>1</sup>, E. Vignudelli<sup>1</sup>, S. Franco<sup>1</sup>, C. Marchetti<sup>1</sup>*

*<sup>1</sup>University of Bologna, Department of Biomedical and Neuromotor sciences, Bologna, Italy*

**PURPOSE:** The aim of this randomized clinical trial is to compare 2 different approaches for Guided Bone Regeneration (GBR) in posterior region of atrophic mandibles. Surgical and healing complications, implant primary stability, and newly-formed bone were evaluated in the two study groups.

**MATERIALS & METHODS:** Forty partially edentulous patients, who require a three-dimensional bone regeneration and an implant-prosthetic rehabilitation, were randomly divided into two groups and consecutively treated by means of non-resorbable d-PTFE titanium-reinforced membranes (group-A) or titanium meshes covered by cross-linked collagen membranes (group-B). All patients received simultaneously two or more double variable thread tapered implants. Implants and barrier devices were left submerged for 9 months before reopening surgery. The patient was regarded as the statistical unit of analysis and the collected data were subjected to statistical analysis to observe any statistically significant differences ( $P=0.05$ ).

**RESULTS:** 99.0% of implants showed an optimal primary stability, with insertion-torque  $> 25\text{Ncm}$  and ISQ  $> 60$ . All implants achieved a successful osseointegration. In the group-A, surgical and healing complication rates were 5.0% and 15.9% respectively. Among these, 2 complications (10.0%) compromised the amount of newly-formed bone. In the group-B, surgical and healing complication rates were 15.0% and 20.0% respectively; three complications (15.0%) compromised the amount of newly-formed bone. Statistically significant differences were observed about complication rates ( $P<0.05$ ).

**CONCLUSIONS:** Implants could achieve an adequate primary stability to be simultaneously placed according to one-stage approach. In the most of cases, surgical and healing complications did not affect the amount of newly-formed bone and the following implant-prosthetic rehabilitation.

## **ORAL SESSION 18: IMPLANTS**

### **IMPLANT-SUPPORTED PROSTHETIC REHABILITATION AFTER BONE DISTRACTION**

*C. Maza Muela<sup>1</sup>, R. Fernandez-Valades Gamez<sup>1</sup>, A. Garcia Sevilla<sup>1</sup>, M. Tousidonis Rial<sup>1</sup>,  
S. Ochandiano Caicoya<sup>1</sup>, C. Navarro Cuellar<sup>1</sup>, J.I. Salmeron Escobar<sup>1</sup>*

*<sup>1</sup>Gregorio Marañón Hospital, Oro Maxillo Facial, Madrid, Spain*

#### **AIMS**

Osteogenesis distraction for jaw reconstruction allows creating bone and soft tissue without the needed for bone grafting and its potential complications. We analyzed our experience in implant-supported prosthetic rehabilitation after bone distraction techniques.

#### **METHODS**

We present a series of 6 cases treated in our hospital in which after a maxillary resection of the jaws, the resulting defect has been rebuilt with bone distraction techniques. We had excluded patients who need additional radiotherapy, because it can compromise bone regeneration during distraction osteogenesis.

Bone defects were the result of two segmental mandibulectomies (resolved mediante uni or bifocal transport), a symphysis marginal mandibulectomy (bifocal bone transport was performed above the baseline), two mandibulectomies and a marginal maxillectomy (vertical distraction of a basal segment).

The device placement was in the same surgical procedure that the primary surgery except in two cases (a secondary reconstruction from an other centre and after a microsurgical flap failure). Once obtaining the desired distraction and after 3 months for a proper consolidation, we remove the device and place the implants.

#### **RESULTS**

After implant-supported prosthetic rehabilitation the patients recover a good aesthetic and function.

#### **CONCLUSIONS**

Osteogenesis distraction techniques are a valid alternative to microsurgical reconstruction in selected patients. The newly-formed bone allows the implant-supported prosthetic rehabilitation which return to patients a good aesthetic and function.

**ORAL SESSION 18: IMPLANTS**  
**MONITORING OF IMPLANT STABILITY WHEN PLACED SIMULTANEOUSLY IN PLATELET RICH FIBRIN ENHANCED MAXILLARY SINUS BONE AUGMENTATION**

*M. Elsholkamy<sup>1</sup>, G. El Desouky<sup>2</sup>*

*<sup>1</sup>Faculty of Dentistry- Suez canal University- Ismailia- Egypt., Oral and Maxillofacial Surgery, Cairo, Egypt*

*<sup>2</sup>Faculty of Dentistry- Suez canal University- Ismailia- Egypt., Oral Radiology, Cairo, Egypt*

**Aim:** Assessment of the effect of platelet rich fibrin (PRF) mixed with sinus bone graft on the stability of implants placed simultaneously during lateral window approach sinus lifting procedure.

**Patients and methods:** Sixteen patients were included in this study. They underwent lateral window approach sinus lifting with simultaneous implant placement. They were divided equally into two groups, Group 1; beta tricalcium phosphate ( $\beta$ -TCP) was used alone to graft the maxillary sinus and Group 2; a mixture of  $\beta$ -TCP and PRF was used to graft the sinus. The stability of the implants was measured immediately postoperative and at 4 and 6 months postoperatively using the Osstell device. Abutment placement and subsequent loading was done when the ISQ was more than 70 at six months postoperatively. The implant stability quotients (ISQ) were statistically tested.

**Results:** Group 2 showed higher mean values of ISQ than group 1. There was no significant difference between both groups at the immediate and 4 months assessment, while the difference was significant at the 6 months assessment. The cases that showed ISQ values below 70 in group 1 were delayed in abutment placement and loading.

**Conclusion:** The use of PRF and bone graft mixture as a sinus augmentation enhancement method had positive impact on the implant stability and hence better clinical outcome and earlier loading were achieved.

## **ORAL SESSION 18: IMPLANTS**

### **LOW INCIDENCE AND PREVALENCE OF PERI-IMPLANT MUCOSITIS AND PERI-IMPLANTITIS IN 230 PATIENTS WITH AUTOLOGOUS BONE AUGMENTATION**

*F.P. Carls<sup>1</sup>, M. Bernasconi<sup>2</sup>, T. Lambrecht<sup>3</sup>, N. Zitzmann<sup>4</sup>, M. Lawrence<sup>5</sup>, G. Lewis<sup>6</sup>, F. Carinci<sup>7</sup>*

*<sup>1</sup>Dr. Dr. Carls, Oral & Maxillofacial Surgery, Oxford, United Kingdom*

*<sup>2</sup>University of Zurich, Dean's office, Zurich, Switzerland*

*<sup>3</sup>University of Basel, Oral Surgery & Radiology, Basel, Switzerland*

*<sup>4</sup>University of Basel, Periodontology & Endodontics, Basel, Switzerland*

*<sup>5</sup>Lawrence & Pinkerton, Dental Practice, Wallingford, United Kingdom*

*<sup>6</sup>Beaumont Dental, Mr Lewis, Oxford, United Kingdom*

*<sup>7</sup>University of Ferrara, Maxillofacial Surgery Department of Morphology-Surgery and Experimental Medicine, Ferrara, Italy*

#### **Aim**

To report the incidence and prevalence of peri-implant mucositis and peri-implantitis in 230 patients with long term follow up and to analyse possible influencing cofactors.

#### **Methods**

230 patients with 478 implants treated between 2000 and 2012 were seen for clinical and radiographical assessment. Preoperative requirements comprised good oral hygiene with no periodontal disease and non-smoking. The patient mean age was 59 years (range 22-88). Autologous bone grafting procedures (local bone, mandibular block bone and hip bone graft) had been carried out for 338 implants. Signs of peri-implantitis and peri-mucositis were recorded on the basis of bleeding on probing, probing pocket depth and bone loss based on rectangular periapical radiographs.

#### **Results**

All 478 implants were in situ after a mean time in function of 66.2 months (range 12-151 months). 24 implant sites (5.02%) in 19 patients showed signs of peri-implant mucositis. 12 implant sites (2.51%) in 12 patients revealed signs of peri-implantitis. The reason for peri-implant mucositis and peri-implantitis were attributed to low compliance with regards to oral hygiene and maintenance at the dentist/hygienist. Further reasons were inadequate prosthetic rehabilitation, while only 2.1 % of implant sites treated with bone augmentation showed signs of peri-implantitis. Refusal to perform implant surgery in smokers may lead as well to the observed low rate of peri-implant infection.

#### **Conclusions**

Low incidence of peri-mucositis and peri-implantitis appears possible when patients are selected carefully, surgery and prosthetic rehabilitation is carried out respecting all anatomical and physiological rules, and augmentation procedures using autologous bone enable adequate implant positioning.

**ORAL SESSION 19: TMJ**

**COMPLICATIONS OF TEMPOROMANDIBULAR JOINT ARTHROSCOPY USING 2 PORTALS COBLATION TECHNOLOGIES: A PROSPECTIVE STUDY OF 475 PROCEDURES**

*J. Fernández Sanromán<sup>1</sup>, C.L. Alberto<sup>1</sup>, F.F. Martín<sup>1</sup>, L. Annahys<sup>1</sup>, S. Bogdan<sup>1</sup>, A.B. Jorge<sup>1</sup>*

*<sup>1</sup>Povisa, Oral and Maxillofacial Surgery, Vigo, Spain*

**Purpose:** The study aimed to investigate the complications of temporomandibular joint (TMJ) arthroscopic procedures using two portals coblation technologies.

**Materials and Methods:** The 397 consecutive patients (475 joints) who underwent arthroscopic surgery were prospectively analyzed.

**Results:** Complications were observed in 39 (8.21%) procedures. Complications recognized during or immediately after surgery were observed in 25 patients (5.26%). Vascular injury in the points of trocar insertion was observed in 7 cases. Lesions of the fibrocartilage layer of the joint secondary to introduction of instruments were observed in 12 cases. Bleeding within the superior joint space was observed in 21 cases. Extravasation of irrigation fluid appeared in 5 patients, affecting the oropharyngeal space in 1 case. In 20 patients more than one complication at the same time of surgery occurred. Delay postoperative complications were noted in 14 patients. Blood clots in the external auditory canal were found in 8 cases and lacerations in 2 cases. One patient suffered a partial hearing loss, and two patients suffered from vertigo. Temporary hypesthesia of the auriculotemporal nerve was seen in 2 cases. In 4 patients temporary damage to the V cranial nerve was observed. Temporary paralysis of the zygomatic branch of the facial nerve was seen in 1 case.

**Conclusion:** Most of the complications presented in our series of patients occurred during the early years using this surgical technique. Therefore, we believe that two portals TMJ arthroscopic procedures using coblation technologies appear to be a safe procedure.

**ORAL SESSION 19: TMJ**  
**QUALITY OF ONLINE INFORMATION RELATING TO TMJ PAIN**

*P. Kiely<sup>1</sup>, D. McGoldrick<sup>2</sup>, C. Cotter<sup>2</sup>*

*<sup>1</sup>University College Cork, School of Medicine, Cork, Ireland*

*<sup>2</sup>Cork University Hospital, Oral and Maxillofacial Surgery, Cork, Ireland*

**Introduction & Aim**

The internet is increasingly used by patients to access information regarding pathology and treatments. We aimed to evaluate the quality of information available to patients on websites relating to TMJ pain.

**Methods**

A search of the term "TMJ pain" was performed on the top three internet search engines - Google, Yahoo and Bing. The top ten results in each search were assessed. Duplicate or unrelated results were excluded. The remaining results were assessed using the DISCERN tool and the JAMA benchmarks.

**Results**

Of the original 30 results, 16 were excluded (15 duplicates, 1 unrelated). The average DISCERN score was 43.4 (range 17-61). No website achieved an excellent score (> 63), 21% were categorised as poor (27-38) and 57% categorised as fair (39-50). No website met all JAMA principles with only 42% adhering to half of the principles.

**Conclusion**

This study indicates that the standard of online information relating to TMJ pain is variable, but generally of fair quality. Patients should be advised to be cautious of online sources and directed towards higher quality websites.

**ORAL SESSION 19: TMJ  
ARTHROSCOPY VERSUS ARTHROTOMY FOR THE TREATMENT OF SYNOVIAL  
CHONDROMATOSIS – PRESENTATION OF TWO CASES**

*W. Abboud<sup>1</sup>, M. Vered<sup>2,3</sup>, R. Yahalom<sup>1</sup>*

*<sup>1</sup>Sheba Medical Center, Department of Oral and Maxillofacial Surgery, Tel Hashomer, Israel*

*<sup>2</sup>Sheba Medical Center, Department of Pathology, Tel Hashomer, Israel*

*<sup>3</sup>Tel Aviv University, Department of Oral Pathology and Oral Medicine, Tel Aviv, Israel*

Synovial chondromatosis (SC) is a rare benign arthropathy with approximately 250 cases reported in the literature. The treatment described in the earlier case reports included removal of loose bodies, synovectomy, meniscectomy, and condylectomy. Since the 1990s, the vast majority of publications described arthrotomy without condylectomy as the treatment of choice. The last 15 years provided an additional shift in treatment trends with many publications describing arthroscopic treatment.

Two cases presented at our department in the last 3 years. The clinical and radiographic examinations of both cases were nonspecific and suggested a differential diagnosis of SC, PVNS, gout/pseudogout, and low-grade chondrosarcoma.

In patient #1, during arthrotomy, the lesion was suspected for invasion into surrounding tissues. Examination of frozen sections raised the possibility of a low-grade chondrosarcoma. Condylectomy and resection of the TMJ structures was undertaken. The final histopathologic diagnosis was SC.

In patient #2, arthroscopy was performed to obtain tissue for biopsy, and it visualized loose bodies in the joint cavity. The loose bodies were relatively small and were easily removed arthroscopically. Final histopathologic diagnosis was SC and no further surgery was required.

In conclusion, SC can pose a diagnostic challenge due to the nonspecific nature of presenting complaints and radiographic findings. Frozen sections for suspected SC might not be accurate as its cytological features overlap with those of cartilage- and bone-related sarcomas. Arthroscopy enables direct visualization of the joint cavity and obtaining tissue biopsy. Furthermore, in incipient cases where the loose bodies are relatively small, arthroscopy may be the definitive therapy.

## **ORAL SESSION 19: TMJ**

### **TEMPORO-MANDIBULAR JOINT DYSFUNCTIONS AND ORTHOGNATHIC SURGERY**

*C.M. Bandini<sup>1</sup>, T. Schouman<sup>1</sup>, J.B. Kerbrat<sup>1</sup>, L. Ben Slama<sup>1</sup>, P. Goudot<sup>1</sup>*

*<sup>1</sup>Hôpital La Pitié-Salpêtrière- 75013, Maxillo-Facial Surgery and Stomatology, Department, Paris, France*

#### Introduction

Our objective was to assess the impact of orthognathic surgery on temporo-mandibular joint (TMJ) function.

#### Material and Methods

We prospectively included patients undergoing orthognathic surgery in our department, from January 2013 to January 2015. We collected pre-treatment data for every patient (1 month before surgery). We identified maxillo-mandibular disharmonies, the type of surgery, TMJ dysfunctions, especially spontaneous or provoked TMJ pain, sounds, disc click or disc locking, and masticatory muscle contracture. We measured mouth opening, propulsion, and mandibular lateral excursion. A post-therapeutic analysis (1 or 2 years after surgery) was performed, by collecting the same type of clinical data. The main criterion of evaluation concerned the evolution of TMJ symptoms.

#### Results

58 patients were included. We performed 14 Lefort I osteotomies, 13 bilateral sagittal split mandibular osteotomies, and 31 maxillo-mandibular osteotomies.

56 % presented with pre-operative TMJ dysfunction. After surgery, 48% were still in this case.

15 % presented with worsening of TMJ symptoms after surgery: 5 Class II malocclusions, 3 Class III malocclusions, and one hypercondylia. These patients had undergone 2 Lefort I osteotomies, 2 bilateral sagittal split osteotomies (BSSO), and 8 maxillo-mandibular osteotomies.

24 % presented with improvement or total resolution of TMJ symptoms. The maxillo-mandibular disharmonies in this group were 5 Class II malocclusions and 9 Class III malocclusions. These patients had undergone 2 Lefort I osteotomies, 4 BSSO, and 8 maxillo-mandibular osteotomies.

No statically significant differences were observed.

#### Discussion

Orthognathic surgery did not impact TMJ function negatively. Conversely TMJ symptoms remained stable or improved for 49/58 patients (84%). These results correlate with published data.

**ORAL SESSION 19: TMJ**

**A TEN-YEAR EXPERIENCE AND FOLLOW-UP OF 63 PATIENTS FOLLOWING TOTAL RECONSTRUCTION OF THE TEMPOROMANDIBULAR JOINT AT HELSINKI UNIVERSITY CENTRAL HOSPITAL**

*Z. Hodzic<sup>1</sup>, J. Törnwall<sup>1</sup>*

*<sup>1</sup>Helsinki University Central Hospital, Oral and Maxillofacial Surgery, Helsinki, Finland*

The purpose of this study is to present results obtained after total temporomandibular joint (TMJ) reconstruction with Biomet/Lorenz Microfixation TMJ replacement system (Jacksonville, FL, USA) and TMJ Concepts prosthesis (TMJ Concepts Inc, Camarillo, CA, USA). We report our ten-year experience with the total reconstruction of TMJ in 63 patients treated between 2006 and 2016. The general data and measurements were taken from medical records. A total of 100 devices (cases: unilateral 28, bilateral 36) were implanted in 63 patients (19 males, 44 females) during this 10-year period. TMJ reconstruction was done using stock TMJ replacement system (41) and custom made total joint prosthesis (59). All patients who had total TMJ reconstruction within a 10-year period were included. The primary diagnoses were degenerative disease, ankylosis, arthritis, syndrome, neoplasm, injury and previous operations. The mean age of the patients was 40.4 years (range 9.6-75.5 years). Median follow-up was 3.1 years (range 0-8.89). The most common complication reported was transient facial nerve impairment. Six patients required a second operation due to a complication (reankylosis, infection, luxation, unsatisfactory prosthesis position). During the study period, two of 100 implants (2%) were explanted and new TMJ replacements fitted. There were significant improvements in pain scores and maximum mouth opening. The results of this study support the view that total TMJ reconstruction gives good early and long-term improvements in pain and function, with few complications.

**ORAL SESSION 19: TMJ  
QUALITY OF LIFE OUTCOMES FOLLOWING TMJ REPLACEMENT AT 1 YEAR USING  
SHORT FORM 36 QUESTIONNAIRES**

*R. Rashidi<sup>1</sup>, N. Ahmed<sup>1</sup>, A. Sidebottom<sup>1</sup>*

*<sup>1</sup>Queens Medical Centre- Nottingham, Oral and Maxillofacial Department, Nottingham,  
United Kingdom*

**Aim**

The aim of this study was to assess the quality-of-life (QoL) outcomes of patients who had undergone temporomandibular joint (TMJ) replacement surgery with the short form 36 (SF36) questionnaire which is validated for use in this context.

**Methods**

30 patients who underwent TMJ replacement between 2013 and 2015 were evaluated using the SF36 questionnaire. Each completed a pre- and post-operative questionnaire (at one year). Data was recorded using an Excel spreadsheet and the results were analysed using SPSS software.

**Results**

This cohort of 30 patients consisted of 27 females and 3 males. Mean age at time of TMJ replacement was 43 (range 19-66).

Post-TMJ replacement surgery patients showed statistically significant decreases in pain scores, diet and chewing, mood and anxiety compared with their presurgical scores with a p value of <0.05. However, there were no statistically significant differences between the pre- and post-TMJ replacement surgery scores in terms of speech or recreation, although most self reported an overall improvement in their general well being.

**Conclusion**

The results of this study suggest that TMJ replacement is associated with a positive QoL effect in terms of reducing pain levels and improved diet for this cohort, along with improved QoL effect on speech, mood and lifestyle.

This should be mandatory information and data to collate which should support individual funding requests which are still undertaken in some UK to gain gain clinical commissioning group (CCG) approval to proceed with surgery.

**ORAL SESSION 19: TMJ  
CONCOMITANT TEMPOROMANDIBULAR TOTAL JOINT RECONSTRUCTION AND  
ORTHOGNATIC SURGERY**

*G. Gerbino<sup>1</sup>, E. Zattero<sup>1</sup>, S. Sembrino<sup>2</sup>, G. Bosco<sup>1</sup>, G. Ramieri<sup>1</sup>*

*<sup>1</sup>A.O. CITTA' DELLA SALUTE E DELLA SCIENZA- P.O. MOLINETTE, Surgical Science-  
Maxillofacial Unit, Torino, Italy*

*<sup>2</sup>S. Maria degli Angeli Hospital, Maxillofacial Unit, Pordenone, Italy*

**Aim.** Alloplastic joint prostheses have been used in the treatment of severe diseases of the temporomandibular joint (TMJ) for many years. TMJ disorders or pathology and dentofacial deformities commonly coexist. The TMJ pathology could be the causative factor of the deformity or develop as a result of the jaw abnormality or both may develop independently of each other. We report a single stage technique for replacement of affected joint using stock prosthesis or custom-made prosthesis and orthognatic surgery to change or correct the occlusion. Technical aspects and the indications will be discussed.

**Methods.** 18 Lorenz/Biomet prosthesis were placed in 11 patients who underwent unilateral or bilateral alloplastic total TMJ replacement with mandibular repositioning and orthognatic surgery. Data collected from the patient's records included age, gender, etiology, number of previous TMJ operations, treated TMJ, hospital stay, complications. Preoperative and follow-up assessment for TMJ pain, diet consistency, and maximal interincisal opening was performed. The minimum follow-up was one year.

**Results.** The prosthetic components used in these cases provided excellent anatomical reconstruction. All patients presented a noticeable improvement in maximal interincisal opening, TMJ pain and diet consistency at follow-up compared to preoperative situation. Occlusion and aesthetical changing remain stable at one-year follow-up.

**Conclusions.** Patients with TMJ disorders and concomitant dentofacial deformities may benefit from one-stage corrective surgical intervention. Computer-assisted surgical simulation decrease the preoperative workup time and increase the accuracy and safety of surgery.

**ORAL SESSION 19: TMJ**

**PATHOLOGY OF THE INTRA-ARTICULAR DISC IDENTIFIED AT TMJ ARTHROSCOPY: CAN IT PREDICT THE NEED FOR TMJ REPLACEMENT? REVIEW OF ACTIVITY IN A UK CENTRE**

*C. Frezzini<sup>1</sup>, A. Hopkins<sup>1</sup>, L. Hua<sup>1</sup>, N. Ahmed<sup>1</sup>, A. Sidebottom<sup>1</sup>*

*<sup>1</sup>Nottingham University Hospitals- QMC Campus, Oral and Maxillofacial Surgery, Nottingham, United Kingdom*

Introduction: Temporomandibular joint (TMJ) arthroscopy is an intermediate minimally invasive procedure in the management of TMJ dysfunction (TMJD). During this procedure, intra-articular pathology can be identified along with a significant chance of therapeutic benefit. Patients who fail to improve might require further surgical management. TMJ replacement is indicated in symptomatic patients with unresolved pathology who fit within strict guidelines and indications. To date no correlation between intra-articular pathology found at arthroscopy and subsequent need for TMJ replacement has been documented.

Aim: To audit TMJ arthroscopy findings under one surgeons care over the period 2004 - 2015 to identify whether disc pathology at arthroscopy could be correlated to subsequent requirement for open surgery or ultimately TMJ replacement.

Methods: 427 patients underwent TMJ arthroscopy between October 2004 and June 2015. All data had been completed on the prospective departmental database by one surgeon (AJS). The presence of intra-articular pathology and the number of patients who subsequently underwent open surgery or TMJ replacement were identified. Demographic data, Wilkes scores and type of pathology are described.

Results: 427 patients underwent 596 arthroscopies. Specific disc pathology was identified in 82 procedures. Of these, 23 subsequently had open surgery involving exploration (2), disc plication/repositioning (4), discectomy +/- joint surface modification (11), and TMJ replacement (6).

Conclusions: Pathology of intra-articular tissues identified at arthroscopy can aid in the prediction of the subsequent need for further surgical procedures and therefore aid in the decision to offer TMJ replacement.

**ORAL SESSION 19: TMJ  
ADHERENCE TO NICE GUIDELINES FOR TMJ REPLACEMENT AT UNIVERSITY  
HOSPITALS BIRMINGHAM**

*C. Vereia Linares<sup>1</sup>, A. Attard<sup>1</sup>, B. Speculand<sup>1</sup>, J. Green<sup>1</sup>*

*<sup>1</sup>University Hospitals Birmingham, Oral and Maxillofacial Department, Birmingham,  
United Kingdom*

**Aim**

It is recommended that individual units audit outcomes against national guidelines. The aim of this project was to assess the compliance with indications for TMJ replacement derived from NICE guidance for total prosthetic replacement of the temporomandibular joint (August 2014).

**Method**

This is a retrospective study of all patients who underwent a total prosthetic replacement of their temporomandibular joint from 2014 to 2015 at University Hospitals Birmingham.

**Results**

Our unit is 100% compliant with NICE guidelines for TMJ replacement. We present the data obtained from this study, being commonest preceding diagnosis osteoarthritis.

**Conclusions**

The results from our unit are in keeping with the findings from the national reports. There are no long-term outcome studies from the UK and further work is recommended.

## **ORAL SESSION 19: TMJ**

### **SYNOVITIS OF THE TEMPOROMANDIBULAR JOINT IN ARTHROSCOPY**

*E. Varela Reyes<sup>1</sup>, R. Martin-Granizo<sup>1</sup>, A. Encinas Bacones<sup>1</sup>, O. De la Sen Corcuera<sup>1</sup>,*

*I. Martinez Padilla<sup>1</sup>, N. Naranjo Aspas<sup>1</sup>, F. Falahat<sup>1</sup>, M. De Pedro Marina<sup>1</sup>*

*<sup>1</sup>Hospital Clinico San Carlos, Department of Oral & Maxillofacial Surgery, Madrid, Spain*

#### *Aims:*

Before the advent of arthroscopy of the TMJ, synovial pathology was unknown, since there were no diagnostic methods to indicate their existence. Synovitis is an inflammatory process that occurs when synovial levels of cellular debris and inflammatory agents reach such a level that cannot be processed and eliminated by the synovial membrane. At that time, an inflammatory response occurs by superficial synovial capillaries and acute synovitis is established. Our aim is to describe the arthroscopic findings of synovitis and analyze its relationship with other arthroscopic findings.

#### *Methods:*

A retrospective study was carried out by analyzing 177 patients in whom 337 arthroscopy was performed in Oral and Maxillofacial Surgery Department at Hospital Clínico San Carlos, Madrid, Spain, during the period between January 2005 and January 2016. In all cases an operative arthroscopy was done with different techniques and anatomical structures were evaluated objectively under arthroscopic vision and four patient groups were established according to the severity of synovitis presenting (grade I, II, III and IV).

#### *Results:*

An important relationship between the presence of advanced stages of synovitis and articular disc status is observed. Therefore, early diagnosis of this entity is important to carry out therapeutic measures indicated and prevent the gradual deterioration of the articular surface.

#### *Conclusions:*

The treatment pretend to reduce inflamated synovitis tissue. By washing arthrocentesis we can only clean the inflammatory agents within the joint. Arthroscopy provides a direct means of treating the inflamed synovial tissue.

## **ORAL SESSION 19: TMJ**

### **TEMPOROMANDIBULAR JOINT DISC PERFORATION: LONG-TERM RESULTS AFTER OPERATIVE ARTHROSCOPY**

*V. Hidalgo-Lopez<sup>1</sup>, C. Salcedo-Gil<sup>1</sup>, P.C. Sambo-Salas<sup>1</sup>, M.A. Morei-Mas<sup>1</sup>, J.I. Iriarte-Ortabe<sup>1</sup>*

*<sup>1</sup>Hospital Son Espases, Department of Oral and Maxillofacial Surgery., Palma de Mallorca, Spain*

The objective is to evaluate the effectiveness of the arthroscopic treatment in patients with a diagnosis of meniscal perforation (MP) found during the arthroscopic exploration. We made a follow-up study of every patient that underwent a TMJ arthroscopy between January 2011 to February 2016. In every patient was made lysis, washing, electrocoagulation of the posterior ligament with myotomy, capsulotomy when necessary, and hyaluronic acid infiltration. They were compared the postsurgical evolution of patients diagnosed of meniscal perforation and those without perforation found. It was evaluated the clinical response of both groups through the Visual Analog Scale (VAS) and the Maximum Mouth Opening (MMO). 105 patients who were made a TMJ arthroscopy were monitored, with a total of 133 procedures (taking in account bilateral). It was noticed that 36 patients (34%) shown MP, finding out that 22 of them (23%) were considered recovered, 15 (42%) had a good clinical evolution, 5 had an improvement with residual pain, and 6 (16%) remains the same as previously. In 2 of them a discectomy was made, in 2 (2%) a haloplastic prosthesis was implanted. It was confirmed the improvement of 7mm in MMO, and a 5 point reduction in non perforated patients and 3 points reduction in perforated ones.

Arthroscopy is a useful and effective technique for the MP diagnosis, and with a good clinical response. It is necessary to reduce the prevalence of meniscal perforations, because it is too high when comparing with medical literature (5-10%)

## **ORAL SESSION 19: TMJ**

### **ASSESSMENT OF COMPUTER-GUIDED RESECTION OF TEMPOROMANDIBULAR JOINT ANKYLOSIS**

*M. Khashaba<sup>1</sup>, M. Ahmed<sup>1</sup>*

*<sup>1</sup>Cairo University, Oral & Maxillofacial Surgery, Giza, Egypt*

**Background** In treating a bony ankylosis of the mandibular condyle, gap arthroplasty is performed. To avoid bony reunion, silicone implants, full-thickness skin grafts, temporal muscle grafts, rib grafts, and microvascular metatarsophalangeal joints are inserted. Wide bone resection of the ankylotic mass remains the most important aspect in the surgical protocol to avoid relapses. Resecting massive bone formations at the skull base in a distorted anatomic environment is difficult and carries the risks of severe bleeding, nerve injuries, dura mater exposure, and cerebrospinal fluid leak. Computer-guided surgical simulation (CGSS) has not been a routine part of craniomaxillofacial surgery in bony ankylosis to date.

**Purpose** This study investigates the use of Prefabricated Cutting splint to promote the safe removal of ankylosed temporomandibular joint bone in the skull base.

**Patients & Methods** This study included 8 cases of unilateral bony ankylosis. The patients were evaluated using Computed Tomography scans from which the size and extension of the ankylotic mass was measured. Guided by the normal contralateral side, a prefabricated computer guided cutting splint was made. The patients underwent a surgical procedure of bony gap arthroplasty that was guided by a prefabricated cutting splint. It aided in a predetermined guiding of the depth and extensions of the gap arthroplasty intraoperatively.

**Result:** The use of CGSS resulted in the promotion of safe surgical excision of the ankylosed skull base tissue.

**Conclusions:** The CGSS is an addition to minimise the complications in gap arthroplasty.

**ORAL SESSION 19: TMJ  
MULTI-STAGE TREATMENT OF TMJ ANKYLOSIS WITH PROSTHESES IN THE  
TREATMENT OF CHILDREN AND ADOLESCENTS LEADING TO FULL FACIAL  
REHABILITATION.**

K. Dowgierd<sup>1</sup>

<sup>1</sup>*Reg. Children's Hospital, Maxillofacial Reconstructive and Aesthetic Surgery, Olsztyn, Poland*

TMJ ankylosis is a pathologic condition where the mandible is fused to the fossa. This interferes with mastication, speech, oral hygiene, and normal life activities. There are factors that can result in ankylosis: trauma, arthritis, infection, previous surgery, congenital deformities, idiopathic factors, iatrogenic causes.

The use of patient-fitted or stock prostheses reduces operative time, there is no potential donor site morbidity, and the patient can immediately return to function. Various strategies are implemented depending on the type of ankylosis and the patient's age.

If ankylosis is present in young patients and the disease is advanced the main objective of treatment is to restore functions and to protect the upper respiratory. Further management is based on observation of the growth of the facial skeleton, OSAS, monitoring supervision by a speech therapist, orthodontist, rehabilitant and psychologist.

Surgical treatment includes removal of an ankylotic segment with gap-arthroplasty and osteodistraction of the mandible.

In older patients treatment is targeted so as to solve the problem ultimately. Necessary surgical interventions in the field of orthognathic surgery are performed to correct a facial-occlusal deformation that has been formed, such as transverse distraction of the maxilla and mandible, removal of abnormally located or impacted teeth, in order to create a possibility to place a TMJ prosthesis correctly. If the bone mass is not sufficient it is necessary to perform another mandibular osteodistraction. The final stage of treatment includes a procedure including prosthesis placement with maxillary osteotomy.

The final objective is to restore functions and aesthetics of the face.

**ORAL SESSION 20: CRANIOFACIAL AND SKULL BASE  
CRANIO-MAXILLO-FACIAL RESECTION FOR TREATMENT OF ORAL AND  
MAXILLOFACIAL-HEAD AND NECK TUMOR INVOLVED SKULL BASE—A 10-YEAR  
RETROSPECTIVE STUDY AT A SINGLE CENTER**

*J. Sun*<sup>1</sup>

*<sup>1</sup>Ninth People's Hospital - Shanghai Jiaotong University - School of Medicine,  
Department of Oral Maxillofacial-Head Neck Oncology, Shanghai, China*

**Objective:** To review patients who underwent cranio-maxillo-facial resection in recent 10 years and explore the indication.

**Methods:** From 2003 to 2013, 127 patients underwent cranio-maxillo-facial resection for treatment of tumor involved skull base. Tumors involved skull base were divided into 3 types according to invasions of skull base as showed in the coronal planes of imaging. Type 1 was tumor adjacent to skull base but bone is free (n=35), type 2 was tumor involved skull base but dura is intact (n=24), type 3 was tumor involved dura but brain is free (n=26). All patients underwent cranio-maxillo-facial resection by oral and maxillofacial surgeons and neurosurgeons. The defects were reconstructed immediately with adjacent local or regional flaps (n=70) and free vascularized flap (n=57) according to different defects, respectively.

**Results:** Cranio-maxillo-facial resection was successful performed in all patients. No intraoperative complication was found. The overall success rate of soft tissue flaps and free flaps was 98.4% and 96.6%, respectively. Three patients with intracranial infection (n=2) and bleeding in internal carotid artery were dead postoperatively although they underwent salvage surgery. Overall rate of complications was 13.4%, dead rate was 2.4%. Recurrence was found in 20 patients and distant metastasis was found in 1 patient during the follow-up.

**Conclusion:** For cranio-maxillo-facial resection, the balance between tumor resection and postoperative function, survival rate and quality should always be paid attention to. It includes the balance between form and function, survival and quality of life, donor site and recipient site, and the important function and secondary function.

**ORAL SESSION 20: CRANIOFACIAL AND SKULL BASE**  
**LONG-TERM FOLLOW-UP OF ONE-PIECE FRONTOORBITAL ADVANCEMENT WITH**  
**DISTRACTION BUT WITHOUT A BANDEAU FOR CORONAL CRANIOSYNOSTOSIS:**  
**REVIEW OF CONSECUTIVE 26 CASES**

*W.S. Jeong<sup>1</sup>, J.W. Choi<sup>1</sup>, Y.C. Kim<sup>1</sup>, T.S. Oh<sup>1</sup>, K.S. Koh<sup>1</sup>*

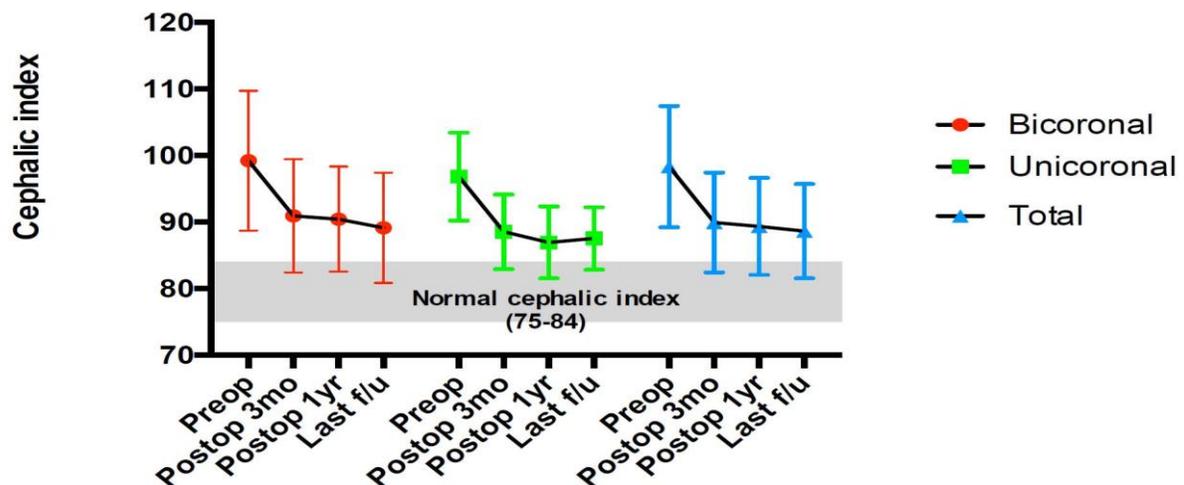
*<sup>1</sup>Asan Medical Center- University of Ulsan College of Medicine, Plastic Surgery, Seoul, Republic of Korea*

**INTRODUCTION:** To adopt the traditional frontoorbital advancement technique designed by Tessier in the application of a distraction technique, the frontal bone flap should be detached before the distraction. In order to maximize the merit and potency of the distraction, we have applied the “one-piece cranioplasty” technique without bandeau for coronal craniosynostosis.

**MATERIALS AND METHODS:** Our new surgical technique used to treat 10 unilateral and 16 bilateral craniosynosis patients between February 2005 and August 2014.

**RESULTS:** Satisfactory results achieved in all patients. An average distraction of 25.2 mm was possible without detachment from the dura mater. The average cephalic index (width/length × 100) decreased from 98.3 to 89.9 after 3 months postoperatively and was maintained at 88.6 until 6.4 years on average after the operation. In 10 unilateral coronal synostotic patients, the endocranial angulation of the anteroposterior axis was improved from 165.3° to 174.8° after 3 months postoperatively and was maintained at 174.5° until 5.8 years on average after the operation.

**CONCLUSION:** Our present findings indicate that the novel one-piece frontoorbital advancement with distraction approach appears to be less invasive and suitable for correcting single-suture coronal craniosynostoses, except for the complex form of this condition, even at longer follow-up intervals.



**ORAL SESSION 20: CRANIOFACIAL AND SKULL BASE  
TIMING OF CRANIAL VAULT RECONSTRUCTION IN NON-SYNDROMIC  
CRANIOSYNOSTOSIS: THE JOHNS HOPKINS HOSPITAL'S THIRTY-YEAR EXPERIENCE**

*J. Lopez<sup>1</sup>, A. Utria<sup>1</sup>, R. Cho<sup>1</sup>, G. Munding<sup>2</sup>, G. Jallo<sup>1</sup>, E. Ahn<sup>1</sup>, C. Vander Kolk<sup>3</sup>, A. Dorafshar<sup>1</sup>*

*<sup>1</sup>Johns Hopkins Hospital, Plastic & Reconstructive Surgery, Baltimore, USA*

*<sup>2</sup>University of Washington, Plastic & Reconstructive Surgery, Seattle, USA*

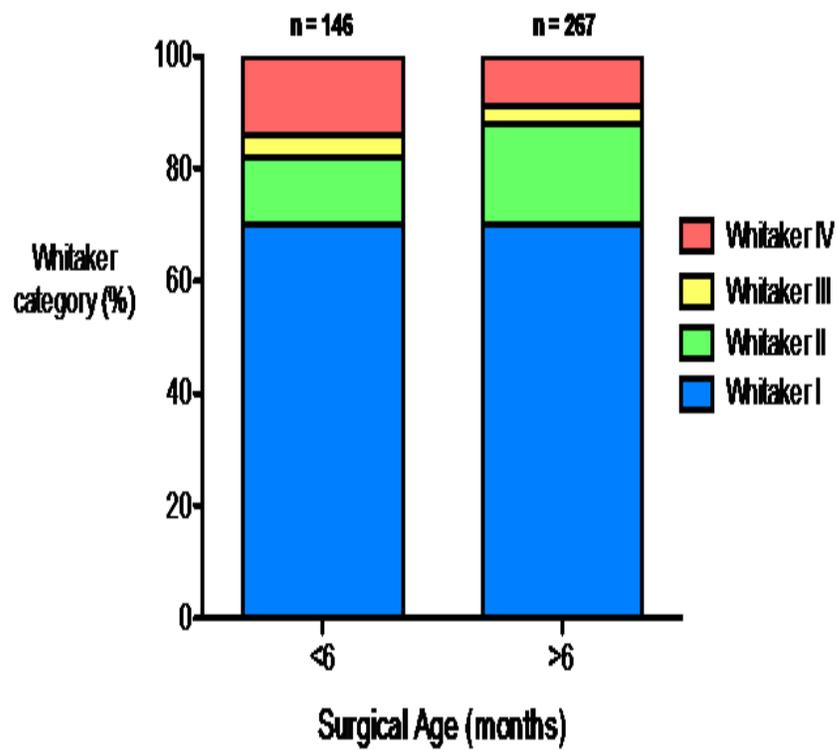
*<sup>3</sup>Mercy Medical Center, Plastic & Reconstructive Surgery, Baltimore, USA*

**Background:** Due to the changing properties of the infant skull, there is still no clear consensus on the ideal time to surgically intervene in cases of non-syndromic craniosynostosis (NSC). This study aims to shed light on how age at time of surgery may affect surgical outcomes and the subsequent need for reoperation.

**Methods:** A retrospective cohort review was conducted for patients with NSC who underwent primary cranial vault remodeling from 1990-2013. Patient demographics, characteristics, and surgical interventions were recorded. Postoperative outcomes were assessed by assigning each procedure to a Whitaker category. Multivariate logistic regression analysis was performed to determine the relationship between age at surgery and need for minor (Whitaker I/II) versus major (Whitaker III/IV) reoperation. Odds ratios (OR) for Whitaker category by age at surgery were assigned.

**Results:** A total of 413 unique patients underwent cranial vault remodeling procedures for NSC during the study period. Multivariate logistic regression demonstrated increased odds of requiring major surgical revisions (Whitaker III/IV) in patients less than 6 months of age (OR=2.49, 95% CI: 1.05-5.93), and increased odds of requiring minimal surgical revisions (Whitaker I/II) in patients greater than 6 months of age (OR=2.72, 95% CI: 1.16-6.41).

**Conclusion:** Our data demonstrates that patients operated on before 6 months of age had an increased odds ratio of requiring major surgical revisions.



**ORAL SESSION 20: CRANIOFACIAL AND SKULL BASE  
TMJ ANKYLOSIS AFTER EARLY MANDIBULAR DISTRACTION OSTEOGENESIS: A NEW  
SYNDROME ?**

*V. candotto<sup>1</sup>, M. Galiè<sup>1</sup>, L. Clauser<sup>1</sup>*

*<sup>1</sup>Unit of Cranio Maxillo Facial Surgery- St Anna Hospital and University,  
Unit of Cranio Maxillo Facial Surgery St Anna Hospital and University Ferrara- Italy, Ferrara, Italy*

Distraction Osteogenesis (DO) has been one of the most innovative concepts in craniomaxillofacial syndromology and surgery through the last 25 years.

After a quarter of century of extensive use DO 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.

For selected newborns, mandibular DO will allow for avoidance of a tracheostomy and improved oral feeding. A careful evaluation of the patient's airway and feeding must be performed and evaluated by a multidisciplinary Team approach.

In syndromic micrognathia early mandibular distraction seems to be an appropriate indication. Benefits are functional, morphological, aesthetic with consistent psychological and familiar positive effects.

An increased incidence in TMJ complication during distraction osteogenesis in neonates has been recently reported, especially in syndromic patients.

TMJ ankylosis after neonatal Mandibular Distraction Osteogenesis could be considered a new pathological entity.

**ORAL SESSION 20: CRANIOFACIAL AND SKULL BASE  
SPRING ASSISTED CRANIOPLASTY FOR THE CORRECTION OF NON-SYNDROMIC  
SCAPHOCEPHALY: A QUANTITATIVE ANALYSIS OF 100 CONSECUTIVE CASES**

*W. Rodgers<sup>1</sup>, G. Glass<sup>1</sup>, A. Tahim<sup>2</sup>, A. Ponniah<sup>1</sup>, S. Schievano<sup>1</sup>, A. Borghi<sup>1</sup>, A. Freida<sup>1</sup>,  
W. Breakey<sup>1</sup>, N. Florez-Rodriguez<sup>1</sup>, J. O'Hara<sup>1</sup>, G. James<sup>1</sup>, D. Dunaway<sup>1</sup>, N.O. Jeelani<sup>1</sup>*

*<sup>1</sup>Great Ormond Street Hospital for Children, Craniofacial Surgery, London, United Kingdom*

*<sup>2</sup>The Royal London Hospital, Maxillofacial Surgery, London, United Kingdom*

Introduction

Spring-assisted cranioplasty has been proposed as an alternative to total calvarial remodelling for sagittal craniosynostosis.

Method

All patients treated at our institution between April 2010 and September 2014 were evaluated retrospectively. Patients with isolated non-syndromic sagittal craniosynostosis were included. Data were collected for operative time, anaesthetic time, hospital stay, transfusion requirement and complications in addition to cephalic index pre-operatively and at one day, three weeks and six months post-operatively. Results Mean cephalic index was 68 pre-operatively, 71 at day 1 and 72 at 3 weeks and 6 months post-operatively. Eight patients required transfusion following insertion and 1 patient following removal. Two patients developed a CSF leak requiring intervention. One patient required early removal of springs due to infection. One patient had a spontaneous expulsion of spring and 1 patient sustained a venous infarct with hemiplegia. Three patients required calvarial remodelling surgery for incomplete correction and 2 patients required calvarial remodelling surgery for raised ICP.

Conclusion

Our modified spring design and protocol represents an effective strategy in the management of single-suture sagittal synostosis. Although an improvement in scaphocephaly was achieved, further calvarial remodelling was required in a minority. The morbidity and mortality profile is favourable compared to total calvarial remodelling. The correction was durable over the time period studied. In patients referred within the first 6 months of birth this technique has become our procedure of choice. In a minority of cases and in the older age groups the correction may still leave them with a scaphocephalic head shape requiring further remodelling surgery.

**ORAL SESSION 20: CRANIOFACIAL AND SKULL BASE  
SURGICAL TREATMENT OF CRANIOSYNOSTOSIS: AN ANALYSIS OF COMPLICATIONS IN  
28 PATIENTS**

*G. Arenas De Frutos<sup>1</sup>, A. Garcia Sevilla<sup>1</sup>, M. Tousidonis Rial<sup>1</sup>, R. Fernandez-valades Gamez<sup>1</sup>,  
C. Navarro Cuellar<sup>1</sup>, C. Maza Muela<sup>1</sup>, R. Garcia Lea<sup>2</sup>, J. Acero Sanz<sup>3</sup>, C. Navarro Vila<sup>1</sup>,  
S. Ochandiano Caicoya<sup>1</sup>*

*<sup>1</sup>Gregorio Maranon University Hospital, Department Of Oral And Maxillofacial Surgery, Madrid, Spain*

*<sup>2</sup>Gregorio Maranon University Hospital, Department Of Neurosurgery, Madrid, Spain*

*<sup>3</sup>Ramon Y Cajal University Hospital, Department Of Oral And Maxillofacial Surgery, Madrid, Spain*

**Aims:**

In the context of recent advances in the surgical treatment of craniosynostosis in the last decade, and particularly in relation with fixation methods and associated complications, we analyze the experience at our Institution in the last 10 years.

**Methods:**

A total of 28 patients were operated by our department in collaboration with the Neurosurgery team at our Hospital between 2006 and 2016. The variables analyzed in this study were sex, age, affected suture, comorbidity, osteosynthesis material (quantity of plates, mesh and resorbable pins (Resorb-Xs, KLS Martin®) inserted by ultrasound-aided device (SonicWelder-Rx®)) and postoperative outcomes, with particular emphasis on local complications related to osteosynthesis.

**Results:**

Of 28 patients, 20 were males (71%) and 8 were females (29%). Mean age at the time of the surgery was 7.6 months. Diagnosis was: 17 trigonocephaly (60,7%), 6 oxycephaly (21,4%) and 5 plagiocephaly (17,9%). Both esthetics and functional bone remodeling results were satisfactory. Complications occurred in 6 patients (21%), mainly associated with foreign body reactions due to osteosynthesis material. In such cases, minor reinterventions were required in a small percentage of patients (14,3%).

**Conclusion:**

In our experience, resorbable material and ultrasound-assisted pinned system have shown to be a timesaving, safe and stable technique in the surgical treatment of craniofacial deformities. Foreign body reactions around osteosynthesis material, being the most common postoperative complication, has proven to be a self-limiting phenomenon associated to a low rate of surgical reinterventions.

**ORAL SESSION 20: CRANIOFACIAL AND SKULL BASE  
FURTHER EVIDENCE FOR THE CRITICAL ROLE OF SHH AND CANONICAL WNT  
SIGNALING IN CRANIAL SUTURE FATE**

*M. Rachwalski<sup>1,2,3</sup>, Y. L<sup>2,3,4</sup>, I. Varge<sup>5,6</sup>, P. Nürnberg<sup>7</sup>, N. Akarsu<sup>8</sup>, B. Wollnik<sup>2,3,4</sup>*

*<sup>1</sup>University Hospital of Cologne, Department of Craniomaxillofacial Plastic Surgery, Cologne, Germany*

*<sup>2</sup>University Hospital of Cologne, Institute of Human Genetics, Cologne, Germany*

*<sup>3</sup>University of Cologne, Center for Molecular Medicine Cologne CMMC, Cologne, Germany*

*<sup>4</sup>Georg-August University Göttingen, Institute of Human Genetics, Göttingen, Germany*

*<sup>5</sup>Hacettepe University Medical Faculty, Department of Plastic and Reconstructive Surgery, Ankara, Turkey*

*<sup>6</sup>Kirikkale University Medical Faculty, Department of Plastic and Reconstructive Surgery, Kirikkale, Turkey*

*<sup>7</sup>University of Cologne, Cologne Center for Genomics CCG, Cologne, Germany*

*<sup>8</sup>Hacettepe University Medical Faculty, Department of Medical Genetics- Gene Mapping Laboratory, Ankara, Turkey*

**Aims:** Mutations frequently found in FGFR2 have been attributed to various forms of syndromic craniosynostosis. However, a relatively large subset of these patients remains FGFR2 mutation negative, thus strongly suggesting genetic heterogeneity. We therefore aimed to elucidate the underlying molecular basis of craniosynostosis in mutation negative patients.

**Methods:** We performed whole exome sequencing in three patients diagnosed with various forms of craniosynostosis in whom mutations in known causative genes have been previously excluded. Since consanguinity was suspected, variants in regions of homozygosity were prioritized. Direct sequencing of all coding regions of the newly identified candidate gene was then conducted in additional syndromic cases.

**Results:** We detected a total of three different mutations in LRP2, a gene known to be implicated in Donnai-Barrow syndrome but which hitherto has not been associated with the development of craniosynostosis. One homozygous splice-site mutation (c.8452+1 G/T) in a patient with Crouzon syndrome and a homozygous and heterozygous missense substitution (p.R3236Q and p.4019K) were detected. Additionally, we were able to identify a homozygous mutation (p.G169A) in WNT9A in a patient with trigonocephaly and cleft lip and palate. Previous studies showed that Wnt signaling plays a prominent role in craniofacial development.

**Conclusions:** In this study, we were able to identify LRP2 and WNT9A as a new molecular cause underlying syndromic forms of craniosynostosis. Additional functional studies of these genes and its downstream molecules will further enhance our understanding on the regulation of cranial suture morphogenesis and fusion.

**ORAL SESSION 20: CRANIOFACIAL AND SKULL BASE  
CHARACTERISATION OF ORBITAL MORPHOLOGY IN TREACHER COLLINS SYNDROME  
USING 3D CEPHALOMETRICS AND GEOMETRIC MORPHOMETRICS**

*J. Levasseur<sup>1</sup>, R.H. Khonsari<sup>1</sup>, G. Giran<sup>2</sup>, J. Nysjö<sup>3</sup>, R. Olszewski<sup>4</sup>, P. Corre<sup>2</sup>, N. Zwetyenga<sup>5</sup>,  
A. Picard<sup>1</sup>*

*<sup>1</sup>Necker-Enfants Malades University Hospital, Service de chirurgie maxillo-faciale et plastique,  
Paris, France*

*<sup>2</sup>CHU de Nantes, Stomatologie et chirurgie maxillo-faciale, Nantes, France*

*<sup>3</sup>Uppsala University, Centre for Image Analysis, Uppsala, Sweden*

*<sup>4</sup>Université Catholique de Louvain - Cliniques Universitaires Saint-Luc,  
Service de stomatologie et chirurgie maxillo-faciale, Brussels, Belgium*

*<sup>5</sup>CHU de Dijon, Service de chirurgie maxillo-faciale, Dijon, France*

**Aims**

A serious challenge in the management of Treacher Collins syndrome (TCS) is the reconstruction of orbital anomalies. Surprisingly, few studies assess the precise anatomy of the orbit in this syndrome.

**Methods**

CT-scans from 13 patients with TCS (mean age 11.7) and 60 age-matched controls were considered. Most patients had several scans covering their craniofacial growth from birth to 21 years of age. Orbital morphology was investigated using conventional 3D cephalometry based on 20 landmarks, 10 planes, 16 angles and 22 distances focused on the orbit. Orbital volume measurement and shape analysis were performed after semi-automatic mesh-based image segmentation of the orbital contents. Shapes were compared using the maximum absolute distance (MAD), the Hausdorff distance (HD) and the Dice similarity coefficient (DSC).

**Results**

We characterized the 3D morphology of the TCS orbit and showed that the parameters characterizing the specific orbital morphology in TCS were significantly more modified in older patients and with age.

**Conclusions**

TCS has a specific orbital morphology. Orbital anomalies are in line with the role of *TCOF1* in craniofacial development but their evolution with age indicates that both morphogenesis and growth are disturbed in this syndrome.

## ORAL SESSION 20: CRANIOFACIAL AND SKULL BASE FORCE MEASUREMENTS DURING THE COURSE OF POSTERIOR CALVARIAL VAULT OSTEODISTRACTION: A NOVEL MEASUREMENT METHOD

A. Ritvanen<sup>1</sup>, M. Savolainen<sup>2</sup>, M. Paulasto-Kröckel<sup>1</sup>, D. Nowinski<sup>3</sup>, J. Hukki<sup>2</sup>, D. Saiepour<sup>3</sup>,  
E. Tukiainen<sup>2</sup>, J. Leikola<sup>2</sup>

<sup>1</sup>Aalto University- School of Electrical Engineering,  
Department of Electrical Engineering and Automation, Espoo, Finland

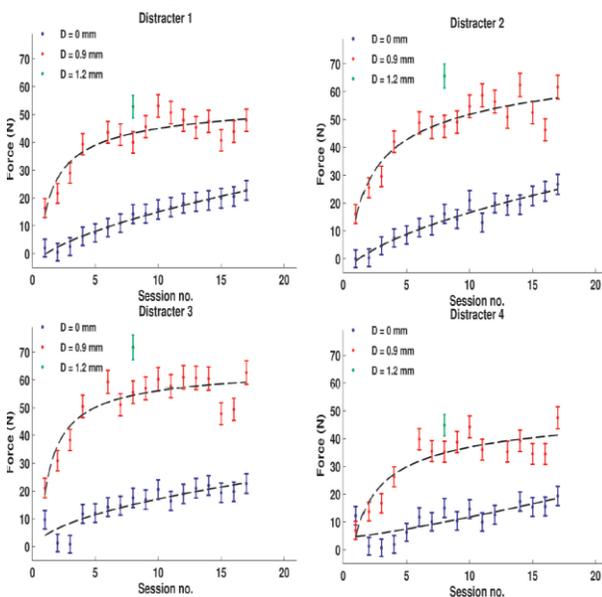
<sup>2</sup>Helsinki University Hospital, Department of Plastic Surgery, HELSINKI, Finland

<sup>3</sup>Uppsala University Hospital, Craniofacial Center, Uppsala, Sweden

Posterior calvarial vault osteodistraction (PCVO) has become increasingly popular in the correction of craniosynostosis in recent years. The main advantages of PCVO when compared with one-stage calvarial vault reconstruction (CVR) includes shorter operation time, less blood loss during operation, lower probability of venous sinus puncture, greater intracranial volume (ICV) advancement and lower rate of relapse.

Generally distraction protocols are based mainly on clinical observations rather than systematic clinical research. Faster distraction protocols are suggested to reduce complications. Distraction protocols producing higher forces can increase complications. There is an urgent need to understand these forces, in order to so improve distraction protocols and devices.

We developed a force measurement method that can be used on PCVO devices and we present new data about forces developed during PCVO. We measured forces for four syndromic craniosynostosis patients during the course of PCVO. We observed a linear trend between the force increase and the distraction distance within distraction sessions. We observed a step wise force increase between the distraction sessions (Figure 1) and that the distraction force relaxed rapidly shortly after distraction session. The data suggests that current treatment protocols might be re-evaluated to favor shorter distraction distances and more frequent distraction sessions. The mean maximum pre-distraction force for one distractor was 20.4 N. The mean maximum end-distraction force for one distractor was 57.6 N.



**ORAL SESSION 20: CRANIOFACIAL AND SKULL BASE  
VALIDATION OF A NEW SOFTWARE PLATFORM FOR 3D VIRTUAL TREATMENT  
PLANNING OF ORTHOGNATHIC SURGERY.**

*G. Swennen<sup>1</sup>, L. Pottel<sup>1</sup>*

*<sup>1</sup>AZ Sint-Jan Brugge-Oostende AV, Maxillo-facial and Facial Plastic Surgery, Brugge, Belgium*

Introduction

The purpose of this study is to introduce and validate a new software platform for 3D virtual treatment planning of orthognathic surgery.

Materials and methods

A clinical phase and closed  $\beta$  testing of “IPS CaseDesigner (KLS Martin, Tuttlingen, Germany)” was performed from March 1<sup>st</sup> 2016 to April 28<sup>th</sup> 2016 to evaluate and validate this novel 3D software platform towards 3D virtual treatment planning of orthognathic surgery. 3D virtual planning of orthognathic surgery was performed in 25 consecutive orthognathic cases by the same investigator (GS) with both IPS CaseDesigner and the conventional Maxilim software (Medicim, Nobelbiocare, Belgium) which was considered as the gold standard in this study. Euclidian intersurface distances were measured using the interactive closest point (ICP) technique after superimposition of both 3D virtual plannings for all 25 cases. The root mean square deviation (RMSD) was applied to evaluate the accuracy of the novel software.

Results

The overall mean error between the gold standard “Maxilim” and the new 3D software platform “IPS CaseDesigner” was less than 0.5 mm.

Conclusion

The results of this study show that IPS CaseDesigner is valid for 3D virtual planning of orthognathic surgery in the clinical routine and requires less planning time compared to Maxilim.

**ORAL SESSION 20: CRANIOFACIAL AND SKULL BASE  
PROSPECTIVE EVALUATION OF A NOVEL SOFTWARE FOR 3D VIRTUAL TREATMENT  
PLANNING OF ORTHOGNATHIC SURGERY: AN INTERNATIONAL, MULTICENTRIC TRIAL**

*L. Pottel<sup>1</sup>, G. Swennen<sup>1</sup>*

*<sup>1</sup>AZ Sint-Jan Brugge-Oostende av, Division of Maxillofacial Surgery- Department of Surgery, Bruges, Belgium*

Introduction

The potential of 3D virtual planning of orthognathic surgery has been well recognized worldwide. However, current available software is still time-consuming and requires a steep learning curve for optimal use. The purpose of this prospective, international, multicentric trial is to evaluate the performance and feasibility of “IPS CaseDesigner”, a novel software platform for 3D virtual treatment planning of orthognathic surgery

Materials and methods

After completion of the preclinical phase (GS) and single surgeon (GS) closed  $\beta$  testing of “IPS CaseDesigner (KLS Martin, Tuttlingen, Germany)”, a prospective international multicenter clinical field testing phase was initiated to evaluate this novel 3D software platform towards 3D virtual treatment planning of orthognathic surgery. The investigators of a total of 12 general and university international hospital settings were asked to prospectively register patient demographics, type of surgery, and to provide feedback regarding the required time to complete the different 3D virtual planning steps (3D-VPS).

Results

Intra- and interrater reliability, as well as intergroup comparison of the 3D virtual planning steps (3D-VPS) of IPSCaseDesigner between the different investigators will be presented.

Conclusion

It is anticipated that implementation of IPS CaseDesigner in the clinical routine could enhance efficiency in 3D virtual planning of orthognathic surgery.

**ORAL SESSION 20: CRANIOFACIAL AND SKULL BASE  
MIDFACIAL ADVCEEMENT IN TREATMENT SYNDROMIC CRANIOSYNOSTOSIS**

*K. Dowgierd<sup>1</sup>, D. Larysz<sup>2</sup>*

*<sup>1</sup>Reg. Children's Hospital, Maxillofacial Reconstructive and Aesthetic Surgery Department, Olsztyn, Poland*

*<sup>2</sup>Reg. Children's Hospital, Maxillofacial Reconstructive Aesthetic Surgery Department, Olsztyn, Poland*

Le Fort III osteotomy is the procedure which is performed in cases of midface hypoplasia treatment in syndromic craniosynostosis based on Le Fort III/II, monobloc distraction. This condition occurs in severe sleep apnea OSAS and exophthalmos of the eye globe. The main group of patients are syndromic craniosynostosis like Crouzon, Apert, Pfeiffer syndrome and achondroplasia. Each of them has mid-face hypoplasia and breathing problems. We present cases, which used Le Fort III osteotomy with distraction osteogenesis of the midface for improvement of eye globe protection and resolve breathing problems.

Our study population includes 20 cases treated with LF3 level osteotomy with midface distraction. Age range 4 to 18 yo, with the following syndromes: Crouzon, Apert, Taib, Binder and achondroplasia. Lateral cephalometric angular measurements SNA, SNB, ANB and linear measurements N-ANS, S-PNS, and B-PNS were calculated. Dolphin cephalometric software was used to measure the surface and volume of the airway. All patients underwent nocturnal polysomnography.

Volume of upper airway increased 59.1%. Cross-sectional surface area of upper airway increased 63.8%. Angular and linear measurements were correlated with increase in airway volume and surface area.

The patients showed an improvement of the respiratory outcome after treatment. A significant improvement of the upper airway after advancement in our patients is demonstrated at the level of nasopharynx and also, to a lesser extent on the level of oropharynx. We observed correlation between advancement and airway volume changes. Postoperative sleep study showed significant improvement of OSAS in all patients.

**ORAL SESSION 20: CRANIOFACIAL AND SKULL BASE  
CRANIOSYNOSTOSIS SURGERY: 10 YEAR OUTCOMES AND A CRITICAL ANALYSIS OF  
RELAPSE**

C. El Amm<sup>1</sup>

<sup>1</sup>*University of Oklahoma Health Sciences Center, Surgery - Plastic Surgery, Oklahoma City, USA*

Background: Relapse after Craniosynostosis surgery is increasingly recognized among craniofacial practitioners. Its impact and root cause analysis are complicated by lack of uniformity of reporting and measurement tools. This study reports the 10 years outcomes of cranioplasty for craniosynostosis with examination of Acute (technical failure), Subacute (bone resorption), Intermediate (Scar constriction) and Chronic (growth impairment) Relapse.

Methods: Retrospective Query of Prospectively Collected database. Clinical data collected include the type of synostosis, age at operation, intraoperative blood loss, dural repair, method of fixation, and duration of operation. Measurement tools include serial photographs, serial surface scans (3D photos), and CT generated surface reconstructions. Acute (<3 weeks), Subacute (3-8 weeks), Intermediate (2-12months) and Chronic (>12 months) deviations from norm/symmetry were generated using a linear-mixed model.

Results: 377 charts were reviewed. Correlation was found between duration of surgery, dural repair and Subacute relapse. Intermediate relapse was found to be significant in patients with Apert's Syndrome and metopic Synostosis. Acute relapse was associated with unicoronal synostosis and resorbable fixation. Chronic relapse was associated with syndromic synostosis

Conclusion: Post operative relapse is not a uniform entity. Standardized measurements and reporting tools allow for multicenter comparison of outcomes.

## **ORAL SESSION 21: CANCER**

### **ASSESSING PSYCHOONCOLOGICAL SUPPORT IN PATIENTS WITH PRIMARY AND SECONDARY/RECURRENT ORAL CANCER: A STUDY BASED ON AN ELECTRONIC PSYCHOONCOLOGICAL SCREENING INSTRUMENT**

*S. Hoefert<sup>1</sup>, N. Schaeffeler<sup>2</sup>, M. Teufel<sup>2</sup>, M. Wicker<sup>2</sup>, S. Zipfel<sup>2</sup>, S. Reinert<sup>1</sup>*

*<sup>1</sup>University Hospital, Oral and Maxillofacial Surgery, Tuebingen, Germany*

*<sup>2</sup>University Hospital, Department for Psychosomatic Medicine and Psychotherapy, Tuebingen, Germany*

Cancer patients suffer from severe distress, and oral cancer patients report some of the highest distress levels of all cancer patients. The German S3-Guideline and the certified Head and Neck Cancer Centres recommend psychooncological support for patients. This study analysed the need for psychooncological support with an electronic screening instrument (ePOS). This instrument included the DISTRESS questionnaire (DT), the Hornheider Screening Instrument (HSI) and enquiries for personal support need.

176 patients were screened including 140 patients with primary cancers (PC) and 36 with secondary/recurrent cancers (SRC). The mean age was 63.8 years. The electronic ePOS instrument was well accepted in 91%. Results from the DT (cut-off 6) revealed that 44% of PC patients and 42% of SRC patients indicated a treatment need. Similar results were noted in both patient groups with the HSI with 39% and 40% (PC and SRC, respectively). Patients had one of both tests in 61% (PC) and 57% (SRC) positive. However, only 34% of patients opted for psychooncological support in both groups (PC and SRC).

Generally ePOS demonstrated a psychooncological support need in up to 61% of patients in test results, but only 34% of patients opted for psychooncological support. Both patients groups (PC and SRC) showed similar test values and subjective needs. At present, the combination of assessment instruments and patients' subjective need is good practice for identifying patients with psychooncological need. Head and neck cancer centres should be prepared for psychooncological treatment in a minimum of 34% of all head and neck cancer patients.

**ORAL SESSION 21: CANCER**  
**THE EAST GRINSTEAD CONSENT COLLABORATIVE: SETTING A STANDARD FOR HEAD AND NECK CONSENT**

*S. Rupert*<sup>1</sup>

<sup>1</sup>*Queen Victoria Hospital, Oral and Maxillofacial Surgery, East Grinstead, United Kingdom*

**Background**

The East Grinstead (EG) head and neck consent forms were introduced 3 years ago after we identified a significant problem in our consent documentation. These were well received by head and neck MDT members and patients. We wanted to offer the same protection to colleagues and set up the EG consent collaborative. The aim of this trainee collaborative was to determine nationwide consent practices for patients undergoing head and neck procedures.

**Method**

55 trainee collaborators nationwide expressed an interest in this retrospective audit. Specific aspects of consent examined included the documentation of general and specific risks of procedures, a record of alternatives discussed, grade of surgeon obtaining consent and timing of consent relative to procedure date. Comparisons were made between the EG standard and the 'rest of the UK'.

**Results**

We have collected data for 2000 patients from 29 units and expect further data from 2 units. Preliminary analysis has shown significant variability in consent documentation ( $p < 0.001$ , 1-way ANOVA). When we compared EG with the 'rest of the UK' we found significant differences ( $p < 0.001$ ) in the documentation of 'risk of death' 87% versus 23% (95%CI 12%-32%), 'alternative discussed' (89% versus 2%) and the number of days before surgery for obtaining consent (5 days versus 1 day).

**Discussion**

Since the introduction of the head and neck specific consent forms we have seen a marked improvement in our consent documentation. We aim to provide these forms via online tools that can be used to generate patient and procedure specific consent forms.

**ORAL SESSION 21: CANCER**  
**SURVIVAL FOLLOWING PRIMARY SURGERY VERSUS PRIMARY RADIOTHERAPY FOR HPV NEGATIVE OROPHARYNGEAL CARCINOMAS**

E. Van Cann<sup>1</sup>

<sup>1</sup>*University Medical Center Utrecht, Department of Head and Neck Surgical Oncology, Utrecht, Netherlands*

**Aim:** Oropharyngeal squamous cell carcinomas (OPSCC) are often treated with primary radiotherapy. HPV positive OPSCC respond well to radiotherapy and have a relatively favorable prognosis compared with their HPV negative counterparts; although HPV negative OPSCC are less radiosensitive they are also often treated with primary radiotherapy. The goal of this study is to compare survival of patients with HPV negative OPSCC following primary radiotherapy versus primary surgery.

**Methods:** Patients with HPV negative OPSCC, treated with curative intent between 2000 and 2013 were included. Clinical data were extracted from patient records. Disease specific survival (DSS) was determined using Kaplan-Meier and Cox-regression analysis.

**Results:** From the 223 patients with HPV negative OPSCC, 154 patients were treated with primary radiotherapy and 69 patients were treated with primary surgery. For the whole cohort, DSS was significantly higher at 5 years following surgery than following radiotherapy (77.8% resp. 62.2%,  $p=.018$ ). In patients with cT1-2 tumors (N=96) no statistical difference was seen between surgery and radiotherapy. In patients with cT3-4 tumors (N=127) DSS was significantly higher at 5 years following surgery than following radiotherapy (73.1% resp. 51.1%,  $p=.023$ ). After correction for tumor and nodal stage this association remained (HR 2.369, 95% CI: 1.032-5.439,  $p=.042$ ).

**Conclusions:** HPV negative OPSCC showed higher DSS following primary surgery compared to primary radiotherapy. For the treatment of HPV negative OPSCC primary surgery should be considered.

**ORAL SESSION 21: CANCER**  
**RHABDOMYOSARCOMA OF THE HEAD AND NECK IN CHILDREN. 20 YEARS**  
**EXPERIENCE**

*I. Iatrou<sup>1</sup>, F. Tzerbos<sup>1</sup>, N. Theologie-Lygidakis<sup>1</sup>, O. Schoinohoriti<sup>1</sup>, A.M. Vesala<sup>1</sup>*  
*<sup>1</sup>dental School- University Of Athens, Oral and Maxillofacial Surgery, Athens, Greece*

Background: Rhabdomyosarcomas of the maxillofacial region in children develop as fast growing solid tumors, usually associated with swelling and pain. Management is multidisciplinary, including chemotherapy, surgery and radiotherapy. Prognosis is associated with early diagnosis and histologic type.

Aim: To present the 20 years experience of a Pediatric Oral and Maxillofacial Department in the treatment of rhabdomyosarcomas.

Material and Methods: All rhabdomyosarcomas of the maxillofacial region, treated since 1996, were included in the study. These were managed according to established protocols for the disease, followed by our Pediatric Oncology Clinic. Our contribution as a surgical department consisted, apart from biopsies, in performing resection of the tumors and basic reconstruction at the appropriate time.

Results: Nine children (four boys and five girls), aged 2-15 years upon diagnosis, were treated for rhabdomyosarcomas. Four tumors were located in the mandible, two in the maxilla and the remaining three at the temporal bone, the zygomatic bone and the cheek respectively. Extended surgical tumor resections were performed and reconstruction plates were applied in mandibular tumors. With regards to their histologic type, tumors were in five cases of the embryonal type, in 3 cases alveolar and in 1 case botryoid type. The overall 5 years survival rate was found to be 75%, in accordance to recently reported case series.

Conclusions: According to our experience the current protocols for rhabdomyosarcoma, when fully applied, manage to control and hopefully treat the disease.

## **ORAL SESSION 21: CANCER**

### **SURVIVAL IN PATIENTS WITH CERVICAL NODAL METASTASES OF UNKNOWN PRIMARY CARCINOMA WITH AND WITHOUT POSITRON EMISSION TOMOGRAPHY DIAGNOSTICS**

*M. Rysz<sup>1</sup>, S. Starosciak<sup>1</sup>, M. Pietras<sup>1</sup>, J. Lenartowicz<sup>1</sup>, K. Romuald<sup>1</sup>*

*<sup>1</sup>Memorial Cancer Center Institute of Oncology, Head and Neck Cancer Department, Warsaw, Poland*

#### **Introduction**

Position Emission Tomography (PET) in patients with cervical lymph node carcinoma of unknown primary (CUP) metastases is a standard procedure. Waiting for PET may delay definitive treatment and any advantage from more specific diagnosis may be lost.

#### **Aim of the study**

To evaluate how addition of PET imaging to diagnostic procedure in patients with UPC influenced overall survival.

#### **Material**

Retrospective analysis of 45 patients (27M, 18F), mean age 57,8, with CUP who underwent neck dissection and radiotherapy. In all patients primary site was not found in standard diagnostic methods (fiberscopy and contrast CT). For 25 patients treated between 2004 and 2009 PET was not available. 20 patients treated between 2009 and 2013 had PET as part of diagnostic procedure.

#### **Results**

There were no significant differences in survival between group without PET and with PET imaging in 3-year follow-up. There were no differences in clinical characteristic of the patients (TNM, Ca grading) between groups. In PET group radiotherapy dose was significantly higher (mean: 4605 Cgy) than in group without PET (mean: 3684 CgY). 12 patients in PET group (60%) and 7 patients without PET (28%) recieved adjuvant chemotherapy ( $p < 0,05$ ). Time between first visit and date of operation was significantly longer (26 days) in PET group.

#### **Conclusion**

Addition of PET imaging of patients with CUP did not result in improved 3-year overall survival. One of reasons might be significantly longer time before treatment was started in PET group. Larger prospective studies need to be done to clarify this surprising result.

## **ORAL SESSION 21: CANCER**

### **EVALUATION OF PROGNOSTIC FACTORS IN RELATION TO TREATMENT OUTCOME IN ADVANCED (PHARYNGO)LARYNGEAL SQUAMOUS CELL CARCINOMA.**

*D. Dequanter<sup>1</sup>, M. Shahla<sup>2</sup>, Y. van Hemelrijck<sup>2</sup>, Y. Deniz<sup>2</sup>, C. Aubert<sup>2</sup>, R. Lamartine<sup>2</sup>, P. Lothaire<sup>2</sup>*

*<sup>1</sup>Head and Neck Surgery, CHU Charleroi, Aalst, Belgium*

*<sup>2</sup>Chu Charleroi, Head and Neck Surgery, Charleroi, Belgium*

**Introduction:** This study evaluated the associations between lymphatic and vascular invasion of oral and (pharyngo)laryngeal cancers, the utility of lymph node density (LND) and their impact on patient outcomes after treatment.

**Methods:** 56 patients with oral and (pharyngo)laryngeal squamous cell carcinoma were included. The primary tumor was located in the oral cavity in 16 cases, involved the larynx in 17 cases and the hypopharynx in 23 cases. All the tumors were staged T4. All the lymph nodes harvested from the neck dissection were carefully examined, with lymph node density (LND) calculated as the ratio of positive lymph nodes to total lymph nodes removed. Lymphatic and vascular invasion were found in 5% of the patients and 3% of the patients, respectively.

**Results:** Receiver operating characteristic curve analysis showed that lymph node density (LND) was significantly associated with locoregional failure. Lymph node density >0.09 (as the cutoff point) could predict locoregional failure after surgery for oral and (pharyngo)laryngeal cancers with a sensibility of 93 % and specificity of 100%. After univariate analysis, neither lymphatic nor vascular invasion were statistically associated with local recurrence, neck recurrence, and distant metastasis. Although lymphatic invasion exhibited significant associations with poorer overall survival ( $P < 0.001$ ), disease-specific survival ( $P < 0.001$ ), and disease-free survival ( $P = 0.01$ ), it was not demonstrated to be an independent prognostic factor in all multivariate analyses.

**Conclusions:** After surgery, pathologic evaluation of the neck using lymph node density was found to reliably stratify the risk of disease recurrence.

## **ORAL SESSION 21: CANCER**

### **COMPARISON BETWEEN RADIAL FOREARM AND ANTEROLATERAL THIGH FLAP FOR MICROSURGICAL HEAD AND NECK RECONSTRUCTION. OUR EXPERIENCE.**

*F. Ramírez-Pérez<sup>1</sup>, L. Ruiz-Laza<sup>1</sup>, R. González-García<sup>1</sup>, C. Hernández-Vila<sup>1</sup>, J. Ruiz-Casas<sup>1</sup>, F. Monje-Gil<sup>1</sup>*

*<sup>1</sup>Hospital Infanta Cristina, Oral and Maxillofacial Surgery, Badajoz, Spain*

#### **Aims**

Nowadays, soft tissue coverage of complex head and neck (H&N) defects is possible due to the use of microsurgical free flaps.

The aim of the study is to compare the radial forearm free flap (RFFF) and the anterolateral thigh flap (ALT) in reconstructing H&N defects.

#### **Methods**

A retrospective study from February 2006 to March 2016 has been done among 207 microsurgical consecutive H&N procedures developed by our Department.

#### **Results**

Among 207 reconstructions, 163 RFFF and 44 ALT were harvested. Most RFFF (90.2%) and ALT (93.2%) covered oncologic defects. Facial artery was used in 50.3% of RFFFs, while superior thyroid artery was used in 45.5% of ALT. A single deep system vein was used in both groups for most cases. For RFFFs, the global surgical procedure was an average of 8.01 hours, and 7.6 hours for ALTs. 91.4% of RFFs and 81.8% of ALTs were viable, this difference being not statistically significant ( $p=0.067$ ), but near to the  $p<0,05$  level. The most frequent complication was cervical bleeding (11%) in RFFF group and cervical infection (6.8%) in ALTs. Seven patients in the RFFF group had swallowing and speech problems, in contrast to the ALT group.

#### **Conclusions**

Regarding to our data, reconstruction of H&N defects can be considered a safe procedure in both flaps, but the trend of p value next to the level of signification may change the surgeon option to RFFFs, although it depends on several surgical aspects, including defect size and location. Further randomized controlled studies are necessary to properly compare both flaps in H&N reconstruction.

## ORAL SESSION 21: CANCER

### IMPACT OF SECOND PRIMARY TUMORS OF HEAD AND NECK: AN ANALYSIS OF OUR EXPERIENCE

*A. Agudelo Torres<sup>1</sup>, J.Á. Tomás Américo<sup>1</sup>, C. Salvador<sup>2</sup>, L.M. Floria García<sup>1</sup>, C. Nuño Iglesias<sup>1</sup>, L.G. Fernandes Ciaccia<sup>1</sup>, J. Delhom Valero<sup>1</sup>, E. Bizcarrondo Ruiz<sup>1</sup>, M.C. Baquero Ruiz de la Hermosa<sup>1</sup>*

<sup>1</sup>Hospital Universitario y Politecnico La Fe, Cirugía Oral y Maxilofacial, Valencia, Spain

<sup>2</sup>Hospital Universitario y Politecnico La Fe, Oncología Médica, Valencia, Spain

A significant problem in the treatment and follow-up of patients with head and neck cancer is the high incidence of second primary tumors (SPT), which has a great impact on survival rates, representing the leading long-term cause of mortality in these patients.

A descriptive retrospective study was conducted in our center. Patients with a diagnosis of head and neck tumor between January/2005 and February/2015 associated with the presence of SPT in the head and neck were included.

SPT were defined under Warren and Gates criteria.

394 patients were included. The median duration of follow-up was 149 months (range 25-297 months). A total of 35 patients (8.9%) developed SPT. Characteristics of index tumor and SPT are described in **Table1**.

VARIABLES	NUMBER	%
<b>Gender</b>		
Men	28	80
Women	7	20
<b>Age</b>		
Median (range)	57 (38-92)	
<b>Toxic habits</b>		
Smoke	9	25.7
Alcohol	11	31.4
Both	2	5.7
None	13	37.1
<b>Histology first primary tumor</b>		
Squamous cell carcinoma	34	97.1
Adenocarcinoma	1	2.9
<b>Tumor differentiation</b>		
Well differentiated	21	60
Moderately differentiated	7	20
Poorly differentiated	3	8.6
Unknown	4	11.4
<b>Sites of first primary tumor</b>		
Oral cavity	12	34.5
Oropharynx	7	20
Larynx	10	28.7
Paranasal sinuses	1	2.9
Parotid gland	2	5.7
<b>Stage of first primary tumor</b>		
I	7	20
II	10	28.6
III	3	8.6
IVA	12	34.3
IVC	1	2.9
Unknown	2	5.7
<b>Treatment of first primary tumor</b>		
Only surgery	12	34.3
Radiotherapy (RT)	1	2.9
Chemotherapy (CT) + RT	7	20
Surgery + CT + RT	2	5.7
Surgery + RT	11	31.4
Unknown	2	5.7

PRIMARY TUMOR CHARACTERISTICS

VARIABLES	NUMBER	%
<b>Histology of SPT</b>		
Squamous cell carcinoma	33	94.3
Adenocarcinoma	1	2.9
Unknown	1	2.9
<b>Localization of SPT</b>		
Oral cavity	10	28.7
Oropharynx	9	25.7
Larynx	7	20.1
Hypopharynx	2	5.7
Paranasal sinuses	1	2.9
Esophagus	5	14.3
Parotid gland	1	2.9
<b>Stage of SPT</b>		
Local	13	37.1
Locally advanced	16	45.7
Metastatic	4	11.5
Unknown	2	5.7
<b>Treatment of SPT</b>		
Only surgery	4	11.4
Radiotherapy (RT)	1	2.9
Chemotherapy (CT)	9	25.7
CT y RT	7	20
Surgery + CT + RT	10	28.6
Surgery + RT	3	8.6
No treatment	1	2.9

SPT CHARACTERISTICS

The median time from initial diagnosis to the diagnosis of SPT was 62 months (range 0-168 months). The median overall survival (OS) was 149 months (range 84-214 months).

The multivariate Cox regression analyses of the associations among various clinic-pathological variables with OS revealed that SPT was the only independent predictor of lower OS ( $p=0.04$ ).

The risk of SPT in patients with previous malignancy of the head and neck is greater than the age-matched general population and it remains constant over time. In our series, the incidence rate of SPT of head and neck region was 8.9%.

SPT was the only independent predictor of lower OS in our study.

The recurrence or the SPT must be detected before symptoms appear, in order to have a chance for curative treatment of the neoplasm.

## ORAL SESSION 21: CANCER

### EWING SARCOMA OF THE HEAD AND NECK: LOCAL TREATMENT EVALUATION, OF THE FRENCH POPULATION OF EURO-EWING99

*J. Bouaoud<sup>1</sup>, S. Bolle<sup>2</sup>, S. Temam<sup>3</sup>, K. Belhous<sup>4</sup>, L. Galmiche<sup>5</sup>, Q. Quassemyar<sup>3</sup>, F. Bidault<sup>6</sup>, V. Couloigner<sup>7</sup>, M.C. Le Deley<sup>8</sup>, N. Gaspar<sup>9</sup>, N. Kadlub<sup>10</sup>*

*<sup>1</sup>Necker Enfants Malades, Chirurgie Maxillo-faciale et Plastique, PARIS, France*

*<sup>2</sup>Gustave Roussy Cancer Campus, Radiation oncology department, Villejuif, France*

*<sup>3</sup>Gustave Roussy Cancer Campus, Unit of Head and Neck Surgery, Villejuif, France*

*<sup>4</sup>APHP- Necker Enfants Malades- University Paris Descartes, Department of pediatric Radiology, Paris, France*

*<sup>5</sup>APHP- Necker Enfants Malades-University Paris Descartes, Department of Pathology, Paris, France*

*<sup>6</sup>Gustave Roussy Cancer Campus, Department of Radiology, Villejuif, France*

*<sup>7</sup>APHP- Necker Enfants Malades- University Paris Descartes, Unit of otolaryngology and head and neck surgery, Paris, France*

*<sup>8</sup>Gustave Roussy Cancer Campus, Department of Biostatistics, villejuif, France*

*<sup>9</sup>Gustave Roussy Cancer Campus, Department of Oncology for Child and Adolescents, Villejuif, France*

*<sup>10</sup>APHP- Necker Enfants Malades- University Paris Descartes, Unit of maxillofacial and Plastic Surgery, Paris, France*

**Background.** Ewing Sarcoma (ES) is the second most common primary bone malignancy in child and adolescent. ES of the head and neck is rare [1-15% of all ES].

**objectives.** To describe the characteristics, as well as local relapse, survival and acute and long-term functional and esthetic outcome, according to the choice of local control modalities.

**Method.** We analyzed prospectively collected data of the French patients with head and neck ES registered in the Euro-Ewing 99 (EE99) trial from 1999 to 2014 and retrospectively reviewed their charts to refine some items on local treatment and sequels. Event-Free (EFS) and Overall survival (OS) were calculated with the Kaplan–Meyer method. Literature review was performed by a PubMed search.

**Results.** Overall 50 patients presented head and neck ES. Median age was 13.2 years [1,2-32,4 y]. Primary tumor mainly of the bone (90%) had usually small initial volume (<200ml; 92% of cases), were located in the skull (52%), mandible (20%) and maxilla (8%), with local, regional or metastatic extension, in respectively 82%, 10% and 8% of cases. After neoadjuvant, local treatment consisted on combined surgery/radiotherapy (60%), surgery alone (22%) or exclusive radiotherapy (18%). The median follow up was 67 month. The 3-years, EFS and OS were respectively 80% [64-89%] and 86% [70-93%], for the all population of the study; 81% [65-90%] and 88% [72-96%] for localized head and neck ES.

**Discussion.** Local treatment indications, contraindications, and short term and long-term complications will be described after radiological review. Prognostic factors of local relapse will be studied.

## **ORAL SESSION 22: TRAUMA**

### **A NEW MINIPLATE DESIGN FOR OSTEOSYNTHESIS OF MANDIBULAR ANGLE FRACTURES**

*T.S. Pituru<sup>1</sup>, C. Gudas<sup>2</sup>, S.M. Pituru<sup>3</sup>, O. Dinca<sup>1</sup>, A. Bucur<sup>1</sup>*

*<sup>1</sup>University of Medicine and Pharmacy "Carol Davila", Medical Department of Oro-Maxillo-Facial Surgery, Bucuresti, Romania*

*<sup>2</sup>Marshall Aerospace, Aerospace, Cambridge, United Kingdom*

*<sup>3</sup>University of Medicine and Pharmacy "Carol Davila",*

*Professional Organization in Medical and Dental Legislation, Bucuresti, Romania*

This study provides important data for improving healing in bone fractures of the mandibular angle. Collaboration between specialists in Aerospace and Medicine led to a result that can solve an acute problem in oro-maxillo-facial traumatology. The study presents how the maximum strains developed during biting affects the balance between bone resorption and remodeling at the fracture line. 2D models were used to assess force distribution between screws when used a standard miniplate in mandibular angle fractures fixation. Study results showed that at the distance lower than 1.7 mm diameter screw, specific maximum strains that cross the border of 1500 microstrains were concentrated in the first screw and the fracture, leading to delayed healing and possible occurrence of postoperative complications. The distance between the first screw near the fracture and the fracture line must be 2.0 – 2.5 screw diameter to facilitate the healing by decreasing the strains in the area. These virtual studies have led to a new design that eliminates the disadvantages of standard osteosynthesis miniplates currently used in practice. The new device creates conditions for a fast and secure healing and minimizes postoperative complications. The study was conducted using MD NASTRAN and PATRAN programs, working with finite elements. Then the results were confirmed in the laboratory on sheep mandibles. Metal fatigue was tested using the dye penetration technique.

**ORAL SESSION 22: TRAUMA**  
**INTRAORAL ENDOSCOPICALLY ASSISTED MANAGEMENT OF THE MANDIBULAR**  
**CONDYLAR FRACTURES – 11 YEARS EXPERIENCE**

*Z. Stopa<sup>1</sup>, H. Wanyura<sup>1</sup>*

*<sup>1</sup>Medical University of Warsaw, Department of Cranio-Maxillofacial Surgery-  
Oral Surgery and Implantology, Warsaw, Poland*

**INTRODUCTION:** Mandibular condylar fractures are frequent, accounting from 31 to 43% of all fractures of the mandible. It is suggested that better results can be obtained with intraoral endoscopically assisted reposition than with traditional open approaches. There is also benefit of minimal risk to the facial nerve injury.

**OBJECTIVES:** The aim of this study was to evaluate treatment outcomes of patients with mandibular condylar fractures who underwent intraoral endoscopically assisted stable fixation.

**METHODS:** Intraoral endoscopically assisted approach to the mandibular condylar fracture was carried out in 436 patients (461 approaches) between 2005 and 2015. The average age of treated patients was 32.1 years (from 8 to 76 years). There were 373 males and 63 females. There were 328 subcondylar, 116 neck and 17 head fractures. Luxation of the head was found in 48 fractures. 331 patient had an additional fracture of the mandible. In all 461 procedures a 4 mm in diameter, 18 cm in length and 30° angled endoscope was used.

**RESULTS:** In 5 cases additional extraoral approach was performed. In 2 patients due to inadequate fixation and malocclusion, second operation was necessary. Initially, our average operating time for the treatment of one condylar fracture was approximately 90 min. When the approach became a routine method of fracture treatment the average operating time dropped to 30 min. A postoperative facial nerve palsy has not been observed.

**CONCLUSIONS:** Intraoral endoscopically assisted osteosynthesis of mandibular condylar fractures seems to be a safe and effective surgical method.

## **ORAL SESSION 22: TRAUMA**

### **EVALUATION OF SEVERITY OF COMMINUTED FRACTURES OF THE MANDIBLE**

*A. Huseynov<sup>1</sup>, V. Malanchuk<sup>1</sup>, I. Logvynenko<sup>1</sup>, N. Malanchuk<sup>2</sup>*

*<sup>1</sup>National Medical University, Oral & Maxillo-Facial Surgery, Kiiv, Ukraine*

*<sup>2</sup>National Medical University, Oral & Maxillo-Facial, Kiiv, Ukraine*

**PURPOSE:** Evaluation of severity of comminuted fractures of the mandible on the basis of indices of a biological condition of tissues in the field of trauma.

**MATERIALS AND METHODS:** 63 patients with fractures of the mandible have been examined from 2013 to 2015 y. 10 main anatomic and biological indices were under consideration: the general status, trauma etiology, prescription of trauma, quantity of fragments of the mandible, sizes of fragments, degree of rupture of mucous membrane, sources of extraosseous blood circulation, displacement of fragments, disturbance blood circulation of bone according to rheography, volume of diastasis. Indices were estimated on the degree of clinical expressiveness in points (0-1-2). The points for forecasting of clinical course of comminuted fractures of the mandible conditionally graduated like: To 8 points (I group) – the course of a fracture is favorable. 8-14 points (II group) – the doubtful course of the fracture. 15-20 points (III group) - the adverse course of the fracture.

**RESULTS:** 1 group –25 (39,6 %) patients, 16 (64%) of them were treated with open reduction, 9 (36 %) patients – with close reduction.

2 group –33 (52,5%) patients; 32 (96,9%) were treated with open reduction, 1 (3,1%) patient – underwent conservative treatment.

3 group - 5 (7,9%) patients; were treated by open reduction.

**CONCLUSIONS:** Biological indices of comminuted fractures estimation helps to make proper decision of treatment algorithm.

## **ORAL SESSION 22: TRAUMA**

### **POST-OPERATIVE CLINICAL-FUNCTIONAL ANALYSIS OF 34 CASES OF CONDYLAR FRACTURES TREATED SURGICALLY WITH RESTRAINT BY TWO PLATES.**

*G.M. Lombardi<sup>1</sup>, P.R. Giacomini<sup>1</sup>, M. Bassi<sup>1</sup>, M. Gessaroli<sup>2</sup>, M. Manfred<sup>2</sup>, N. Tomasetti<sup>1</sup>, A. campobassi<sup>1</sup>, E. Bartolucci<sup>3</sup>*

*<sup>1</sup>Hospital M. Bufalini Cesena, Unit of Maxillo Facial Surgery, Forlì, Italy*

*<sup>2</sup>Hospital M. Bufalini Cesena, Unit of Maxillo Facial Surgery, Cesena, Italy*

*<sup>3</sup>Freelance, Posturologist, Perugia, Italy*

**Introduction:** The clinical functional analysis has been done on patients affected by fractured neck condyle with angular dislocation with overlapping fragments. All the fractures studied have been surgically treated and the contents have been fitted with two titan small-plates and screws. In every case the two small-plates were positioned according to the functional direction and weight.

**Materials and Methods:** the patients were 9 female and 25 male with an average age of 32,05 years. We examined 48 condylar fractures of which 25 showed angular dislocation and 23 overlapping of fragments. 10 patients demonstrated normal-face typology, 9 patients with long-face and 15 patients with short-face. Closing function was of I class Angle in 22 patients, II class in 8 patients and III class in 4 patients. The instrumental clinical assessment was made an average of 6,6 years after surgery. The clinical valuation included closing function, mastication activity and mandibular dynamics with oral opening, protrusive and side mandibular movement. The instrumental analysis consisted of an eletromiographic and kinesiographic exams.

**Results:** the final results are put in comparison by type of angular fractures or with overlapping, to obtain and show possible relation between the type of dislocation and results of the instrumental exams, and facial typology and muscle movements and direction.

## **ORAL SESSION 22: TRAUMA**

### **PEDIATRIC MANDIBULAR FRACTURES: A RETROSPECTIVE STUDY TO COMPARE THE OUTCOMES IN DIFFERENT MANAGEMENT STRATEGIES IN A TERTIARY CARE HOSPITAL**

*A. Bansal<sup>1</sup>, A. Roychoudhury<sup>2</sup>, O. Bhutia<sup>2</sup>, R. Yadav<sup>2</sup>, K. Bhatt<sup>2</sup>, T. Deky<sup>2</sup>*

*<sup>1</sup>All India Institute Of Medical Sciences- New Delhi Autonomous, Oral And Maxillofacial Surgery, Panchkula, India*

*<sup>2</sup>All India Institute Of Medical Sciences- New Delhi Autonomous, Oral And Maxillofacial Surgery, New Delhi, India*

**Background:** Owing to differences in pediatric mandibular anatomy, fracture patterns and healing progression, conservative versus surgical treatment is still an area of debate.

**Materials and methods:** A retrospective cohort study of 100 pediatric mandibular fractures treated at the Department of Oral and Maxillofacial Surgery, AIIMS, NEW DELHI from Jan 2005 to July 2015 was done. Patients were  $\leq 12$  yrs. Conservative group consisted of no treatment with soft diet and active mouth-opening exercises; inter-maxillary fixation or splinting whereas surgical group consisted open reduction and internal fixation. Outcomes of mouth-opening, occlusion-status, bony union, nerve-status and growth abnormalities were evaluated on follow-up (3 months- 1 year).

**Results:** 69% were male and 31% were females, mean age was  $6.7 \pm 3.2$  years. 75% fractures were after fall, followed by RTA (20 %) and other causes (5%). Unilateral parasymphysis (22%), condylar (15%), symphysis(11%) and combination of bilateral condylar and symphysis(6%) were most common patterns, presenting with deranged occlusion in 56%. 77% patients received conservative and 23% surgical treatment. Mean post-operative mouth-opening was 26.9 and 29.3mm in conservative and surgical group respectively. None of the cases had non-union or growth abnormality. Occlusion was mildly deranged only in one conservative case group while nerve paresthesia in only one surgical case group. Second procedure under GA/ sedation was needed in 6 cases in conservative and all of the surgical group cases.

**Conclusion:** Good results were obtained by either of the treatment; hence, until open surgery demonstrates a consistent functional advantage, nonsurgical managements should be considered the first treatment option.

**ORAL SESSION 22: TRAUMA  
OUR EXPERIENCE WITH MODIFIED RISDON APPROACH FOR SUBCONDYLAR  
MANDIBULAR AREA AND REVIEW OF LITERATURE.**

*I. Page<sup>1</sup>, F. Pérez-Flecha<sup>1</sup>, E. Sánchez-Jauregui<sup>1</sup>, B. Lago<sup>1</sup>, D. Villegas<sup>1</sup>, J. Gonzalez<sup>1</sup>,  
J.M. Eslava<sup>1</sup>, J. Acero<sup>1</sup>*

*<sup>1</sup>Hospital Ramón y Cajal, Oral and maxillofacial department. Hospital Ramón y Cajal., madrid,  
Spain*

**Background**

Various approaches have been described in the literature for the reduction of mandibular condyle fractures.

The modified Risdon approach, described in 2006 by Meyer et al, is gaining popularity nowadays and indications have been increased.

This approach requires an incision along the basilar border of the mandible and the subcutaneous tissue superficial to the platysma muscle. Then the platysma muscle is incised along the same axis to expose the masseter muscle. Care is taken to avoid the marginal mandibular branch or the buccal branch of the facial nerve, running under the masseter aponeurosis. The masseter was cut just above the lower mandible border and dissection was carried out to the periosteum to expose the area.

**Method:**

We present a retrospective review of 16 patients with different pathologies in subcondylar area, 11 patients with different types of unilateral low and medium subcondylar fractures, 2 patients with high ramus mandibular fracture and 3 patients with temporomandibular joint disorders who need condylar prosthesis. All of them treated by the Modified Risdon Approach. All fractures were reduced and prosthetic replacement was performed. A postop 3D Scan was made in all patients and photographs of the scars were taken. No facial palsy was noticed.

**Finding and Conclusions:**

Our conclusion is that the Modified Risdon approach for low and medium subcondylar mandibular fractures and other pathology should be one of the first surgical options, due to the easy technique, minimum face scar and good exposure of the area.

**ORAL SESSION 22: TRAUMA**  
**TREATMENT OF MANDIBULAR CONDYLE FRACTURES USING A MODIFIED**  
**TRANSPAROTID APPROACH VIA TRAGAL RETROMANDIBULAR INCISION**

*J. Hou<sup>1</sup>, C. Wang<sup>1</sup>, H. Huang<sup>1</sup>, J. Liang<sup>1</sup>*

*<sup>1</sup>Guanghua School of Stomatology- Hospital of Stomatology- Sun Yat-sen University,  
Oral and maxillofacial Surgery, Guangzhou, China*

**Aims:** To assess the results of surgical treatment of condylar fractures using a modified transparotid approach via tragal retromandibular incision.

**Methods:** A modified transparotid approach was used in 56 mandibular condyle fractures. The incision was made along the skin on the tragal margin and around the earlobe retroauricularly to expose fracture line and fixed with mini-plated. All the patients were subjected to clinical examination including: occlusion, facial nerve function, mandibular movements, assessment of the scar aesthetics and the presence of salivary fistula or salivary cyst after surgery. Radiography of the mandible was made before the operation, on the first day after surgery and after 3 months.

**Results:** All the condylar fractures were well visualized and fixed with titanium miniplates accurately, and there was no postoperative discrepancy in occlusion. No obvious scars and salivary fistula were observed in all patients. Follow-up CT within the first three months postoperatively showed complete anatomical reduction of the mandibular condyle fracture in all patients. However, 7 patients with a partial paresis of the facial nerve was noticed followed by a spontaneous recovery 1 months postoperatively, including 5 patients with incomplete eye closure and 2 patients with decreased depth of forehead wrinkles. 2 patients with salivary cyst were also found after drainage stopped, but recovered after 2 weeks treatment with aspiration and compression dressing bandage.

**Conclusion:** This modified transparotid approach allows for direct visualization, proper reduction and a stable three-dimensional fracture stabilization, with a low risk of facial nerve paresis and less scar exposures.

**ORAL SESSION 22: TRAUMA**

**TITANIUM MESH SHAPING AND FIXATION FOR TREATMENT OF COMMUNUTED MANDIBULAR FRACTURES: A RETROSPECTIVE STUDY**

*J. Shi<sup>1</sup>, J. Dai<sup>1</sup>, J. Zhang<sup>1</sup>*

*<sup>1</sup>Ninth People's Hospital, Oral and Craniomaxillofacial Surgery, Shanghai, China*

**Background:** Treatment of comminuted mandibular fractures is still a challenge. We gain inspiration from treating the bone defect using autologous bone granule with titanium mesh, and try to using titanium mesh shaping and fixation to treat comminuted mandibular fractures.

**Methods:** Nine patients with traumatically comminuted mandibular fractures were selected in this study. The open reduction and internal stable fixation surgery was performed 7-10 days after primary debridement of the facial trauma. After the fractured mandible and the displaced fragments were reduced, the titanium mesh was reshaped according to the morphology of mandible, and the reduced bone fragments were fixed with the reshaped titanium mesh and screws. Then the wound condition, absorption condition of bone fragments, mandible morphology and mandibular function were chosen to evaluate the surgical effect at routine follow up.

**Results:** Most of displaced fragments were reserved and fixed in all patients, and the titanium mesh exhibited favourable shaping ability to restore the nice morphology of mandible during surgery. No intraoperative complications were encountered. The results also showed that the no infection happens in all patients, and no serious resorption in most of fixed fragments after surgery. The mandible exhibited a favourable morphology, and offered enough bone mass for the teeth implantation or denture prosthesis after the removing of titanium mesh.

**Conclusions:** Titanium mesh shaping and fixation could effectively treat comminuted mandibular fractures with less bone fragments loss, less soft tissues exposure, lower infection rate and nice mandibular morphology.

## **ORAL SESSION 22: TRAUMA**

### **10 YEARS MULTICENTRE EXPERIENCE WITH TRANSMUCOSAL FIXATION FOR ATROPHIC MANDIBULAR FRACTURES**

*R. Benech<sup>1</sup>, D. Campbell<sup>1</sup>, A. Benech<sup>2</sup>*

*<sup>1</sup>St Johns Hospital, Oral & Maxillofacial Surgery, Livingston, United Kingdom*

*<sup>2</sup>A. O. U. Maggiore della Carita', Maxillofacial Surgery, Novara, Italy*

Treatment of the edentulous atrophic mandibular fractures continues to represent a crucial challenge in the assessment of elderly traumatised patients. Acute and chronic comorbidities frequently complicate their management, with additional anaesthetic risks.

There have been proposed many methods of immobilisation. Load-bearing osteosynthesis and locking reconstruction plates, via extraoral approach, represent the most widely adopted solutions. However, serious complications have been frequently reported, such as bony non-union, fracture of hardware, high rates of permanent perimandibular anaesthesia/paraesthesia, problems with dentures and chronic pain. Moreover, the extra-oral approach often causes an undesirable scar, correlated to potential salivary fistulas and potential injuries of the mandibular branch of the facial nerve.

Consequently, our International and Multicentre experience suggests the intraoral transmucosal approach as a more effective solution. This system offers both mechanical and biological benefits, working as an internal fixator. Preserving periosteum integrity, it guarantees adequate blood supply to the bone and it facilitates bony healing. Our results illustrate minimal morbidity, reduces intra-operative time, while obtaining adequate fixation and bony union. The procedure could be managed under a local anaesthesia, with or without sedation, whenever a general anaesthesia is inadequate.

Intraoperative technique, tips, tricks and pitfalls will be presented and discussed. Furthermore, alternative techniques and strategies are shown and the difficulty of developing such devices in a commercial environment imbalanced against surgical innovation are presented.

## **ORAL SESSION 22: TRAUMA**

### **EFFECT OF BONE MARROW ASPIRATE ON OUTCOME OF MANDIBULAR FRACTURES CLINICAL AND EXPERIMENTAL OVERVIEW**

*A. Husein<sup>1</sup>*

*<sup>1</sup>Faculty of Medicine. Suez Canal University, Oral Maxillofacial Surgery Department, Cairo, Egypt*

**Introduction:** Nonunion or delayed union in managements of traumatized patients considered one of major complication in craniofacial osteosynthesis. Different bone growth promoting material are new entity in this field.

**Aim:** The aim of this work to evaluate the effect of bone marrow aspirate as source of growth factors and stem cell in healing of mandibular fractures through radio graphic and scatological views.

#### **Patient and Methods:**

(a) Clinical study: This study carried on 30 patients suffered from mandibular fractures, all the patients carried the surgical procedures through open reduction and fixation by plating system. two groups of patients are included in this study as G 1 include mandibular fixation without bone marrow aspirate, G2 included mandibular fixation with outogenous bone marrow aspirations. Clinical parameters as edema ,pain, infection are evaluated clinically. While radiographic evaluation were through digital panoramic view at the follow up peroid.

(b) Experemental study: 20 male old rabbits were selected in this study and all animals free from source of infections. All animals are preserved in surgical field of traumatization at the angle area and split the jaw. Two group of animals as same in clinical study. Histological staining and evaluation of different interleukins were the aim.

**Results:** the results of this study demonstrated the success rate in group of bone marrow aspirate either clinically and experementally

**ORAL SESSION 23: SALIVARY GLAND DISEASE**  
**TREATMENT OF DROOLING WITH ULTRASOUND-GUIDED BOTULINUM TOXIN**  
**INJECTIONS INTO SALIVARY GLANDS**

*W. Abboud<sup>1</sup>, S. Nadel<sup>1</sup>, S. Hassin-Baer<sup>2</sup>, A. Arad<sup>3</sup>, R. Yahalom<sup>1</sup>*

*<sup>1</sup>Sheba Medical Center, Department of Oral and Maxillofacial surgery, Tel Hashomer, Israel*

*<sup>2</sup>Sheba Medical Center, Department of Neurology, Tel Hashomer, Israel*

*<sup>3</sup>Sheba Medical Center, Department of ENT, Tel Hashomer, Israel*

Drooling is the unintentional loss of saliva from the mouth. It may be caused by poor swallowing function (neurologic diseases, post-laryngectomy patients, etc.) or excessive production of saliva (side effect of antipsychotics and cholinergic agonists). Drooling can cause various health conditions ranging from perioral skin infections to lung aspirations, and poses psychosocial and functional distress for the patients and caregivers.

Traditionally, drooling was treated by pharmacologic agents, with various degrees of success and adverse events, and surgery was considered in recalcitrant cases or in cases with intolerable drug reactions. Botulinum toxin was introduced into medicine 30 years ago and became the first bacterial toxin used as a drug. It is a potent neurotoxin that temporarily inactivates release of acetylcholine from nerve endings and thus blocks nerve stimuli to target areas. The first report of botulinum injection into the salivary glands for the treatment of drooling was published in 1997, and since then, few publications evaluated the efficacy and safety of this technique.

This presentation describes our department's experience with ultrasound-guided intra-glandular injections of botulinum toxin into the submandibular and parotid glands for the treatment of drooling. During a 1-year period, twelve patients were treated using this technique. We describe patient's characteristics, operative technique, outcome of treatment, onset and duration of effect, and adverse events.

Ultrasound-guided intra-glandular Botulinum toxin injection is a simple, safe, and efficacious therapeutic modality that should be considered by oral and maxillofacial surgeons treating patients with drooling.

**ORAL SESSION 23: SALIVARY GLAND DISEASE**  
**MANAGEMENT OF RECURRENT PLEOMORPHIC ADENOMA PAROTID TUMORS.**

*N. Papadogeorgakis<sup>1</sup>, C. Economou<sup>1</sup>, E. Kalfarentzos<sup>1</sup>, P. Strantzias<sup>1</sup>, V. Petsinis<sup>1</sup>*  
*<sup>1</sup>"Evangelismos" General Hospital- University of Athens Dental School- 45-47 Ipsilantou Str- Athens- GR 10676- Greece, Oral and Maxillofacial Surgery, Athens, Greece*

Salivary gland neoplasms account for 3% of all tumors in the head and neck area. 75% of them originate from the parotid gland while approximately 70-82% of those are pleomorphic adenomas of the parotid gland. Pleomorphic adenomas are benign tumors with a known tendency to recurrence and the dynamic for developing malignancy (estimated risk: 2-3% per year).

Recurrence is mainly attributed to the tumors characteristics, such as: thin capsule thickness, a primary multicentric origin, pseudopodia formation and the existence of satellite nodules. Still the most significant factor leading to recurrence seems to be incomplete surgical removal. The recurrent tumors are almost always multifocal which renders re-operation more difficult with a higher likelihood of facial nerve injury.

Recurrence rates after surgery for parotid pleomorphic adenomas are estimated around 1.8% after Total Parotidectomy, 2.6% after Superficial Parotidectomy, 3% after Partial Superficial Parotidectomy, 2.6% after Extracapsular Dissection. Management of these recurrent tumors is still not well defined. The purpose of this study is to present 17 cases of recurrent pleomorphic adenoma tumors and discuss the different treatment modalities available for such cases as well as to propose a surgical algorithm for the management of recurrent pleomorphic adenoma disease.

**ORAL SESSION 23: SALIVARY GLAND DISEASE  
IS FINE NEEDLE ASPIRATION CYTOLOGY FOR SALIVARY GLAND NEOPLASMS A  
WORTHWHILE INVESTIGATION?**

*F. Motamedi-Azari<sup>1</sup>, A. Dosanjh<sup>1</sup>, I. Balasundaram<sup>1</sup>, A. Ahmed<sup>1</sup>, B. Visavadia<sup>1</sup>, M. Gilhooly<sup>1</sup>,  
J. McCaul<sup>1</sup>*

*<sup>1</sup>Northwick Park Hospital, Oral and Maxillofacial surgery, LONDON, United Kingdom*

**Introduction**

The aim of this study was to analyse the management and outcomes of salivary gland tumours (benign and

malignant) at a regional maxillofacial unit over the last 33 months. This presentation will debate the value of

fine needle aspiration (FNA) cytology.

**Methods**

A database was formulated containing all salivary tumour cases treated. Data entered in the database was

done prospectively. All patients had ultrasound guided needle biopsy.

**Results**

133 patients were treated of which there were 101 benign and 32 malignant tumours. Of the malignant

tumours, 5/32 (16%) were initially diagnosed as benign and 3/32 (9%) were inconclusive. The sensitivity for

malignant tumours was 79%. The malignant tumours were managed by total parotidectomy (28%), superficial

parotidectomy (22%), extra capsular dissection (25%), wide local excision (13%) and partial parotidectomy

(6%). The cases managed by extra capsular dissection, were as a result of FNA being non-diagnostic,

suggesting the lesion is benign or a lymphoma.

**Conclusion**

The sensitivity of FNA is around 79%. In this series 16% of malignant tumours were wrongly diagnosed as

benign. Therefore there may be a justification to consider core biopsy for all inconclusive FNAs or those

clinically suspicious for malignancy.

**ORAL SESSION 23: SALIVARY GLAND DISEASE  
SIALENDOSCOPY GUIDED LARGE SALIVARY STONE REMOVAL. MINIMIZING SIDE  
EFFECTS**

*J. Rey-Biel<sup>1</sup>, J.A. Garcia-Marcos<sup>1</sup>, P. Barba-Recreo<sup>1</sup>, A. Sanchez-Barrueco<sup>2</sup>, L. Pingarron-Martin<sup>1</sup>, A. Alonso-Torres<sup>3</sup>, F. Guerra-Gutierrez<sup>4</sup>, J. Ruiz-Jimenez<sup>5</sup>, F. Iglesias-Martin<sup>1</sup>*

*<sup>1</sup>Rey Juan Carlos University Hospital, Oral and Maxillofacial Department, Mostoles- Madrid, Spain*

*<sup>2</sup>Villaba General Hospital, ENT, Villalba- Madrid, Spain*

*<sup>3</sup>Rey Juan Carlos University Hospital, Radiology, Mostoles- Madrid, Spain*

*<sup>4</sup>Villaba General Hospital, Radiology, Villalba- Madrid, Spain*

*<sup>5</sup>Infanta Elena University Hospital, Oral and Maxillofacial Department, Valdemoro- Madrid, Spain*

**AIMS:** Large lithiasis affecting salivary glands often lead to remove the organ. Other option is opening the duct that may have some consequences affecting nearby structures. By using the sialendoscope we try to minimize these effects.

**METHODS:** Large stones lesions (over 7mm) affecting the submaxilar and parotid are sialendoscopically displaced distally by using a basket. Minimal intraoral lighting guided incisions are performed to extract lithiasis. Primary closure with microscope suture is achieved.

**RESULTS:** Patients are discharged in day one postop. Ducts are functional in the short follow up. Gland removal is avoided. No remarkable side effects have been found, including neural damage and other nearby structures.

**CONCLUSIONS:** Sialendoscopy is becoming an excellent option when facing large stone affecting these structures, becoming cost-benefit effective.

**ORAL SESSION 23: SALIVARY GLAND DISEASE  
22 YEARS OF EXPERIENCE IN TREATMENT OF SALIVARY GLAND TUMORS IN A SINGLE  
INSTITUTION IN CRACOW, POLAND**

*M. Gontarz<sup>1</sup>, G. Wyszynska-Pawelec<sup>1</sup>, J. Zapala<sup>1</sup>*

*<sup>1</sup>Jagiellonian University Medical College, Department of Cranio-Maxillofacial Surgery, Cracow, Poland*

Salivary gland tumors comprise 3-6% of head and neck neoplasms. The aim of this study was an epidemiological analysis of the salivary glands tumors in a large representative group.

**Material and methods:**

A retrospective study reports medical records of 761 patients with salivary glands tumors operated from 1994 to 2015 in the Department of Cranio-Maxillofacial Surgery in Cracow, Poland.

**Results:**

There were 511 cases of benign and 250 malignant tumors. The average age of patients with benign tumors was 50 years and 57 years with malignant. Among women a higher incidence of benign (60%) and malignant (56%) tumors was observed. The majority of tumors were located in the parotid gland (554), followed by the minor salivary glands (179). The most frequent benign tumor was pleomorphic adenoma (298) mostly located in the parotid gland, followed by the palate. The most common malignant tumor was adenoid cystic carcinoma most frequently occurring on the palate.

**Conclusions:**

This epidemiological study could improve our better understanding of clinical and biological features as well as significant differences in the distribution of the salivary glands tumors.

**ORAL SESSION 23: SALIVARY GLAND DISEASE  
TRANSORAL STENSEN'S DUCT APPROACH. A 27 CASES RETROSPECTIVE STUDY**

*C. Chossegras<sup>1</sup>, J.M. Foletti<sup>1</sup>, L. Guyot<sup>1</sup>*

*<sup>1</sup>APHM, Oral & Maxillofacial Dept, Marseille, France*

**Introduction.** Parotid gland duct lithiasis is preferentially managed using minimally-invasive techniques such as sialendoscopy and lithotripsy. However, these 2 techniques cannot remedy all obstructions and other techniques such as the Transoral Stensen's Duct Approach (TSDA) may sometimes be helpful.

**Material and Methods.** A retrospective study of patients treated with TSDA was conducted to evaluate this procedure between 2006 and 2013. Criteria for inclusion were: failures for lithiasis (22 patients and 28 lithiasis) treated with sialendoscopy and/or lithotripsy for parotid gland duct obstruction. Mean follow-up was 47.4 months. Pain intensity, swelling and occurrence of infectious episodes were evaluated.

**Results.** The best results were obtained for anterior lithiasis, with an 87.5% immediate success rate. Morbidity was low with 2 transient facial nerve upper buccal branch palsies and 2 post-operative stenoses.

**Discussion.** TSDA can be recommended in cases of sialendoscopy or lithotripsy failure for anterior third parotid duct lithiasis. Even if this technique has shown limitations for more posterior lithiasis, or other causes of obstruction (stenosis, megaduct), it requires no specific material and may be useful. It may avoid an external combined approach or a parotidectomy.

**Conclusion:** TSDA is a simple and safe technique, which can be performed under local anesthesia and which does not require specific instrumentation. TSDA avoids a direct papilla approach and, therefore, avoids duct fibrous scarring with sequelar stenosis. It delivers its best results in anterior-third parotid duct lithiasis (for a lithiasis diameter equal to or larger than 3 mm). However, TSDA should not be indicated for posterior lithiasis.

**ORAL SESSION 23: SALIVARY GLAND DISEASE**  
**EVALUATION OF PROGNOSTIC FACTORS OF ADENOID CYSTIC CARCINOMA**

*C.M. Bandini<sup>1</sup>, G. Herve<sup>1</sup>, T. Schouman<sup>1</sup>, A. Chaine<sup>1</sup>, N. Tabchouri<sup>1</sup>, P. Goudot<sup>1</sup>, C. Bertolus<sup>1</sup>*  
*<sup>1</sup>La Pitié-Salpêtrière Hospital- 75013- Paris, Maxillo-Facial surgery and Stomatology Department, Paris, France*

Introduction:

Adenoid Cystic Carcinoma (ACC) is a rare cancer of salivary glands. TNM stage, histopathologic grading, modalities of treatment, margins resection have been reported as independants prognostic factors for the ACC in the litterature. The aim of this study was to define prognostic factors of head and neck ACC.

Material and Methods:

From 1994 to 2014, 82 patients with ACC were referred to our department, at La Pitié Salpêtrière Hospital. We performed for each patient a collection of data including epidemiologic characteristics, clinical data at the diagnosis, histopathologic results, modalities of treatment and follow-up. Univariate and multivariate analysis of disease-free survival and overall survival were made to identify the prognostic factors of ACC. A survival curve was made using the Kaplan Meyer method.

Results:

Complete data were available for 37 patients. The primary site was the accessory salivary glands in 20 cases, and the major salivary glands in 17 cases. Mean follow-up was 68 months. Evaluation of prognostic factors shows that Ki-67 could be taken into account when defining therapeutic strategy.

**ORAL SESSION 23: SALIVARY GLAND DISEASE**  
**SUBMANDIBULECTOMY AVOIDING CERVICAL SCAR: THE INTRAORAL APPROACH**

*J. Davrou<sup>1</sup>, C. Racz<sup>1</sup>, J. Bettoni<sup>1</sup>, A. Algrin<sup>1</sup>, S. Testelin<sup>1</sup>*

*<sup>1</sup>Centre Hospitalier Universitaire, Service de Chirurgie Maxillo-Faciale, Amiens, France*

Surgical management of submandibular gland diseases using a transcervical incision is the routine of all the head and neck surgeons around the world. Driven by the rise of minimal invasive procedures on the one hand, and the increasingly concerned invisible postoperative scars on the other, modified surgical approaches have to be developed.

In the coming years, robotic surgery will probably become a major focus to help us in this way, but this challenging and arduous process is far from becoming the gold standard.

The introduction of the intraoral approach have been described by Hong et al. in 2000 (Otolaryngol Head Neck Surg), but didn't create a lot of expected interest. Regarding some common complications of a classic submandibulectomy using the transcervical approach (mental branch of the facial nerve lesions, and unaesthetic scars), the authors try to determine through their surgical experience the indications, surgical technique, and complications that have been encountered using the intraoral approach.

**ORAL SESSION 23: SALIVARY GLAND DISEASE  
STONEBREAKER™- INTRACORPOREAL PNEUMATIC LITHOTRIPSY FOR SALIVARY  
STONES**

*G.M. Prucher<sup>1</sup>, K.S. George<sup>1</sup>*

*<sup>1</sup>King's College Hospital, Oral and Maxillofacial Surgery, London, United Kingdom*

**Aims**

Stonebreaker™ is a handheld pneumatic lithotripsy device powered by high pressure carbon dioxide and is a recognised treatment for the fragmentation of urinary tract stones. It is produced by Cook Medical who have modified it for use in the management of salivary gland stones. Two centres worldwide, one in the UK and one in Germany, were provided with the device to trial its use in salivary gland stone fragmentation. The UK data is presented.

**Methods**

Patients with intraductal parotid or submandibular gland stones were recruited from a multidisciplinary salivary gland clinic. All were investigated with a pre-operative ultrasound scan and had salivary gland stones positioned in a duct accessible with an endoscope with a working channel of 0.65mm or greater. Data was collected prospectively.

**Results**

The results of the first 50 adult patients treated with the Stonebreaker™ device are presented. Most cases were carried out under local anaesthetic in the outpatient department. Treatment sessions lasted for approximately 1 hour and ranged in number between 1-4. One patient was unable to tolerate the procedure due to pain and so the procedure was aborted. Stone fragmentation was successful in over 80% of patients with stone fragments retrieved by basket or passing spontaneously with gland massage.

**Conclusions**

Stonebreaker™ provides another minimally invasive option for the treatment of salivary gland stones too large for removal by basket retrieval alone. It is a more affordable and successful method of stone fragmentation than extracorporeal lithotripsy and is suitable for use under local anaesthetic in most cases.

## **ORAL SESSION 24: CANCER**

### **DEFECTS IN ORAL SQUAMOUS CELL CARCINOMA (OSCC) STAGING SYSTEM: WHAT OTHER PROGNOSTIC FACTORS SHOULD BE CONSIDERED - LITERATURES REVIEW**

*E. Omar*<sup>1</sup>

<sup>1</sup>*Taibah University, Department of oral & Maxillofacial Surgery, Madinah, Kingdom of Saudi Arabia*

**Background:** Oral squamous cell carcinoma (OSCC) has a remarkably high incidence worldwide, and a fairly serious prognosis, encouraging further research into advanced technologies for noninvasive methods of making early diagnoses, ideally in primary care settings. **Objectives:** Our purpose was to examine the effectiveness of TNMs classification system in assessment of OSCC. **Data sources:** MEDLINE, EMBASE, and CINAHL were searched to identify prognostic factors of OSCC and other information published between 1985 and 10 August 2014; the searches of MEDLINE and EMBASE were updated to November 2015. The search was restricted to peer reviewed articles published in English. **Review Methods:** In this review article, the factors of prognosis of OSCC which not included in TNMs staging system have been reviewed, their effect on the prognosis of the patients and survival rate have been discussed. **Results:** This study identified 196 studies of prognostic factors, evaluation and assessment of OSCC. Site of the tumour 38 studies, tumour's thickness 52 studies, biological behaviour 26 studies, OSCC histological variant and effect in prognosis 38 studies, pattern of invasive front 19 studies, stromal lymphocytic infiltrations 23 studies. All previous factors are important in prognosis of OSCC and are not included routinely in oral cancer patient's evaluation and assessment. **Conclusion:** The outcome of OSCC is greatly influenced by the stage of the disease. The TNMs staging system is not including many factors which are strongly contribute to prognosis of oral cancer and period of survival rate

**ORAL SESSION 24: CANCER**  
**PREOPERATIVE ULTRASOUND FOR EVALUATION OF CLINICALLY N0 NECK IN ORAL**  
**SQUAMOUS CELL CARCINOMA**

*T. Creo Martínez<sup>1</sup>, A. Rollon Mayordomo<sup>2</sup>, V. Nuñez Vera<sup>3</sup>*

*<sup>1</sup>MD- PhD- DDS oral and maxillofacial surgeon, oral and maxillofacial surgery-  
Puerta del Mar Hospital- Cadiz, sevilla, Spain*

*<sup>2</sup>MD- PhD-oral and maxillofacial surgeon, oral and maxillofacial surgery-  
Virgen Macarena Hospital, sevilla, Spain*

*<sup>3</sup>MD oral and maxillofacial surgeon, oral and maxillofacial surgery Puerta del Mar Hospital- Cadiz,  
cadiz, Spain*

**AIMS**

Elective neck dissection (END) is usually recommended in oral cavity squamous cell carcinoma (OCSCC) with clinically node-negative neck (cN0). This study evaluate preoperative cervical ultrasonography in OCSCC and cN0 with the purpose of avoiding unnecessary END.

**METHODS**

Ninety patients treated with cancer excision +/- END were enrolled. The primary cutoff value was to treat 90% of necks with occult metastases and to reduce unnecessary END by 50%. The gold standard for comparison was histological results after END, or during follow-up at least 36 months.

**RESULTS**

The sonographic criteria statistically significant ( $P < 0.05$ ) in univariate analysis were: multilevel lymph node (LN), transverse diameter ( $T > 6.5$ mm), and the combination  $T > 6.5$  mm or longitudinal diameter ( $L$ )/ $T < 1.3$ ; and in multivariate logistic regression analysis were: combination  $T > 6.5$ mm and  $L/T < 1.3$ , LN in level II, and moderate-poorly differentiated OCSCC.

**CONCLUSIONS**

We conclude that preoperative ultrasound is useful to reduce at least 50% unnecessary END in OCSCC and truly negative neck.

**ORAL SESSION 24: CANCER**

**IS THERE A CORRELATION BETWEEN FAVORABLE DEFINITIVE MICROSCOPIC FINDINGS AND HEAD AND NECK CANCERS OUTCOME.**

*M. Bouzaiene<sup>1</sup>, T. Sirine<sup>1</sup>, H. Jouada<sup>1</sup>, C. Ezer<sup>1</sup>, T. Hajer<sup>1</sup>*

*<sup>1</sup>University Hospital Center, Oral and Maxillofacial Surgery, Mahdia, Tunisia*

Management of head and neck cancers is nowadays standardized due to the randomized trials achieved in big centers. The attitude of the clinicians in front of head and neck variety of cancers tend to be uniform all over the world regarding to the amount of articles published in the literature dealing with this subject. Distant safety margins following tumor resection don't give total insurance to suppose that patients are cured. Same fact is to extrapolate when neck dissection reveals that all the lymph nodes are negative. Meanwhile sometimes the follow up of the patient don't show any recurrence despite economic or intra tumor margin especially when we felt that we have been wide and far while performing tumor removal. Shall we believe histological reports in both situation and are there other factors influencing the post operative behavior of head and neck cancers. Both the tumor's stage and the type of differentiation have certainly an impact on prognosis. It happens that when we believe we have done well treating patients with the insurance that we have control on the disease, we felt deceived when the malignant lesion continue to progress or when the patients express recurrence in the mean follow up. Reviewing clinical cases in our routine work we intend to raise discussion about the unpredictable evolution of some head and neck treated cancers and share with you the feeling of failure whenever it looks like in some of your cases.

**ORAL SESSION 24: CANCER**  
**SQUAMOUS CELL CARCINOMA OF THE MAXILLA AND OCCULT METASTASIS:**  
**IMPLICATIONS FOR MANAGEMENT OF THE CLINICALLY NODE NEGATIVE NECK**

*E. Van Cann*<sup>1</sup>

<sup>1</sup>*University Medical Center Utrecht, Department of Head and Neck Surgical Oncology, Utrecht, Netherlands*

*Aims:* The management of the clinically node negative (N0) neck in patients with squamous cell carcinoma of the maxilla (MSCC) is a matter of debate. In this retrospective cohort study the incidence, survival of, and factors associated with occult metastases is determined in patients with MSCC and clinically N0 neck.

*Objective:* To evaluate the management of the clinically N0 neck in MSCC.

*Methods:* 77 consecutive patients with MSCC and a 'watch and wait' strategy for the clinically N0 neck were included. Clinical and histopathological data were registered from the medical records. The incidence of occult metastases was calculated. Cox regression analysis was used to assess the predictive value of the clinical and histopathological parameters. Survival was calculated using Kaplan-Meier survival analysis.

*Results:* Occult metastases occurred in 14.3% (11/77). Patients with T4 showed the highest rate of occult metastases (24.1%). 45% (5/11) of the metastases were located in the contralateral neck while the MSCCs did not cross the midline in these 5 patients. The hazard ratio for perineural growth was 5.39 (p=0.017) and for perivascular invasion 11.12 (p=0.003). 5 year overall survival was 62.3% and 5 year disease-specific survival was 87.0%.

*Conclusions:* We recommend elective treatment of the neck in patients with T4 MSCC with clinically N0 neck because of the high rate of occult neck metastases. Sentinel node biopsy may improve the detection of occult metastases in the ipsilateral and contralateral neck while avoiding the drawbacks of bilateral elective neck dissection or radiotherapy.

## **ORAL SESSION 24: CANCER**

### **SENTINEL NODE BIOPSY IN OLDER PATIENTS WITH ORAL CANCER**

*C. Schilling<sup>1</sup>, C. SENT Group<sup>2</sup>, M. McGurk<sup>1</sup>*

*<sup>1</sup>Guys and St Thomas' NHS Trust, Head and Neck Surgery, London, United Kingdom*

*<sup>2</sup>European SENT, Head and Neck Surgery, London, United Kingdom*

#### **Background**

Sentinel node biopsy (SNB) is an accurate staging procedure resulting in reduced morbidity compared to elective nodal clearance. Intuitively this is an ideal tool for older patients, however studies have shown they are less likely to be offered SNB than younger counterparts. We present data on older patients with oral cancer undergoing SNB into determine if there is any detriment to outcome or excess complications in this group.

#### **Methods**

Data from 403 patients enrolled in the Sentinel European Node Trial (SENT), a multinational observational study of patients with T1-T2 oral cancer undergoing SNB, was grouped by age. Patients over 70 years comprised 24% of the study group and were considered as older patients for this analysis. Variables such as performance status, disease stage and treatment complications were analyzed. Survival data including recurrence was reported at 3 years post treatment.

#### **Results**

Patients over 70 years had a lower baseline performance status but fared no worse in terms of complications and inpatient stay. There was no difference in the tumour characteristics, or sentinel node status. Overall survival but not disease related survival was reduced in the older patient ( $p= 0.0019$ ,  $p= 0.087$  respectively).

#### **Conclusion**

Our data shows that SNB is well tolerated a selected group of older patients with oral cancer and moderately reduced performance status. Future developments allowing on-table detection of metastasis will only increase the applicability of this technique to the ageing population.

## **ORAL SESSION 24: CANCER**

### **SENTINEL LYMPH NODE BIOPSY FOR HEAD AND NECK MELANOMA - A MULTICENTER STUDY EXAMINING SAFETY, EFFICACY AND PROGNOSTIC VALUE**

*B. Passmore-Webb<sup>1</sup>, B. Gurney<sup>2</sup>, S. Johns<sup>3</sup>, F. Sundram<sup>3</sup>, C. Newlands<sup>2</sup>, S. Sharma<sup>4</sup>*

*<sup>1</sup>University of Southampton, Faculty of Medicine, Southampton, United Kingdom*

*<sup>2</sup>Royal Surrey County Hospital, Oral and Maxillofacial Surgery, Guildford, United Kingdom*

*<sup>3</sup>University Hospital Southampton, Nuclear Medicine, Southampton, United Kingdom*

*<sup>4</sup>University Hospital Southampton, Oral and Maxillofacial Surgery, Southampton, United Kingdom*

#### Introduction:

Sentinel lymph node biopsy (SLNB) is a highly accurate staging procedure for malignant melanoma (MM). The use of SLNB in head and neck melanoma has recently gained popularity as it is thought to offer useful prognostic information and the upstaging of disease can allow patients to enter novel trial based targeted therapies.

Cranial nerves and variable lymphatic pathways can make SLNB in the head and neck challenging. The debate around the accuracy, safety and prognostic usefulness in the head and neck region continues. Our study examines the data and experiences from University Hospital Southampton (UHS) and Royal Surrey County Hospital (RSCH).

#### Methods

A retrospective case note analysis of 130 SLNB procedures was completed and the data analysed for safety, efficacy and prognostic value.

#### Results:

Lymphoscintigraphy accurately predicted the location of the sentinel node in 92% of cases. 56% of patients had only one sentinel node removed. 22.5% of SLNB procedures yield a node positive for metastatic melanoma. 94% of these patients subsequently underwent completion lymphadenectomy. The relative risks of a SLNB giving a positive result, are 0.53 and 3.1 for intermediate ( $1.0 \leq x \leq 4.0$ mm), and thick ( $>4$ mm) melanomas respectively. The false negative rate was 1.6%, with a single patient identified with regional recurrence following a negative SLNB. No cases of permanent spinal accessory or facial nerve palsy, or vascular damage were seen.

#### Conclusions:

This staging procedure offers prognostically useful information with a low risk of complication. SLNB in the head and neck is a safe, accurate and valuable procedure.

## **ORAL SESSION 24: CANCER**

### **STILL NO CONSENSUS? PROPHYLACTIC NECK DISSECTION FOR THE NODE NEGATIVE NECK IN PATIENTS WITH T1/T2 TONGUE SQUAMOUS CELL CARCINOMA**

*R.S. McCormick<sup>1</sup>, J. Adams<sup>2</sup>*

*<sup>1</sup>Newcastle Hospitals NHS Foundation Trust and City Hospitals Sunderland NHS Foundation Trust, Oral and Maxillofacial Surgery, Newcastle upon Tyne, United Kingdom*

*<sup>2</sup>Newcastle Hospitals HNS Foundation Trust, Oral and Maxillofacial Surgery, Newcastle upon Tyne, United Kingdom*

Prophylactic neck dissection (PND) for T1/T2 tongue squamous cell carcinoma (SCC) with node negative necks is warranted when tumour depth exceeds 3mm. Other risk factors; a non-cohesive invasive front, perineural invasion (PNI) and lymphovascular spread (LVE) may influence decisions. A prospective, randomised controlled trial demonstrates improved overall and disease free survival for patients undergoing PND, creating debate about current management. We aimed to examine management locally of the N0 neck in small tongue SCC and determine what influenced decisions.

A retrospective audit of 108 patients with T1/T2 tongue SCC treated at 2 local centres collected data on tumour size, whether PND was undertaken, depth of invasion, LVE, PNI, tumour grade, invasive pattern, resection margins, lymph node yield and treatment justification.

58% underwent PND. Of these, 81% had tumour depths greater than 3mm and 95% had one or more risk factors for occult nodal metastasis. 28% of PNDs demonstrated positive nodal disease. 65.4% of patients whose necks were managed conservatively had no risk factors for occult metastasis. A small tumour depth was the most common justification to watch and wait. Patient choice and co-morbidities were uncommon reasons. Few patients (<4%) not undergoing PND developed nodal disease.

Traditional risk factors, mainly depth of invasion continue to influence decisions around the need for PND. The minority benefit from the procedure and most may be exposed to unnecessary risk. PND on all patients is likely to have increased financial and morbidity costs. The advent of sentinel node biopsy could help address this difficult question.

## **ORAL SESSION 24: CANCER**

### **OCCULT LYMPH NODE METASTASES IN PATIENTS WITH MALIGNANT HEAD AND NECK NEOPLASMS: RETROSPECTIVE STUDY**

*A. Barbosa Silva<sup>1</sup>, R. Eusébio Freitas<sup>1</sup>, I. Pinto de Matos<sup>1</sup>, C. Maria da Mata Carracha<sup>1</sup>, H. Rodrigues<sup>1</sup>, P. Valejo Coelho<sup>1</sup>*

*<sup>1</sup>Centro Hospitalar Lisboa Central, Maxillofacial Surgery, Lisboa, Portugal*

#### **Introduction**

Oral squamous cell carcinoma has the propensity for occult lymph node metastasis in the early stage and they are a major prognostic factor. Preoperative neck staging is fundamental but there are no established imagiologic malignant criteria and up to one-third of lymph node metastases are smaller than 3 mm, which is the detection threshold of current available imaging techniques. The recurrence rate in the N0 neck is about 23.7%-42%.

#### **Objective**

Compare pre and postoperative neck staging in patients treated with elective neck dissection for malignant head and neck neoplasms.

#### **Methods**

It is a retrospective study including 59 patients treated with elective neck dissection at Centro Hospitalar Lisboa Central, between September 2009 and June 2014.

#### **Discussion**

Primary malignant lesions were commonly located in tongue (22%) and oral floor (22%). Preoperative neck staging was N0 in 38 (70,4%) patients, of whom 28 (73,7%) were in stage I and II. Histological diagnosis was well differentiated in 20 (37,0%) patients and moderated differentiated squamous cell carcinoma in 22 (40,1%). Occult lymph node metastases were detected in 11 cases of the 38 patients with preoperative N0 (25.6%) including one T1N0 (2,63%). Around 91,0% of pN+ were T2N0 and 63,6% were well differentiated squamous cell carcinoma.

#### **Conclusion**

Elective neck dissection is performed when the risk of metastases exceeds 15-20% in stage I and II tumors. It is fundamental to study those risk factors because nodal recurrence has more extracapsular dissemination and neck dissection in a second surgery has a lower success rate with a higher patient comorbidity.

## **ORAL SESSION 24: CANCER**

### **MANAGEMENT OF LYMPH NODE METASTASIS IN ORAL SQUAMOUS CELL CARCINOMA: OUR EXPERIENCE AND NEW PERSPECTIVES.**

*I. Ruiz-Martin<sup>1</sup>, P. Lopez-Fernandez<sup>2</sup>, M. Redondo-Alamillos<sup>2</sup>, M. Mejia-Nieto<sup>2</sup>, R. Gutierrez-Diaz<sup>2</sup>, C. Ballestin-Carcavilla<sup>3</sup>, M.J. Tabuenca<sup>4</sup>, G. Sanchez-Aniceto<sup>2</sup>*

*<sup>1</sup>Hospital 12 de Octubre, Oral and Maxillofacial Surgery Department, Madrid, Spain*

*<sup>2</sup>Hospital 12 de Octubre, Oral and Maxillofacial Surgery, Madrid, Spain*

*<sup>3</sup>Hospital 12 de Octubre, Pathology Department, Madrid, Spain*

*<sup>4</sup>Hospital 12 de Octubre, Nuclear Medicine Department, Madrid, Spain*

#### **Introduction**

Presence of lymph node metastases occurs in almost 50% of patients with Squamous Cell Carcinoma (SCC) of the oral cavity and represents the most important prognostic factor associated with 50% of lower survival rates.

#### **Material and Methods**

4-year retrospective review of patients with oral cavity SCC who underwent neck dissection (ND) from 2012 to 2015.

The aim of the study is to evaluate the influence of cervical lymph node metastasis with the prognosis besides the cervical surgical management in relation to the final pathologic stage in our population.

#### **Results**

64 patients including 37 males (58%) and 27 females (42%), mean age of 62 (range 33-86 years).

The sites of primary tumor are tongue 50%, gum 14%, floor of mouth 10%, retromolar trigone 14%, buccal 4.6%, lip 4.6% and Hard palate 1.5%.

55(86%) patients underwent ipsilateral ND and 9(14%) bilateral. 78% of them were Selective Neck Dissection (SND levels I-III/IV) and 22% Modified Radical Neck Dissection (MRND)

A majority of the patients were pathologically classified pT1-T2 81% (65% N0 and 34% N+) whereas 18% were pT3-T4 (50% N0 and 50% N+). 24(37.5%) were prophylactic ND with clinical and pathologic N0.

At the time of these analyses 17 (26.0%) patients had died, 5(29%) of them were initially pN0.

#### **Conclusions**

A better understanding of the patterns of lymph node metastasis promoted the use of selective neck dissection in selected patients.

Diagnostic procedure for mapping the neck N0 like Sentinel Lymph Node Biopsy allows an

accurate staging of cervical lymph node. New molecular markers are joining the conventional histopathology analysis to more accurately evaluate the presence of micrometastasis.

## **ORAL SESSION 24: CANCER**

### **DETECTION AND PROGNOSTIC IMPACT OF DISSEMINATED TUMOR CELLS IN LYMPH NODES OF PATIENTS WITH NODE-NEGATIVE HNSCC**

*C. Sproll<sup>1</sup>, A.K. Freund<sup>1</sup>, B. Behrens<sup>2</sup>, R.P. Lousa das Neves<sup>2</sup>, C. Tóth<sup>3</sup>, W. Kaisers<sup>4</sup>, N. Stoecklein<sup>2</sup>*

*<sup>1</sup>University Hospital Düsseldorf, Department of Oral- and Maxillo- and Plastic Facial Surgery, Düsseldorf, Germany*

*<sup>2</sup>University Hospital Düsseldorf, Department of General- Visceral and Pediatric Surgery, Düsseldorf, Germany*

*<sup>3</sup>University Hospital Heidelberg, Institute of Pathology, Heidelberg, Germany*

*<sup>4</sup>Heinrich-Heine-University Düsseldorf, Mathematical Institute, Düsseldorf, Germany*

**Aims:** We investigated the prevalence and regional Distribution of disseminated tumor cells (DTCs) in lymph nodes of patients with clinically and pathologically node- and metastasis-free (c/pN0 and c/pM0) Head and Neck Squamous Cell Carcinoma (HNSCC). Furthermore, we investigated the prognostic impact of the detection of these DTCs.

**Methods:** A total of 4.190 sections of 1.137 exactly mapped lymph nodes (LN) of 50 patients classified as negative on clinical examinations and conventional histopathology were prospectively analyzed with immunohistochemistry using antibodies directed against human CK5/14, against human CD44v6 and Pan-cytokeratin. The IHC results were correlated with clinico-pathologic parameters and clinical follow-up data.

**Results:** Seven micrometastases were detected in five patients. Furthermore, we detected 31 DTCs in 22 LN of 12 patients. 25 cells were positive for CK5/14, five were positive for AE1/AE3, and one cell was positive for CD44v6. Taken together, we detected micrometastases in 5 (10%) patients and DTCs in 12 (24%) patients. Overall, we found 15 (30%) patients to be positive for micrometastases or DTCs. The mode of spread of the tumor cells to the regional LNs was mainly according to the routes described for macrometastases of tumors of the upper aerodigestive tract, skipping of lymphatic stations was observed in five (33,33%) patients. We were not able to correlate our findings with any clinico-pathological or prognostic data.

**Conclusions:** Our results indicate that LN-DTCs occur frequently in pN0-HNSCC, but are not associated with a poorer prognosis. According to our data, performing selective neck dissections in cN0-HNSCC-patients seems to be appropriate.

## **ORAL SESSION 24: CANCER**

### **ORAL SQUAMOUS CELL CARCINOMA TREATMENT MODALITIES: A BAYESIAN STATISTICAL ANALYSIS FOR A BETTER CLINICAL PRACTICE**

*O. Iocca*<sup>1</sup>

<sup>1</sup>*Italy*

The main treatment modality of oral squamous cell carcinoma is surgical resection. On the other hand, treatment approaches combining in various ways surgery, chemotherapy and radiotherapy may become necessary depending on the different modalities of disease presentation. Tumor resectability, patient systemic conditions, pathological findings are among the many factors to consider in choosing the best treatment approach.

Our study aims to clarify the best approaches in the various clinical situation on the basis of a relatively new statistical technique which is the bayesian network meta-analysis.

In this way a comparison is attempted even for treatment regimens that were not previously compared directly.

RCTs only were identified for inclusion in the systematic review and subsequent statistical analysis. Overall Survival and local and distant recurrence of disease were selected as the end-points for comparison.

After a series of standard pairwise meta-analyses, a Bayesian Network-metaanalysis was performed to draw indirect conclusions on which treatment modality can be considered most likely the best compared to the others.

Bayesian Network-meta-analysis allowed to obtain a rank of intervention efficacy, this may be especially useful to suggest which surgical, chemotherapy or radiotherapy regimen is the most likely successful in specific clinical situations.

**ORAL SESSION 24: CANCER**

**CHROMOSOME INSTABILITY IN TUMOR RESECTION MARGINS OF PRIMARY OSCC IS A PREDICTOR OF LOCAL RECURRENCE.**

*D. Pierssens<sup>1</sup>, M. Borgemeester<sup>1</sup>, S. van der Heijden<sup>1</sup>, C. Peutz-Kootstra<sup>1</sup>, A. Ruland<sup>1</sup>, A. Haesevoets<sup>1</sup>, P. Kessler<sup>1</sup>, B. Kremer<sup>1</sup>, E.J. Speel<sup>1</sup>*

*<sup>1</sup>Maastricht UMC+, Maxillofacial Surgery, Maastricht, Netherlands*

*Background.* The local recurrence rate in oral squamous cell cancer (OSCC) hardly decreases. This is partly due to the presence of (pre)malignant cells in the remaining tissue after resection, that may lead to the development of a new tumor in time. Detection of histologically (pre)malignant cells in the tumor resection margins should predict these patients at risk for recurrence, however this appears to be difficult in routine practice. Purpose of this study was to apply easy-to-use molecular tests for more accurate detection of (pre)malignant cells in histopathologically tumour-free margins, to improve diagnosis of patients at risk.

*Methods.* 42 patients with firstly diagnosed, radically resected primary OSCC with histopathologically confirmed tumor-free resection margins (treated between 1994 and 2003) were included. Inclusion criteria comprised of follow-up  $\geq 5$  years, and radical surgery without postoperative treatment. Formalin-fixed paraffine-embedded tissue sections of 42 tumors, 290 resection margins, and 11 recurrences were subjected to fluorescence in situ hybridization (FISH) to examine chromosome 1 and 7 copy number variations (CNV), and to p53 immunohistochemistry (IHC).

*Results.* 11 out of the 42 patients developed a local recurrence within 5 years. FISH analysis showed that nine of eleven recurrences exhibited CI in at least one of the resection margins ( $p = 0.008$ ). P53 overexpression and routine histopathologic classification were not correlated with recurrent disease. The presence of CI in the resection margins revealed a significantly worse progression-free survival (log-rank  $p = 0.012$ ).

*Conclusions.* CI in the resection margins of OSCC can reliably identify patients at risk for developing a local recurrence.

## **ORAL SESSION 25: TRAUMA**

### **EVALUATION OF ONE-POINT FIXATION FOR ZYGOMATICOMAXILLARY COMPLEX FRACTURES USING UNSINTERED HYDROXYAPATITE/POLY-L-LACTIDE PLATE**

S. Nam<sup>1</sup>, K. Seyoung<sup>1</sup>, K. Yongbae<sup>1</sup>, P. Eunsoo<sup>1</sup>, L. Youngman<sup>2</sup>, C. Changyong<sup>3</sup>

<sup>1</sup>Soonchunhyang University Bucheon Hospital, Plastic and Reconstructive Surgery, Bucheon-si, Republic of Korea

<sup>2</sup>Soonchunhyang University Cheonan Hospital, Plastic and Reconstructive Surgery, Cheonan-si, Republic of Korea

<sup>3</sup>Soonchunhyang University Gumi Hospital, Plastic and Reconstructive Surgery, Gumi-si, Republic of Korea

**Background:** The purpose of this study is to evaluate the stability and aesthetic appearance outcomes of the one-point fixation using unsintered hydroxyapatite/poly-L-lactide plate for ZMC fracture patients.

**Methods:** From March 2014 to December 2014, 34 patients with ZMC fractures were treated by one-point fixation in zygomaticomaxillary buttress using unsintered hydroxyapatite/poly-L-lactide plate. The differences of the malar height between fractured side and unfractured side were evaluated using photogrammetric analysis with 3-dimensional camera (Morphius®). Evaluations for the difference of malar height between fractured side and unfractured side were performed at pre-operation(T0), postoperative 1 week(T1), postoperative 1 month(T2) and postoperative 3 months(T3). The paired t-test was used to compare the differences of malar height.

**Results:** : At 3 months postoperatively, all 34 patient achieved the satisfactory bony stability and symmetric malar appearance. At preoperatively, the differences of malar height between fractured side and unfractured side were -6.59 mm. It were 1,56 mm at 1 week postoperatively, -1.47 mm at 1 month postoperatively and -1.48 mm at 3 months after surgery. Comparing preoperatively and 1 week postoperatively, the differences of malar height were statistically significant ( $p<0.01$ ). The differences of malar height between 1 week and 1 month postoperatively were statistically significant ( $p<0.01$ ). There was no statistically significant between 1 month and 3 months postoperatively (Table 3).

**Conclusion:** This clinical study suggests that one point fixation using unsintered hydroxyapatite/poly-L-lactide plate provides reliable, satisfactory and safe clinical results in patients with ZMC fractures.

## **ORAL SESSION 25: TRAUMA**

### **MAXILLO-FACIAL INJURIES IN SYRIAN INJURED PATIENTS**

*H. Bahouth<sup>1</sup>, Y. Ghantous<sup>2</sup>, A. Rachmiel<sup>3</sup>, Y. Leiser<sup>3</sup>, A. Wolff<sup>3</sup>, I. Abu el-naa<sup>2</sup>*

*<sup>1</sup>Rambam Medical Campus, Surgery Department, Haifa, Israel*

*<sup>2</sup>The Baruch Padeah Medical Center- Poria, Maxillofacial Surgery, Tiberias, Israel*

*<sup>3</sup>Rambam Medical Campus, MaxilloFacial Department, Haifa, Israel*

Background: Syria is currently under the greatest world's humanitarian catastrophe and most dangerous geopolitical hotspot. So far there have been more than 400,000 dead and ten million displaced. A unique and severe type of injuries were observed in the Syrian civil war, most of them due to explosive, and shrapnel blast injuries.

Aim: to address the maxillofacial (MF) injuries, pathogenesis, severity, and MF injuries type.

Methods: demographic (age, sex), clinical (type of injury, injury severity score (ISS), length of hospital stay, length of intensive care unit -ICU- stay), mortality, time to admission and time to surgery, were evaluated retrospectively.

Results: The cohort included 300 patients; the mean age was 24.46 (3–66) years. Major sites of injury included extremities (45%), chest (15%), maxillofacial (12%), and abdomen (8%). The pathophysiology of the injuries were mainly blast injuries (shrapnel injuries in 72%), followed by penetrating injuries (gunshot 20%), median ISS was 20.65. The mean age of the MF group was 20.92 years (3-45), and the main pathophysiology of MF injuries were also blast injuries (shrapnel injuries 85%), however; the ISS of this group was 27.84. Soft tissue injuries and orbital fractures were the predominant type of injuries (18% and 16% respectively), and 15 patients (0.36%) needed trachiotomy.

Conclusions: MF injuries are common in injured Syrian patients. High ISS score reflects the extent of their injuries. Also, it is highly recommended to identify the pathophysiology of each injury. A detailed protocol based on our experience in the management of blast MF injuries, is described.

**ORAL SESSION 25: TRAUMA**  
**THE EAST GRINSTEAD CONSENT COLLABORATIVE: NATIONAL AUDIT OF CONSENT**  
**FOR MAXILLOFACIAL TRAUMA SURGERY**

*D. Sharma*<sup>1</sup>

<sup>1</sup>*Queen Victoria Hospital, Oral and Maxillofacial Surgery, East Grinstead, United Kingdom*

Introduction

Health professionals have a legal and ethical obligation to obtain valid informed consent before surgical procedures. Consent forms should accurately reflect this process. Use of abbreviations, symbols and acronyms can be misinterpreted and cause confusion. The East Grinstead Consent Collaborative (EGCC) is a trainee led group that has retrospectively audited consent for head and neck and orthognathic surgery. Following on from the success of these projects we aim to audit consent for trauma procedures.

Method

This project is primarily aimed at medical and dental students. We will contact and visit individual schools and surgical societies and expect to recruit 2 to 3 students per site, aiming for 50 students nationwide and data for 2000 patients with completion in June. The early draft of the consent forms is under development and we will consult the trauma SSIG for advice. Analysis will include timing of consent relating to operation date, general and specific risks and grade of surgeon obtaining consent.

Results

Early results from the head and neck and orthognathic projects have obtained data for 1400 patients in three months from 15 units in total. We hope to replicate this success for maxillofacial trauma.

Conclusion

The aim of the EGCC is to improve the documentation and process of consent for patients undergoing surgery. After we have established nationwide practices in consent for trauma patients, we will use this information to develop and standardise consent forms by providing an online tool that generates both patient and procedure specific consent forms.

## **ORAL SESSION 25: TRAUMA**

### **ASSESSMENT OF FRONTAL SINUS OBLITERATION/ CRANIALIZATION VERSUS PURE ORIF AFTER SEVERE HEAD INJURIES: MANITOBA EXPERIENCE**

*R. Elgazzar<sup>1</sup>, M. Anous<sup>1</sup>, A. Shah<sup>1</sup>*

*<sup>1</sup>College of Dentistry/ University of Manitoba, Oral and Maxillofacial Surgery/ DDSS, Winnipeg, Canada*

#### **Objectives:**

The magnitude of the frontal sinus fracture and the patency of the Nasofrontal duct (NFD) usually determines the type of surgical intervention. Different materials for the sinus and NFD obliteration have been reported. This retrospective study aimed at assessing the outcomes of frontal sinus obliteration / cranialization compared to pure frontal bone ORIF, after severe head injuries.

#### **Materials and Methods:**

A retrospective chart review of 273 skull injury cases that presented to Manitoba Health Sciences Center (HSC) Adult Emergency Department between years 2004-2014. Ethical approval was obtained from Bannatyne Health Ethics Board and from HSC. 228 (85.4%) Head injuries did not fulfill the inclusion criteria and were excluded due to various reasons. A total of 45 (14.6%) patients (43 male, 2 female; average age 38.6 years) had a significant frontal sinus fracture and fulfilled the inclusion criteria were included in this study. Patients' data were compiled and statistically analyzed.

#### **Results:**

Out of the 45 patient, 4 (9.7%) severely injured patients were treated conservatively, 17 (37.8%) patients had Open reduction and internal fixation procedure only, 8 (19.4 %) patients had Cranialization and 16 (38.8 %) treated by sinus obliteration. Surgical outcomes were reviewed and compared in all patients. 6 (14.6%) patients had moderate post-surgical complications directly related to their frontal sinus injury.

#### **Conclusion:**

Although the management of frontal sinus fractures has recently transitioned to a more conservative approach, Sinus cranialization and obliteration remain effective surgical choices. Various obliteration materials showed comparable results. Patients treated conservatively or with pure ORIF showed fewer complications.

## **ORAL SESSION 25: TRAUMA**

### **MATHEMATICAL ANALYSIS OF FRACTURE CONFIGURATION IN PREDICTING OUTCOME IN COMPLEX ANTERIOR SKULL BASE TRAUMA**

*K. Patel<sup>1</sup>, J. Stephens<sup>1</sup>, S. Holmes<sup>1</sup>, B. Evans<sup>2</sup>, S. Lecomber<sup>3</sup>, S. Holmes<sup>4</sup>*

<sup>1</sup>*Queen Mary University of London, Oral and Maxillofacial Surgery, London, United Kingdom*

<sup>2</sup>*University Hospital Southampton, Oral and Maxillofacial Surgery, Southampton, United Kingdom*

<sup>3</sup>*Queen Mary University of London, School of Biological and Chemical Sciences, London, United Kingdom*

<sup>4</sup>*Royal London Hospital, London, United Kingdom*

#### ***Background***

Craniofacial trauma involving the anterior skull base produces a heterogenous group of fracture patterns with variance in complexity and outcome. Variance is influenced by the biomechanical properties of the craniofacial construct and by the magnitude and vector of the impacting energy.

Fractal dimension and other linear metrics applied to individual fracture patterns allow mathematical quantification of fracture complexity, which could then be used to interrogate fracture severity, and compare this with neurological outcome.

#### ***Methods***

Eighty-one frontobasal fracture patterns from two UK major trauma centres were analysed. Fractal dimension, fracture length, number of termini, number of nodes and fracture angle allowed mathematical quantification of disruption. Analysis was then applied to two groups of patients, one with anteriorly based vectors of impact, the second with laterally-based vectors, and compared with neurological outcome using first recorded Glasgow Coma Score (GCS), requirement for intubation, and need for decompressive craniectomy.

#### ***Results***

As fractures increased in total path length, they became more complex and reticulated with anterior impacts than with lateral. This was associated with a significantly lower GCS, and increased requirement for intubation ( $p=6.8 \times 10^{-9}$  and  $p=0.002$  respectively) in the lateral group than anterior group.

#### ***Conclusion***

Fracture propagation and severity of head injury was different in anterior directed trauma compared to lateral directed trauma to the frontal bone. We suggest that the central region of the anterior skull base acts to primarily absorb impact force thereby behaving as a protective 'crumple zone' rather than a pillar of strength.

## **ORAL SESSION 25: TRAUMA**

### **META-ANALYSIS OF ORBITOZYGOMATIC COMPLEX TRAUMA. THE COST-BENEFIT RELATIONSHIP FOR THE USEFULNESS OF EYE CARE AND ORTHOPTICS SCREENING.**

*S. Crimi<sup>1</sup>, A. Calvo<sup>1</sup>, B. D'Alessandro<sup>1</sup>, M. Sergiampietri<sup>1</sup>, L. Catalfamo<sup>1</sup>*

*<sup>1</sup>University of Messina, Maxillo-Facial Surgery, Messina, Italy*

#### Aim

The aim of the study is to demonstrate the importance of the ophthalmologic and orthoptic evaluation in the management of the orbitozygomatic complex fractures in both stages: immediately and in the postoperative follow-up.

#### Methods

The ophthalmologic and orthoptic assessment at the "Time 0" (acute) and distance can have indeed a double advantage: from a clinical point of view to have objective data on the outcome of the surgery and from an ethical point of view to improve the "concordance" of the patient, showing him the outcome of the situation pre- and post- surgery.

Only in 2015 we have hospitalized 81 patients, 74 of whom underwent surgery.

In particular 40 fractures COMZ (54%), 23 fractures of the orbital floor (31%), 4 fractures interesting only the medial wall (5%), 1 NOE fracture (2%), 6 fractures Le Fort (8%).

#### Results

All patients were studied clinically and functionally with Hess-Lancaster screen before and after the surgical treatment. 7 patients were not treated surgically for the absence of clinical symptoms and diplopia studying the ocular motility and the Hess-Lancaster screen. 3 patients have a documented residual diplopia.

#### Conclusions

A thorough clinical study of ophthalmologic and orthoptics evaluation with Hess-Lancaster screen in the pre- and post-operative appear so necessary both in the indication of surgical timing, both in identifying the presence or onset of diplopia. The advantage of the Hess screen is the ability to express numerical values to the ocular motility and to assess the compensatory response of healthy eye.

**ORAL SESSION 25: TRAUMA**  
**EVALUATION OF COMPLICATION RATES FOLLOWING FRONTAL SINUS OBLITERATION**  
**USING ANTERIOR ILIAC CREST BONE VERSUS ABDOMINAL FAT GRAFT FOR THE**  
**MANAGEMENT OF FRONTAL SINUS FRACTURES**

*A. Eledeissi<sup>1</sup>*

*<sup>1</sup>Faculty of Oral and Dental Medicine - Cairo University, Oral and Maxillofacial Surgery, Cairo, Egypt*

**Summary:**

Treatment of frontal sinus fractures is of utmost importance because of the close proximity of the sinus to the periorbital region and the brain. Controversy remains regarding the ideal treatment of the frontal sinus. Most authors however would accept an open exploration and obliteration of the sinus when a displaced anterior wall fracture or injury to the nasofrontal duct is present. Thorough extirpation of the frontal sinus mucosa and occlusion of the nasofrontal duct are crucial for successful frontal sinus obliteration. Complications like mucoceles might develop late, and therefore long-term follow-up is mandatory.

**Aim:** The aim of this study was to evaluate clinically and radiographically whether the use of anterior iliac crest bone graft for obliterating the frontal sinus differ from obliterating with abdominal fat graft.

**Patients and methods:** Patients were selected from the Craniomaxillofacial Surgery Department, Nasser Institute hospital, Cairo, Egypt.

All patients had anterior table frontal sinus fractures planned for correction by obliteration with either abdominal fat or anterior iliac crest bone graft.

The patients were divided into two groups according to the material used for obliteration. The frontal sinus was obliterated with abdominal fat and anterior iliac crest bone graft in groups A and B respectively.

Clinical and radiographic follow-ups in the form of multislice CT scan radiographs were taken immediately post-operatively, and at twelve months post-operatively.

**Results:** Follow-up averaged 12 months. The results showed more complications related to the iliac crest group represented by pain, swelling, infection rates, and mucocele formation.

**ORAL SESSION 25: TRAUMA**

**FREE GRAFTING OF MANDIBULAR CONDYLE FOR PATIENTS WITH SUBCONDYLAR FRACTURES AND OSTEOCHONDROMAS**

*M. Emmerling<sup>1</sup>, G. Warburton<sup>1</sup>, J. Caccamese<sup>1</sup>*

*<sup>1</sup>University of Maryland School of Dentistry, Oral and Maxillofacial Surgery, Baltimore, USA*

**Aims:** Subcondylar fractures represent a unique challenge for the maxillofacial trauma surgeon. For fractures in which an open reduction is indicated, access may be inadequate to facilitate reduction and fixation. In these cases, we propose the use of a free grafting technique with explantation of the condylar segment with or without extra-oral vertical ramus osteotomy (EVRO). This approach can similarly be used for the treatment of osteochondromas of the condyle in which a condyle-sparing resection is performed. Despite controversy regarding the long term health of the condyle, we seek to demonstrate the viability of this technique through a retrospective analysis of treatment outcomes.

**Methods:** From 2006 to 2016, 22 patients were treated using free grafting of the condyle for both subcondylar fractures (15 patients) and osteochondroma (7 patients). Clinical outcomes for these patients were measured, including the presence of malocclusion, trismus, and post-operative infection. Follow-up imaging was examined for radiographic changes by comparison with baseline imaging.

**Results:** The average length of follow-up was 12.5 months. None of the 22 patients demonstrated signs of ankylosis or avascular necrosis on follow-up imaging. Some minor resorption was appreciated, but did not contribute to significant functional impairment. Two cases of malocclusion were attributed to failed repairs of concurrent Le Fort level fractures. Trismus was responsive to aggressive physical therapy and range of motion exercises.

**Conclusions:** Free grafting of the condyle and extracorporeal fixation with or without concurrent EVRO should be considered as a treatment option when more conventional approaches prove unsuccessful.

## **ORAL SESSION 25: TRAUMA**

### **NICKEL TITANIUM ALLOYS IN THE RECONSTRUCTIVE OSTEOSYNTHESIS OF ZYGOMATICO-ORBITAL COMPLEX FRACTURES**

*Y. Medvedev<sup>1</sup>, V. Nikolenko<sup>2</sup>, P. Petruk<sup>1</sup>, V. Volkova<sup>1</sup>, K. Polyakov<sup>1</sup>, B. Sounder Rajan<sup>1</sup>*

*<sup>1</sup>I.M. Sechenov First Moscow State Medical University, Department of maxillofacial surgery, Moscow, Russia*

*<sup>2</sup>I.M. Sechenov First Moscow State Medical University, Department of Human Anatomy, Moscow, Russia*

**Aims:** The aim of this study was to improve the efficiency of surgical treatment of patients with zygomatico-orbital complex (ZOC) fractures, through the use of nickel titanium alloy (NiTi) and titanium (Ti) implants, taking into account the nature of the traumatic bone involvement in affected area.

**Methods:** 120 patients with isolated zygomatico-orbital complex fractures were selected for the study. They were divided into three groups consisting of 40 patients each. Group I - Ti fixation devices and implants, Group II - NiTi fixation devices and implants, Group III – Ti+NiTi fixation devices and implants. The following parameters were compared: a) Number of rigid fixation points b) Duration of the surgery c) Complications d) Postoperative aesthetic appearance.

**Results:** Clinically and radiologically satisfactory results were achieved in 111

cases. In the late postoperative period we observed no secondary bone displacement, ophthalmic disorders and infection.

**Conclusions:** The main principle involved in the management of facial traumas, in particular ZOC fractures, is an accurate and complete restoration of the affected region. Different types of ZOC fractures may be formed depending on the impact force and degree of displacement of the bone. Damage to the maxillary sinus walls and orbital floor is a natural phenomenon seen in ZOC fractures. In cases of comminuted fractures we recommend the use of Ti micro- and mini-plates. In cases of not comminuted fractures – NiTi clamps. The use of mesh and porous NiTi implants in bone defect restoration is a simple and less traumatic method of reconstruction.

**ORAL SESSION 25: TRAUMA**

**THE ROLE OF MAXILLOFACIAL SURGEON IN WARTIME, SYRIA & YEMEN EXPERIENCES**

*N. Alasserj<sup>1</sup>*

*<sup>1</sup>PSMMC, MAXILLOFACIAL SURGERY, RIYADH, Kingdom of Saudi Arabia*

Oral and maxillofacial surgeons play an important role in the treatment of patients in wartime, because many wounded individuals suffer from injuries in the facial area, maxillofacial surgeons represent a vital part of the trauma team.

Since the beginning of the Syrian and Yemen uprising in 2011; war victims have been facing daily attacks from different weapons, firearms mainly resulting in serious life-threatening injuries. The aim of this presentation is to evaluate the patterns of these complex maxillofacial gunshot injuries sustained in the modern warfare by sampling a number of patients from the Syrian and Yemen casualties, those who have been treated by our team in the Syrian refugee camps in Turkey (September 2012) and Yemen refugee camps in Djibouti (May 2015) also to discuss the management of these unique injuries as they represent a new challenging entity in the trauma field encountered by maxillofacial surgeons today.

## **ORAL SESSION 25: TRAUMA**

### **STATISTICAL SHAPE MODELS IN COMPUTER ASSISTED SURGERY (SSM-CAS). THE USE OF REPLICATE DERIVED PATIENT SPECIFIC IMPLANTS (RDPSI) IN RECONSTRUCTION OF SKULL DEFECTS.**

*M. Prof. Dr. Dr. Metzger<sup>1</sup>, M.A. Füllinger<sup>1</sup>, S. Dr. Schlager<sup>2</sup>, R. Prof. Dr. Dr. Schmelzeisen<sup>1</sup>*

*<sup>1</sup>University of Freiburg, Oral and Maxillofacial Surgery, Freiburg, Germany*

*<sup>2</sup>University of Freiburg, Biological Anthropology Freiburg, Freiburg, Germany*

The virtual fracture reconstruction by segmentation, mirroring or registration is time consuming and limited in case of bilateral defects. Based on a statistical model of the midface a new method for fracture reconstruction is presented.

A statistical model of the skull was calculated using CT data. To check the accuracy of the virtual reconstruction a defect of the zygoma has been set. Three different methods for reconstructing were performed. In Group I, the reconstruction was done by mirroring the healthy to the defect site. In group II a rigid deformation of skull templates was applied. In Group III, the reconstructions were performed using the statistical model. The different reconstruction methods were compared to the original surface of the skull. The defect could be reconstructed by any method. For the unaffected side, accuracies were in Group I of 1.00mm +/- 0.34 mm; in Group II of 0.2mm +/- 0.12 mm and 0.79 mm in Group III of +/- 0.12 mm. Considering the reconstruction of the defect accuracies were in Group I of 1,10mm +/- 0,26mm; in Group II of 0,84mm +/- 0,26mm and in Group III of 1,67mm +/- 0,96mm. The results are highly significant.

The results show the high precision of the statistical model in fracture reconstruction. Asymmetries are already taken into account in the statistical model and affects the precision compared to mirroring. The simplified application, the possibility to reconstruct bilateral defects and the possibility to automatically generate patient-specific implants provide advantages over previous proceedings.

## **ORAL SESSION 25: TRAUMA**

### **FRONTAL SINUS FRACTURE, REVIEW OF MANAGEMENT AT UNIVERSITY HOSPITAL OF WALES CARDIFF**

*A. Al-Rikabi<sup>1</sup>, K. Dayananda<sup>1</sup>, A. Cronin<sup>1</sup>, S. Bhatia<sup>1</sup>*

*<sup>1</sup>University Hospital of Wales, Oral and Maxillofacial Department, Cardiff, United Kingdom*

#### **Introduction:**

Management of frontal sinus fractures is not clearly defined. There appears to be no consensus in the literature regarding the indications and timing of surgery and length of follow up. We reviewed the patients with frontal sinus injury treated at University Hospital of Wales to evaluate our practice

#### **Methods:**

Prospectively collected data for the last 5 years (2010-15) from the Maxillofacial surgery database of Cardiff and Vale UHB was accessed for patients with frontal sinus fractures. Patient records on clinical portal and scans were reviewed and these were confirmed with patients' medical notes. Management practices and the outcomes of patient care including complications were recorded.

#### **Results:**

43 patients were found to have frontal sinus fractures. Average patient age was 38 years with age range between 8-82 years. 7 of the patients were female and 36 were male. 38 fractures involved the anterior table, 25 fractures involved the posterior table and 23 fractures involved both tables. 5 patients had confirmed CSF leak and required surgical intervention, one of these was delayed surgical intervention following failed conservative attempt to manage the leak. 22 patients were managed conservatively, 21 were managed surgically.

#### **Conclusion:**

We present a retrospective pool of 43 patients who suffered frontal sinus fracture and were managed in the university hospital of Wales in Cardiff. We discuss the approach undertaken, the complications associated with these injuries and their management, both conservative and surgical. Finally, we present our recommendations for management of such injuries

**ORAL SESSION 26: EVIDENCE BASED PRACTICE  
ASSESSING THE COMPLIANCE OF SYSTEMATIC REVIEW ARTICLES PUBLISHED IN  
CRANIOFACIAL SURGERY WITH THE PRISMA STATEMENT GUIDELINES: A SYSTEMATIC  
REVIEW**

*T.E. Pidgeon<sup>1</sup>, G. Wellstead<sup>2</sup>, H. Sagoo<sup>3</sup>, D. Jafree<sup>4</sup>, A. Fowler<sup>5</sup>, R. Agha<sup>6</sup>*

*<sup>1</sup>Broomfield Hospital, Plastic Surgery, Chelmsford, United Kingdom*

*<sup>2</sup>Barts and the London School of Medicine and Dentistry,  
Barts and the London School of Medicine and Dentistry, London, United Kingdom*

*<sup>3</sup>Guy's- King's and St. Thomas' School of Medical Education, Guy's-  
King's and St. Thomas' School of Medical Education, London, United Kingdom*

*<sup>4</sup>University College London Medical School, University College London Medical School, London,  
United Kingdom*

*<sup>5</sup>Guy's and St. Thomas' NHS Foundation Trust, Guy's and St. Thomas' NHS Foundation Trust,  
London, United Kingdom*

*<sup>6</sup>Guy's and St. Thomas' NHS Foundation Trust, Plastic Surgery, London, United Kingdom*

**Introduction:**

Systematic review evidence within craniofacial surgery is increasing. The PRISMA checklist aids authors in reporting important features of systematic review evidence. Complete reporting of desirable features will aid the reader in assessing study biases. The PRISMA compliance of systematic review articles in craniofacial surgery was formally reviewed.

**Methods:**

A protocol was registered *a priori*. The 2013 Thomson-Reuters impact factor was used to identify three top craniofacial journals. A search for all systematic review articles published within the Journal of Cranio-Maxillo-Facial Surgery, Orthodontics and Craniofacial Research, and the Cleft Palate Craniofacial Journal from 1<sup>st</sup> May 2010 to 30<sup>th</sup> April 2015 was performed. Two independent researchers extracted data on; author, year, journal, the pathology and interventions examined and compliance of each review article with the PRISMA checklist.

**Results:**

62 systematic review articles proceeded to data extraction. The mean percentage of applicable PRISMA items that were met across all studies was 72.5% (range 28.6-96.2%). The areas of poorest compliance were with the declaration of a study protocol (19.4% of studies) and with declaration of funding (37.1% of studies). All studies (100.0%) described the rationale for the review, declared the results of any additional analyses and provided a summary.

**Conclusions:**

Compliance of secondary research within craniofacial surgery with areas of the PRISMA checklist could be improved. Knowledge of these areas could inform and educate future authors of systematic reviews within craniofacial surgery, and thus improve the specialty's evidence base.

**ORAL SESSION 26: EVIDENCE BASED PRACTICE**  
**DAY CASE ORAL & MAXILLO-FACIAL SURGERY - A FRIEND OR FOE ?**

*K.M. Tekel<sup>1</sup>, M. Sinthiya<sup>1</sup>, M. Monteiro<sup>1</sup>*

*<sup>1</sup>Royal Sussex County Hospital, Oral & Maxillo-Facial Surgery, Brighton, United Kingdom*

Due to the chronic shortage of inpatient beds in our hospital, we have been carrying out select maxillo-facial procedures under general anaesthesia as day cases which would normally be done as inpatients. We have retrospectively reviewed our database of day case procedures ranging from fixation of fractured zygoma to open temporomandibular joint surgery. We excluded all dentoalveolar procedures which are normally carried out as day cases.

Our criteria of inclusion were all non dentoalveolar maxillo-facial procedures carried out as day cases in which patients were discharged on the same day of surgery. We reviewed the complication rates, 30 day readmission rates and failure rates for the same day discharging. Our results indicate that in appropriately selected cases, day case surgery is a viable option. Our approach led to fewer cancellations of operations. However, larger studies are needed in order to explore this option furthermore.

**ORAL SESSION 26: EVIDENCE BASED PRACTICE  
INPATIENT MANAGEMENT OF CERVICOFACIAL INFECTION: A MULTICENTRE UK-WIDE  
SURVEY OF CURRENT MAXILLOFACIAL PRACTICE**

*A.A. Hennedige<sup>1</sup>, C. McDonald<sup>2</sup>, B. Dawoud<sup>3</sup>, R. Morrison<sup>4</sup>, K. Panayiotis<sup>5</sup>, K. Gilbert<sup>6</sup>, A. Henry<sup>7</sup>,  
R. Kulkarni<sup>8</sup>, J.A. McCaul<sup>9</sup>*

*<sup>1</sup>Central Manchester Foundation Trust, Maxillofacial Department, Manchester, United Kingdom*

*<sup>2</sup>Aintree University Hospital, Maxillofacial Department, Liverpool, United Kingdom*

*<sup>3</sup>Leeds University Medical School, School of Medicine, Leeds, United Kingdom*

*<sup>4</sup>Aberdeen Royal Infirmary, Maxillofacial Department, Aberdeen, United Kingdom*

*<sup>5</sup>Pennine Acute Hospitals NHS Trust, Maxillofacial Department, Manchester, United Kingdom*

*<sup>6</sup>LONDON NORTH WEST HEALTHCARE NHS TRUST, Head and Neck Research, London, United Kingdom*

*<sup>7</sup>University Hospital of Wales, Oral and Maxillofacial Surgery, Cardiff, United Kingdom*

*<sup>8</sup>Northampton General Hospital, Maxillofacial Department, Northampton, United Kingdom*

*<sup>9</sup>The Royal Marsden NHS Foundation Trust, Maxillofacial Department, London, United Kingdom*

**Introduction:**

Cervicofacial infections are common presentations in maxillofacial departments in the UK. Anecdotal evidence suggests variation in managing these patients, in particular with regard to the use of corticosteroids.

**Aims:**

Ascertain current UK maxillofacial practice managing patients admitted to hospital with cervicofacial infection. To establish whether equipoise exists or can be generated with regard to the benefits or otherwise of corticosteroid use for these patients.

**Methods:**

A questionnaire was designed, piloted and refined by a team of maxillofacial consultants and trainees to assess inpatient management of cervicofacial infections. This was distributed to maxillofacial surgeons throughout the UK via regional maxillofacial trainee research collaborative (MTReC) and at the 2016 Junior Trainees Group (JTG) conference via e-mail and paper hardcopy.

**Results:**

Questionnaires (n=265) were distributed to 17 maxillofacial units in East England, Kent, Surrey, Sussex, London, Mersey, North West, North East, Scotland, Severn, Trent, Wales, Wessex, West Midlands, Yorkshire and Humberside. Eighty six questionnaires were distributed at the JTG conference. We achieved a total response rate of 88.6% (n=311, range by unit 53.3% to 100%). JTG conference response rate was 99% (n=85). There are significant differences in practice between and within maxillofacial units in the UK in managing cervicofacial infections.

**Conclusion:**

These data provide evidence of practice variation regarding corticosteroid use for cervicofacial infection patients. MTReC now plan a snapshot audit of >1000 cases to be followed by a randomised controlled trial.

**ORAL SESSION 26: EVIDENCE BASED PRACTICE  
BACTERIOLOGICAL CULTURES OF DEEP NECK ABSCESSSES DO NOT CHANGE PATIENT  
OUTCOME**

*A. Terzic<sup>1</sup>, A. Garnier<sup>1</sup>, P. Scolozzi<sup>1</sup>*

*<sup>1</sup>HUG, Oral and Maxillofacial Surgery, Geneva, Switzerland*

Surgical incision and drainage are the most important steps in treating deep neck abscesses (DNA) of dental origin. In order to prevent spread of infection, incision and drainage is supported by administration of antibiotics. This is usually started immediately with the surgical treatment after that routine bacteriological swabs for bacteriological cultures are taken. In this context, we have observed that our bacteriological laboratory is not always specifying the bacteria found and that the results sometimes come back as “oral bacterial flora” without carrying out a desirable antibiogram. In order to gain more information if specific or non-specific bacteriological result impact the outcome of the patient, we stratified two groups: a first one with precise bacterial results with an antibiogram and a second one with “oral bacterial flora” without antibiogram. We then compared results for age, sex, the length of hospital stay, length of antibiotic treatment including hospital stay and post-hospitalisation time, presence of antibiotic resistances and the initial inflammatory parameters. We included 78 patients with DNA, clinically present pus at incision and identified dental origin. 69.4% had a detailed analysis while it was absent in 30.6%. There were no statistically significant differences between the two groups for the above mentioned parameters. We conclude that - although performed routinely – there is no evidence that bacterial swabs and an antibiogram improve the outcome and treatment for DNA of dental origin.

**ORAL SESSION 26: EVIDENCE BASED PRACTICE**  
**SEPSIS SIX – ARE WE MEETING THE TREATMENT GUIDELINES?**

*B. collard<sup>1</sup>, C. Pidgeon<sup>1</sup>, E. Botha<sup>1</sup>, V. Shadrack<sup>1</sup>, A. Rochester<sup>1</sup>, M. Esson<sup>1</sup>, A. McLennan<sup>1</sup>, J. Bowden<sup>1</sup>*

*<sup>1</sup>Royal Devon & Exeter Hospital, Oral and Maxillofacial Surgery, Exeter, United Kingdom*

**Introduction**

Cervicofacial infections commonly present to the Emergency Department. It is important to identify whether a patient is septic at the point of admission as early recognition and treatment of sepsis is key to improving outcomes. Guidelines have been produced by “The Surviving Sepsis Campaign” described as the Sepsis 6. We aim through a clinical audit to ensure we are implementing the Sepsis 6 guidelines within our clinical care.

**Method**

We retrospectively analysed the case notes of patients admitted with cervicofacial infections over a two month period. We documented if the sepsis 6 criteria was achieved for each patient.

We set as a standard that 100% of patients should achieve the sepsis 6 criteria and educated all members of the clinical team. Subsequently we reaudited for a further four months to close our audit cycle.

**Results**

Our initial results showed that the sepsis 6 criteria for cervicofacial infections were not routinely being achieved. Common parameters not met included recording blood lactate levels and hourly urine output measurement. Following intensive education of all clinical staff, our final audit cycle showed all patients were treated appropriately with respect to the sepsis 6 criteria.

**Conclusion**

Cervicofacial infections provide a challenging scenario for junior doctors. The early identification of sepsis is paramount in order to provide safe, effective and efficient care. Through simply educating the team we have shown that levels of care have improved and that patients have received appropriate treatment within the designated time frame.

**ORAL SESSION 26: EVIDENCE BASED PRACTICE**  
**THE RELEVANCE OF HEALTH RELATED QUALITY OF LIFE IN MAXILLOFACIAL SURGERY RESEARCH**

*V. Duarte<sup>1,2,3,4</sup>, M. Andreo<sup>5</sup>, F. Werlinger<sup>1,2</sup>*

*<sup>1</sup>Universidad de Chile, Instituto de Investigación en Ciencias Odontológicas- Area Salud Pública., Santiago, Chile*

*<sup>2</sup>Universidad Autónoma de Barcelona,*

*Programa de Doctorado en Investigación Biomédica y Salud Pública, Barcelona, Spain*

*<sup>3</sup>Hospital Carlos Van Buren, Emergency Department, Valparaíso, Chile*

*<sup>4</sup>Pontificia Universidad Católica de Valparaíso, Facultad de Ciencias, Valparaíso, Chile*

*<sup>5</sup>Corporación Municipal de Valparaíso, Dental Primary Care, Valparaíso, Chile*

The concept of quality of life is now seen as a construct composed of a number of domains; It described as the combination of living conditions and personal satisfaction weighted by the scale of values, aspirations and personal expectations.

The development of the study of health related quality of life (HRQOL) arises from the need for new clinical indicators, as part of the process of increasing life expectation, higher prevalence of chronic and degenerative diseases and changes in the perception of health and illness, resulting in a patient participation in decisions concerning their health. The aim of the study was to assess the relevance of quality of life related to health in clinical research in oral and maxillofacial surgery and characterize published reports

Four journals of highest impact factor in maxillofacial surgery were selected and research reports that assessed quality of life as main outcome measure were analyzed.

The search strategy was conducted in Medline database and included the following key concepts "quality of life", "health related quality of life", "health related quality of life assessment", "health related quality of life measurement" and "health related quality of life outcomes". The search was completed in December 2015, obtaining a total of 323 articles published. Two authors, a maxillofacial surgeon and epidemiologist examined the titles and abstracts and selected studies that met the inclusion criteria. From all of the articles published in the four selected journals less than 1.5% are studies related quality of life. However, an increase is observed in the last 5 years.

**ORAL SESSION 26: EVIDENCE BASED PRACTICE**  
**CROSS-CULTURAL ADAPTATION OF ORTHOGNATHIC QUALITY OF LIFE**  
**QUESTIONNAIRE: CHILEAN VERSION**

*V. Duarte<sup>1,2,3,4</sup>, F. Werlinger<sup>1,2</sup>, C. Vidal<sup>3</sup>, R. Osben<sup>3</sup>, O. Badillo<sup>3</sup>, S. Riviello<sup>3</sup>, M. Ferrer<sup>5</sup>,  
J. Villanueva<sup>6</sup>*

*<sup>1</sup>Universidad de Chile, Instituto de Investigación en Ciencias Odontológicas- Area Salud Pública, Santiago, Chile*

*<sup>2</sup>Universidad Autónoma de Barcelona, Doctorado en Metodología de la Investigación Biomédica y Salud Pública, Barcelona, Spain*

*<sup>3</sup>Hospital Carlos Van Buren, Maxillofacial Surgery Department, Valparaíso, Chile*

*<sup>4</sup>Pontificia Universidad Católica de Valparaíso, Facultad de Ciencias, Valparaíso, Chile*

*<sup>5</sup>IMIM Hospital del Mar Research Institute, Health Services Research Group, Barcelona, Spain*

*<sup>6</sup>Universidad de Chile., Maxillofacial surgery department, Santiago, Chile*

In the health area most instruments validated and useful in research are found in other languages other than Spanish. For this reason, to adapt these instruments to our environment requires a process to ensure equivalence conceptual, linguistic, semantic, technical and cultural cooperation with the original instrument, thus ensuring its cross-cultural applicability.

It is necessary that the instrument pass through a process of cultural adaptation, even knowing the psychometric properties of the instrument in the country of origin, because otherwise the instrument will not be valid in our midst; cross-cultural adaptation is oriented towards measuring the same phenomenon in different cultures, and its main objective is to produce an instrument that is appropriate for people who are destined research.

Since 1990 the focus of health care has changed in general to a greater emphasis on patient-centered outcomes, including quality of life related to health (HRQOL). The psychological impact on patients with facial deformities has to do with self-esteem and social acceptability among other relevant factors which not only affects the individual but also their family environment.

The Orthognathic Quality of Life Questionnaire (OQLQ) was developed in the UK in 2000 by Susan J. Cunningham, with the aim of evaluating the success of treatment in terms of its effect on the quality of life from the point of view the patients.

In this study we made a translation and cross-cultural adaptation of OQLQ with the aim of achieving equivalence means between culture.

**ORAL SESSION 26: EVIDENCE BASED PRACTICE  
BACKWARD PLANNING CONCEPT WITH STATIC COMPUTER-ASSISTED SURGERY IN  
IMPLANT-RETAINED ORBITAL RECONSTRUCTION (PRIMARY EXPERIENCE).**

*I. Suharschi<sup>1</sup>, T. Chkadua<sup>2</sup>, S. Abramian<sup>3</sup>, A. Arsenidze<sup>3</sup>, T. Cholokava<sup>2</sup>*

*<sup>1</sup>State University of Medicine and Pharmacy "Nicolae Testemitanu", Department of OMF Surgery, Chisinau, Moldova*

*<sup>2</sup>Central Research Institute of Stomatology and Maxillo-Facial Surgery, Department of congenital defects and deformities of maxillo-facial region and ectoprosthetics, Moscow, Russia*

*<sup>3</sup>Central Research Institute of Stomatology and Maxillo-Facial Surgery, maxillo-facial ectoprosthetics, Moscow, Russia*

**AIM.** To implement the CAD\CAM technologies in patients with implant retained orbital reconstruction at surgical and prosthetic stages.

**Materials.** During 2015-2016 5 (3 posttumoral irradiated, 2 posttraumatic) patients underwent implant anchored orbital reconstruction. In one case Cochlear Vistafix system, in one Nobel Branemark Mark III, in three Conmet extraoral system used. Epithesis were made in two cases Technovent (combined pigmentation) in three cases Ectosil (siloxane intrinsic pigmentation). Surgical stage was performed by using, intraoperative STL templates, respecting manufacturers protocols. Same concept was applied at prosthetic stage. Facial scanning, virtual reconstruction of the interest region (contralateral mirroring and symmetrisation or virtual freeform), retention system virtual design by the alignment of digital impression (freeform). STL guides (laser stereolithography) were printed to manufacture bar retention system, together with the substructure (ABS plastic). Ectoprosthesis model was printed from castable resin with minor wax deposition in epithesis margins. Pigment concentration determined subjectively. After prosthesis adjustment and installation, facial scanning performed to determine prosthesis manufacture accuracy, these data was used to determine implants installation accuracy using scan transfers. Secondary implant stability at prosthetic stage was determined with Periotest.

**Results.** No implants were lost during follow up period. Medium implant vector deviation was 0.4mm, angulation 3 deg. Epithesis medium vector deviation 0.7mm.

**Conclusion.** Due to few solved clinical cases conclusions cannot be specified. Deviation data relatively correspond to data from patients solved by same manner with auricular defects. Static computer assisted technologies at both rehabilitation stages allowed to reduce subjective manipulation to color determination, requesting special skills in guided surgery.

## **ORAL SESSION 26: EVIDENCE BASED PRACTICE**

### **MTREC: FACILITATING HIGH QUALITY SURGICAL RESEARCH THROUGH A TRAINEE LED COLLABORATIVE**

*A. Henry<sup>1,2</sup>, K. Gilbert<sup>3</sup>, R. Kulkarni<sup>1,2</sup>, C. McDonald<sup>4</sup>, B. Dawoud<sup>5</sup>, A. Hennedige<sup>6</sup>, R. Morrison<sup>7</sup>, P. Kyzas<sup>8</sup>, J. McCaul<sup>1,2</sup>*

*<sup>1</sup>The Royal Marsden Hospital, Maxillofacial Department, London, United Kingdom*

*<sup>2</sup>London North West Healthcare - Northwick Park Hospital, Maxillofacial Department, London, United Kingdom*

*<sup>3</sup>London North West Healthcare - Northwick Park Hospital, Maxillofacial Research, London, United Kingdom*

*<sup>4</sup>Aintree University Hospital, Maxillofacial Department, Liverpool, United Kingdom*

*<sup>5</sup>Leeds University Medical School, School of Medicine, Leeds, United Kingdom*

*<sup>6</sup>Central Manchester Foundation Trust, Maxillofacial Department, Manchester, United Kingdom*

*<sup>7</sup>Aberdeen Royal Infirmary, Maxillofacial Department, Aberdeen, United Kingdom*

*<sup>8</sup>Pennine Acute Hospitals NHS Trust, Maxillofacial Department, Manchester, United Kingdom*

#### **Aims:**

Developing research and innovation are a priority in surgery and clinical trials are a key part of this. Trainee research collaborative networks have career advantage for trainees and provide opportunity for high quality, large scale research, leading to better outcomes.

The Maxillofacial Trainee Research Collaborative (MTReC) launched in March 2015

#### **Methods:**

MTReC is a trainee led and delivered research initiative for OMFS, supported by BAOMS Council and BAOMS Research Lead, who is also the UK Royal College of Surgeons Maxillofacial Research Lead. In general, orthopaedic and neurological surgery, these initiatives have delivered large scale studies. MTReC offers the opportunity to run large-scale multi-centre audits and clinical trials by bringing together trainees into one collaborative group.

The MTReC launch held in March 2015 was well attended by trainees from across the UK. start-up research funding has been applied for, and the first project is underway.

#### **Results:**

Interest has been generated and enthusiasm for MTReC built through events and via social media. The first project; a UK-wide multi-centre survey of management of cervicofacial infection is completed and two more initiatives are in the planning phase. This survey achieved wide coverage and high response rate. It also established a research active national network of maxillofacial units for a snapshot audit of current practice and produced equipoise for a large scale multicentre trial of corticosteroid use in these patients.

**Conclusion:** MTReC is establishing a UK network of enthusiastic and energetic trainee surgeons, working together to deliver high quality research and improve outcomes.

**ORAL SESSION 26: EVIDENCE BASED PRACTICE  
WHAT CORE OUTCOMES SHOULD BE REPORTED IN CLINICAL RESEARCH AND IN  
HEALTHCARE FOR PATIENTS WITH CRANIOSYNOSTOSIS? METHODOLOGY FOR A  
SYSTEMATIC REVIEW AND INTERNATIONAL CONSENSUS STUDY**

*T.E. Pidgeon<sup>1</sup>, M.A. Suja<sup>2</sup>*

*<sup>1</sup>Broomfield Hospital, Plastic Surgery, Chelmsford, United Kingdom*

*<sup>2</sup>University of Warwick, Warwick Medical School, Warwick, United Kingdom*

**Background**

Craniosynostosis is a common craniofacial condition with an incidence of 1 in 1500-2000 live births. Variable outcome reporting exists within craniofacial surgery, which could potentially lead to undisclosed outcome reporting bias and poor consensus on the best treatments. Variable outcome reporting can be addressed with the adoption of a Core Outcome Set (COS), but at present none exists for craniosynostosis.

**Aim**

Identify a core outcome set that should be reported in all future clinical research and in the healthcare of patients with craniosynostosis

**Objectives**

Identify outcomes currently reported in the clinical research literature by studies investigating craniosynostosis. Determine if and how these outcomes are defined. Identify outcomes that key stakeholders in the care of patients with craniosynostosis believe to be of value in clinical research and in healthcare. Identify those outcomes from the above that are most highly valued by the international care community for patients with craniosynostosis, and identify how this group feels each outcome should be defined

**Methods**

This study will review the relevant literature to summarise what outcomes are reported in studies of craniosynostosis. It will subsequently discuss these findings with clinical and lay focus groups to explore what outcomes both clinicians and the public feel are important when we treat craniosynostosis. Finally, an international online survey will be circulated to craniofacial multidisciplinary teams worldwide to identify outcomes that are most highly valued by the international craniofacial care community.

**ORAL SESSION 26: EVIDENCE BASED PRACTICE  
EUROPEAN LAW FOR THE EUROPEAN MAXILLOFACIAL SURGEONS - V**

A. Ezsias<sup>1</sup>

<sup>1</sup>*Homerton University Hospital, Maxillofacial Department, London, United Kingdom*

Since the XIX Congress in Bologna in 2008 regular updates have been given at the Association biannual meetings on matters affecting colleagues who wish to practise in a different country to their own.

While major EU legislations which affect free movements and practice of EU graduates and nationals are relatively stable that cannot be said of the political, financial and humanitarian challenges which the EU has been facing in recent years.

It seems the centrifugal forces have been gaining momentum in recent years. The high watermark of enthusiasms for the European project of the 1980s and 1990s has considerably receded. Several countries object certain 'European policies', others raising barriers again which were dismantled many years ago in the name of ever closer union. In fact the UK openly runs the gauntlet by having elected a government which committed itself to a straight in-out referendum on her membership, which has become as divisive in political terms as the civil war was in the 1640s between King and Parliament. By the time of the Congress in London it might well be the case that it will be held in a country which is on the way out and at the beginning of negotiations which will fundamentally change the EU.

The author who is a maxillofacial surgeon as well as a Barrister at the English Bar will assess the situation from the legal point of view what the outcome of the referendum could mean for all of us in Europe.

**ORAL SESSION 27: RECONSTRUCTION  
INTEGRATION OF SOFT TISSUE PLANNING INTO CAD/CAM PROCEDURE FOR JAW  
RECONSTRUCTION**

*E. Goetze<sup>1</sup>, M. Gielisch<sup>1</sup>, M. Moergel<sup>1</sup>, B. Al-Nawas<sup>1</sup>*

*<sup>1</sup>University Medical Centre, Oromaxillofacial Surgery - Plastic Operations, Mainz, Germany*

**Aims**

In reconstruction of combined defects of the jaws osteocutaneous microvascular flaps are the method of choice. CAD/CAM procedures are here widely accepted but normally do not include the aspect of soft tissue. We present a method to include the perforator anatomy into 3D planning of microvascular fibula graft.

**Methods**

The peroneal perforators were imaged through doppler ultrasound and the localisation documented on a measurement device in respect of the lateral condyle. The so acquired positions were marked in virtual reality on the rendered fibula. 3D planning was conducted with Siplant O&O® (Materialise, Leuven, Belgium) respectively PlastyCAD® (3iemme, Cantù, Italy) with respect to the perforator localisations. Based on this surgical templates for leg and jaw were produced.

**Results**

Application to 28 patients (age: 53±16 years; gender ratio m:f 2:1) in 22 primary and 6 secondary reconstructions. Anatomical sites did not differ more than 1 cm from planned sites. Preoperative assessment helped in skin paddle design and place of osteotomy. Templates were applicable in all cases. Two grafts were lost completely. In 19 intraoral, 6 extraoral and 3 splitted cases 1 skin paddle was lost. 4 partial losses occurred. These incidents happened in patients with prior irradiation, severe nicotine abuse and advanced liver cirrhosis.

**Conclusion**

The integration of skin paddle perforators into a CAD/CAM planning is possible. It helps the design of the flap and can support intraoperative decision for paddle splitting.

**ORAL SESSION 27: RECONSTRUCTION**  
**FACE TRANSPLANT: LONG-TERM OUTCOMES**

*J.P. Meningaud<sup>1</sup>, R. Bosc<sup>1</sup>, B. Hersant<sup>1</sup>, P. Aguilar<sup>1</sup>*

*<sup>1</sup>APHP Henri Mondor Hospital, Department of Plastic and Maxillofacial Surgery, Paris, France*

**Introduction:** Over 38 face transplantations have been performed worldwide since 2005. The aim of this study was to give an update of the long-term outcomes of a series of patients operated in our Department between 2007 and 2011.

**Methods:** Outcomes of 7 face allotransplant recipients were reported on average 6 years after transplantation. All hospitalizations except for planned revision surgeries and immunosuppressive follow-up therapy were reported as serious adverse events (SAE). Patient health-related quality of life (HRQoL) was assessed quantitatively using the Short Form-36 (SF-36) health questionnaire.

**Results:** In all patients still alive after a long follow-up, the transplants were functional. Of the 7 patients, 2 died: one 63 days post-transplantation due to transplant destruction with concomitant pseudomonas infection and the second by suicide after battling depression. SAE were related to infection within the first month, acute rejection from 1 day to 7 years post-transplantation, and to side effects of immunosuppressive therapy. Recurrent rejection episodes justified maintenance therapy with high-dose steroids in all patients at the last follow-up visit, yet no patient developed diabetes. Three patients developed hypertension and a treatment was needed in one patient. In all patients, a significant reduction in glomerular filtration rate was noted. All recipients and their families well accepted their transplant. Improvements in social integration and HRQoL were highly variable among patients and depended on baseline levels and psychiatric comorbidities.

**Conclusion:** These long-term outcomes highlight the significant impact of patient social support and pre-existing psychiatric conditions on the risk/benefit ratio of facial transplantation.

**ORAL SESSION 27: RECONSTRUCTION  
THE LATISSIMUS DORSI FREE FLAP FOR COMPLEX MANDIBULAR RECONSTRUCTION  
IN 110 CASES**

*T. Zrnc- MD- DMD-<sup>1</sup>, M. Pau- MD<sup>1</sup>, M. Feichtinger- MD -DMD- PhD<sup>1</sup>, J. Wallner- MD- DMD<sup>1</sup>,  
K. Reinbacher- MD- DMD<sup>1</sup>, H. Kärcher- MD- DMD- PhD- Prof. em.<sup>1</sup>, K. Schwenzler-Zimmerer-  
MD- DMD- PhD- Univ.-Prof.<sup>1</sup>*

*<sup>1</sup>LKH-Univ. Klinikum Graz, Dpt. of Oral and Maxillofacial Surgery, Graz, Austria*

**Objective:** This retrospective analysis is performed to proof the reliability and versatility of the osseomyocutaneous Latissimus dorsi free flap for reconstruction of complex mandibular defects.

**Methods:** A retrospective analysis of 139 patients, which underwent mandibular reconstruction with osseous and osseomyocutaneous scapular free flaps at our department between 01/1983 and 05/2012. Personal data, including sex, age and histopathological diagnosis, were recorded. Extent of the mandibulectomy, concomitant procedures, e.g. neck dissection or additional flap, length of bony graft, skin paddle dimensions, pedicle of the scapular flap, recipient vessels and type of anastomosis were also registered. Complications, submission to adjuvant radiotherapy, appliance of permanent percutaneous endoscopic gastrostomy, and osseointegrated implants completed the data collection. 29 patients were excluded due to incomplete medical data. Complete data were obtained for 110 patients (81 male, 19 female; age range: 31–71y, mean: 54.5y). Statistical evaluations were performed using odds ratio and relative risk; p-values were evaluated using logistic regression or Fisher's exact test.

**Results:** 96(87%) underwent resection for malignancies, 11 (10%) due to osteoradionecrosis, one (0,9%) patient due to a bisphosphonate-associated osteonecrosis, one (0,9%) presented with an eosinophilic granuloma. Mandibular defects were classified according to the scheme proposed by Urken et al.

**Conclusion:** This study confirms that osseomyocutaneous scapular flaps yield a great amount of soft tissue, good length and good bone stock quality, component independency, and a large arc of rotation length and gauge of pedicle. These features probably make it the most versatile free flap for reconstruction of large composite mandibular defects, treatment of osteoradionecrosis and salvage surgery.

## **ORAL SESSION 27: RECONSTRUCTION**

### **3D VIRTUAL PLANNING IN FINLAND'S FIRST FACE TRANSPLANTATION**

*J. Törnwall<sup>1</sup>, J. Horell<sup>2</sup>, A. Lindford<sup>3</sup>, P. Lassus<sup>4</sup>*

*<sup>1</sup>Helsinki University Hospital, Oral and Maxillofacial Surgery, Helsinki, Finland*

*<sup>2</sup>Planmeca, Medical Devices, Helsinki, Finland*

*<sup>3</sup>Helsinki University Hospital, Plastic Surgery, Helsinki, Finland*

*<sup>4</sup>Helsinki University Hospital, Plastic Surgery, Helsinki, Finland*

Traditional reconstruction methods of facial defects are particularly challenging due to the complexities of facial anatomy and function. When compared with conventional reconstructive methods, composite tissue allo-transplantation provides a major advantage by replacing missing or damaged structures with anatomically identical tissues, restoring form and function. To get the best possible results, the correct alignment of the bony structures is essential. Preoperative planning is therefore crucial. Herein, we present a new technique using computer-aided design and manufacturing (CAD-CAM) that was used in Finland's first face transplantation case. The recipient patient had major nasal, zygomatico-maxillary and mandibular defects. Pre-operative CT data was used to determine the size and shape of the defect. The CAD-CAM method was then used to design the facial skeleton osteotomy lines in order to create the defect necessary to reconstruct. The donor patient's CT data was used to create a 3D image and by adjusting the recipient osteotomy guides to the donor face bone osteotomies were planned virtually during the same day the donor face harvesting operation. Patient-specific sawing guides were manufactured prior to surgery and were then used to obtain maximal accuracy in the reconstruction. The donor face transplant included the nose, zygomatico-maxillary complex and mandible from the angles. The fitting and fixation of the mid-face bony skeleton was fast and did not require any bony trimming. We present a method for creating custom made sawing guides for the recipient patient and for the donor patient to optimize the accuracy of the skeletal restoration in face transplantation.

**ORAL SESSION 27: RECONSTRUCTION**

**COST ANALYSIS OF FREE FLAP SURGERY IN HEAD AND NECK RECONSTRUCTION**

*K. Tewfik<sup>1</sup>, C. Copelli<sup>1</sup>, P. Chiarelli<sup>2</sup>, L. Cassano<sup>1</sup>, N. Pederneschi<sup>1</sup>, S. Catanzaro<sup>1</sup>, A. Manfuso<sup>1</sup>, U. Riccelli<sup>1</sup>, R. Cocchi<sup>1</sup>*

*<sup>1</sup>Ospedale "Casa Sollievo della Sofferenza", Maxillo facial Surgery, San Giovanni Rotondo FG, Italy*

*<sup>2</sup>Ospedale "Casa Sollievo della Sofferenza", Management department, San Giovanni Rotondo FG, Italy*

Free flap surgery is overall considered the gold standard for head and neck reconstruction.

Despite of this, microsurgery is not performed in any center because of surgical skills and training needed and for elevated equipement costs and surgical devices. Aim of the study is to evaluate costs of free flap procedures in head and neck reconstruction at Casa Sollievo della Sofferenza (San Giovanni Rotondo, Italy). This evaluation is based on "Hospital Patient Costing" method highlighted on Health Activity-based Costing study, that reach the single hospitalization cost for each activities (ward costs, operation theatres costs, intensive care costs) divided to productivity factors (surgeons, nurses, other health operators, drugs, devices). These results are compared to standard benchmark cost evaluated from a statistical analysis from an Italian Hospital Network.

**ORAL SESSION 27: RECONSTRUCTION  
RECONSTRUCTION OF PAROTID AREA SURGICAL DEFECTS WITH LOCAL AND  
REGIONAL FLAPS**

*N. Papadogeorgakis<sup>1</sup>, I. Papadiochos<sup>2</sup>, E. Pappa<sup>3</sup>, E. Kalfarentzos<sup>2</sup>, S. Sarivalasis<sup>1</sup>,  
C. Ekonomou<sup>1</sup>, L. Goutzani<sup>1</sup>*

*<sup>1</sup>Evangelismos Hospital- Athens, Oral and Maxillofacial Surgery, Athens, Greece*

*<sup>2</sup>Evangelismos Hospital- Athens, Oral and Maxillofacial Surgery, Spata- Athens, Greece*

*<sup>3</sup>Barking- Havering and Redbridge University Hospitals NHS Trust,  
Oral and Maxillofacial Surgery, London, United Kingdom*

**Aims:** Surgery of the parotid gland is associated with a variety of postoperative defects. The aim of this study was to retrospectively review our experience regarding reconstruction of post-ablative defects in parotid area.

**Patients and Methods:** In this study, we enrolled 445 patients who were subjected to surgery for benign (n=394) and malignant parotid tumors (n=51). Type of reconstruction was depended on the size of surgical defect. Small-size defects (n=260) in patients with benign tumors were mainly closed by primary intention with dissection of parotid fascia/SMAS. The rest of the patients with benign tumors were reconstructed with: porcine acellular dermal matrix (n=36), bipediced sternocleidomastoid flap (n=76), and sternocleidomastoid muscle flap (n=22). Reconstruction of surgical defects as a result of malignant disease was achieved with: porcine acellular dermal matrix (n=6), McFee advancement flap (n=14), cervico-facial rotational flap (n=3), sternocleidomastoid muscle flap (n=21), and pectoralis major myocutaneous flap (n=7). Three patients underwent temporal bone and mandibular reconstruction as a result of advanced disease.

**Results:** All patients had acceptable reconstruction of parotid area volume in terms of facial symmetry and contour preservation. Two patients (0.44%) postoperatively presented with clinically evident Frey's syndrome, while six patients (1.3%) developed partial skin necrosis of the flap which was conservatively treated .

**Conclusions:** Reconstruction following surgery for parotid tumors is mandatory in order to avoid functional problems and severe aesthetic disfigurement. Local and regional flaps provide satisfactory skin color/texture match with relatively decreased morbidity of donor site and low complication rates.

## **ORAL SESSION 27: RECONSTRUCTION**

### **RECONSTRUCTION OF COMPOSITE MIDFACIAL DEFECTS WITH CHIMERIC DCIAP-FL**

*A. Bedogni<sup>1</sup>, G. Bettin<sup>2</sup>, G. Saia<sup>2</sup>, L. De Leonardis<sup>2</sup>, F. Apollon<sup>2</sup>, M. Sagron<sup>2</sup>, G. Ferronato<sup>2</sup>*

*<sup>1</sup>University, Neurosciences-DNS, Padova, Italy*

*<sup>2</sup>University of Padova, Neurosciences-DNS, Padova, Italy*

**Aims:** Reconstruction of composite midfacial defects is a real challenge and standard free flap design may not satisfy the reconstructive needs when the defect also involves the facial soft-tissues. We aim at presenting and discuss the pro and cons of the use of the chimeric DCIAP-fl.

**Materials and Methods:** between April 2010 - February 2016, 4 patients underwent complex midface reconstruction with chimeric DCIAP-fl. They were two males and 2 females aged 56, 65, 36 and 70 years respectively. The largest size of bone and facial skin defects were 9x6.5cm and 14x10cm respectively. The nose was included in the resection in 2 cases. The skin paddle of the flap was based on a reliable muscle perforator arising from the DCIA pedicle and piercing the transverse, IOM and EOM at the level of the iliac tubercle. A retrograde approach was used and the ASIS spared to increase the pedicle length. Piezosurgery was used to shape the bone at the donor site. The skin paddle was alternatively used to resurface the oral lining, dehepithelialized to improve the final cheek contour or used to repair the facial skin defect. End-end anastomoses were performed to the facial artery and External jugular vein in all cases.

**Results:** the mean surgical time was 12 hours. All flaps survived; partial skin loss (<20%) occurred once. The donor site healed without sequelae.

**Conclusion:** chimeric DCIAP is a versatile flap that can simultaneously restore both the bone framework and the surrounding soft-tissues in composite midfacial defects.

## **ORAL SESSION 27: RECONSTRUCTION**

### **MICROVASCULAR RECONSTRUCTION IN OVER 90 CANCER PATIENTS: DOES A LIMIT EXIST?**

*G.M. Lombardi<sup>1</sup>, A. Campobassi<sup>1</sup>, M. Gessaroli<sup>1</sup>, M. Bassi<sup>1</sup>, P.R. Giacomini<sup>1</sup>, M. Manfredi<sup>1</sup>, N. Tomasetti<sup>1</sup>*

*<sup>1</sup>Hospital M. Bufalini Cesena, Unit of Maxillo Facial Surgery, Forlì, Italy*

**Purpose:** Using two clinical cases as a springboard we will propose some questions in order to fix a dynamic and personalized approach to a new emerging social need: the surgical treatment of head and neck cancer in over 90 years old patients.

**Methods:** Review of 2 recent cases of squamous cells cancer (SCC) of the oral cavity in over 90 aged patients. Comorbidity, past medical history, social status, medications were recorded. Assessment of physiologic age and treatment benefit and risks was done, the surgical approach described.

**Results:** Both patients were affected by SCC of the left cheek with jaws involvement. An ALT free flap and an intraoral rotation of buccal fat pad were performed in a 95 and 93 years old patients, both had a very good morphologic and functional recovery.

**Discussion:** Which are the parameters to be considered in the treatment decision making? Which kind of physiologists have to be involved in it? How can we give to patient and relatives the best informations in order to decide about the more adequate treatment?

**Summary:** The cure of over 90 years old patients with a good physiologic age is a new challenge of head and neck surgery. We believe that the geriatric oncologist could be really useful in support to the surgeon and anaesthesiologist during the decision making path. The goal still remain a personalized approach, case by case, able to consider all new emerging and social needs of an aging population.

**ORAL SESSION 27: RECONSTRUCTION  
TEMPORALIS MUSCLE FLAP FOR MAXILLARY RECONSTRUCTION; WHEN FREE FLAP IS  
NOT AN OPTION**

*M. della monaca<sup>1</sup>, A. Battisti<sup>1</sup>, A. Cassoni<sup>1</sup>, P. Priore<sup>1</sup>, G.M. Prucher<sup>1</sup>, O. Rajabtork Zadeh<sup>1</sup>,  
V. valentini<sup>1</sup>*

*<sup>1</sup>La Sapienza, Maxillo - Facial Surgery Unit, roma, Italy*

**AIM**

Management of maxillary defects is among the most challenging and controversial areas of head and neck oncologic reconstruction. One of the fundamental problems with reconstructing the maxilla is that defects created by oncological resection are highly variable. Though bone free flaps represent the best option, not all the patients are fit for microvascular reconstruction surgery. Aim of this study is to evaluate the outcome of maxillary reconstruction with temporalis muscle flap.

**Methods**

Retrospective analysis of medical charts from 2000 to 2015 was performed. Only the patients that underwent maxillary reconstruction with temporalis muscle flap were included. Each maxillary defect was classified according to Brown's classification. Complications of the donor and recipient site, the need for further secondary reconstructive procedures and functional and aesthetic outcomes were analyzed.

**Results**

From 2000 to 2015, 120 reconstruction of maxillary defect were performed. No flap was lost. The major complication encountered are wound dehiscence, oro – nasal fistula, donor site deformity. Almost 70% of the patient underwent dental prosthetic rehabilitation.

**Conclusion**

Whenever free flap reconstruction is not feasible, pedicled temporalis muscle flap is a reliable option for maxillary reconstruction.

**ORAL SESSION 28: ORBITAL SURGERY**

**FOREHEAD TRAUMA AND OPTIC CANAL – FINITE ELEMENT ANALYSIS OF ANTERIOR SKULL BASE AND ORBIT ON CAUSES OF VISION IMPAIRMENT**

*H. Huempfer-Hierl<sup>1</sup>, A. Bohne<sup>1</sup>, I. Sterker<sup>2</sup>, T. Hierl<sup>1</sup>*

*<sup>1</sup>University Hospital of Leipzig, Oral and Maxillofacial Plastic Surgery, Leipzig, Germany*

*<sup>2</sup>University Hospital of Leipzig, Department of Ophthalmology, Leipzig, Germany*

**Aims:** Clinical studies report on vision impairment after blunt frontal head trauma. A possible cause is damage to the optical nerve bundle within the optic canal due to microfractures of the anterior skullbase leading to indirect traumatic optic neuropathy.

**Methods:** A finite element study simulating impact forces on the paramedian forehead in different grades was initiated. The setup consisted of a high resolution skull model with about 740,000 elements, a blunt impactor and was solved in a transient time-dependant simulation. To increase realism individual bone material parameters were calculated for each volume element.

**Results:** Results showed stress propagation from the frontal impact towards the optic foramen and the chiasm even at low force fist-like impacts. Higher impacts produced stress patterns corresponding to typical fracture patterns of the anterior skullbase including the optic canal. Transient simulation discerned two stress peaks equalling oscillation.

**Conclusions:** It can be concluded that even comparatively low stresses and oscillation in the optic foramen may cause micro damage undiscerned by CT or MRI explaining consecutive vision loss. Higher impacts lead to typical comminuted fractures, which may affect the integrity of the optic canal. Finite element simulation can be effectively used in studying head trauma and its clinical consequences.

## ORAL SESSION 28: ORBITAL SURGERY

### A COMPARATIVE STUDY OF POROUS POLYETHYLENE VERSUS ABSORBABLE POLY-L/DL-LACTIDE PLATE IN RECONSTRUCTION OF ISOLATED MEDIAL ORBITAL WALL FRACTURE

*S. Nam<sup>1</sup>, Y. Kim<sup>1</sup>, E. Park<sup>1</sup>, Y. Lee<sup>2</sup>, C. Choi<sup>3</sup>*

*<sup>1</sup>Soonchunhyang University Bucheon Hospital, Plastic and Reconstructive Surgery, Bucheon-si, Republic of Korea*

*<sup>2</sup>Soonchunhyang University Cheonan Hospital, Plastic and Reconstructive Surgery, Cheonan-si, Republic of Korea*

*<sup>3</sup>Soonchunhyang University Gumi Hospital, Plastic and Reconstructive Surgery, Gumi-si, Republic of Korea*

**Background:** The purpose of this study was to compare our clinical findings on the use of porous polyethylene and absorbable poly-L/DL-Lactide plate to repair isolated medial orbital wall fracture.

**Methods:** Between March 2009 and December 2013, 423 patients with medial orbital wall fracture were treated using the transcaruncular approach. Patients with bilateral blow out fracture or inferior orbital wall fracture or orbital roof fracture or zygomaticomaxillary complex fracture were excluded from this study. 111 patients were lost to follow-up for non-study related reasons. Of the remaining 312 patients, the difference of enophthalmos between injured side and uninjured side was evaluated at preoperative (T0), 1 week (T1), 1 month (T2), 3 months (T3), 6 months (T4) and 12 months (T5) after surgery.

**Results:** 203 patients were treated using absorbable poly-L/DL-lactide plate and 99 patients were treated using porous polyethylene. In absorbable poly-L/DL-lactide plate group, there were statistically significant difference between all evaluated times ( $P < 0.01$ ) except between 6 months and 12 months after surgery ( $P=0.318$ ). In porous polyethylene group, there were statistically significant difference between all evaluated times ( $P < 0.01$ ) except between 6 months and 12 months after surgery ( $P=0.158$ ). When we compared between porous polyethylene and absorbable poly-L/DL-lactide plate groups, there were statistically significant differences at 1 months and 6 months after surgery ( $P < 0.01$ ).

**Conclusion:** Porous polyethylene and absorbable poly-L/DL-lactide plate have no statistically significant difference in postoperative enophthalmos. Therefore, porous polyethylene and absorbable poly-L/DL-lactide plate have equal effect and safety in medial orbital wall reconstruction.

## **ORAL SESSION 28: ORBITAL SURGERY**

### **THE COMBINATION OF PATIENT SPECIFIC ORBITAL TITANIUM IMPLANTS, FAT-DERMIS-GRAFT AND SYNTHETIC EYE PROSTHESIS FOR THE TREATMENT OF ANOPHTHALMIC ENOPHTHALMOS.**

*F. Wilde<sup>1</sup>, F. Mascha<sup>1</sup>, A. Schramm<sup>2</sup>, R. Müller-Welt<sup>3</sup>, K. Lipke<sup>4</sup>*

*<sup>1</sup>Military Hospital Ulm- Academic Hospital of the University of Ulm,  
Oral and Maxillofacial Surgery- Facial Plastic Surgery, Ulm, Germany*

*<sup>2</sup>Ulm University & Military Hospital Ulm- Academic Hospital of the University of Ulm,  
Oral and Maxillofacial Surgery- Facial Plastic Surgery, Ulm, Germany*

*<sup>3</sup>Ruth Müller-Welt GmbH, Institut für Künstliche Augen, Stuttgart, Germany*

*<sup>4</sup>Military Hospital Ulm- Academic Hospital of the University of Ulm, Oculoplastic surgery, Ulm,  
Germany*

Aesthetic satisfactory long term results in the treatment of an anophthalmic enophthalmos are still a challenge. In particular, the filling of the supratarsal fold turned out to be unsatisfactory frequently.

In a multidisciplinary approach, integrating maxillo-facial-surgery, oculoplastic surgery and ocularistic art, it was possible to improve our long-term results considerably.

The developed algorithm consists out of (1) implantation of a patient specific orbital titanium mesh-implant, (2) fat-dermis-grafting in the eye bulb and (3) manufacturing of a synthetic eye prosthesis.

In the center of the algorithm stands the reduction of the orbital volume. This can be achieved by implantation of a CAD/CAM patient specific orbital titanium mesh-implant. The design of the titanium mesh leads to effect that the eye bulb will be pushed cranial and anterior.

Hereby, the volume of the additional fat-dermis-graft, which is implanted in the eye bulb additionally and which is usually underlying considerable resorption can be reduced significantly.

By the final functional shaping and artistic coloring of a synthetic eye prosthesis, it is possible to achieve stable and satisfactory long-term results.

**ORAL SESSION 28: ORBITAL SURGERY  
COMPARISON OF THE OUTCOMES OF ORBITAL FRACTURE REPAIR WITH AND  
WITHOUT SURGICAL NAVIGATION SYSTEM. A PROSPECTIVE COHORT STUDY WITH  
HISTORICAL CONTROLS**

*E. Zavattero<sup>1</sup>, G. Gerbino<sup>1</sup>, F. Roccia<sup>1</sup>, F. Baietto<sup>1</sup>, R. Benech<sup>1</sup>, G. Ramieri<sup>1</sup>*

*<sup>1</sup>A.O. CITTA' DELLA SALUTE E DELLA SCIENZA- P.O. MOLINETTE, Surgical Science-  
Maxillofacial Unit, TORINO, Italy*

**Aims:** In severe orbital fractures, restoration of orbital shape and volume is required to avoid diplopia and posttraumatic enophthalmos. The purpose of this study was to compare outcomes between navigation-aided and conventional technique for complex unilateral orbital fractures using titanium mesh.

**Methods:** the outcomes and the CT-measured orbital volume of two groups of orbital complex unilateral reconstruction cases were compared. The study group consisted of a consecutive cohort of unilateral severe orbital fracture that underwent surgery with the aid of a navigation system (Brainlab, Germany). An historical control group was composed of consecutive operations performed immediately prior to the beginning of navigation system use. A total of 55 operations were then identified and studied for patient characteristics, diplopia and globe position, preoperative and postoperative orbital volumes, complications, need for revision surgery and surgeon's performance.

**Results:** Postoperative diplopia severity was lower in the study group than in the control group. Orbital volume analysis showed that reconstructed orbital volume in the study group were closer to unaffected orbital volume than in the control group. Significant orbital volume reduction in the reconstructed orbit could be achieved in the study group and no significant reduction in the control group compared to the unaffected side. The globe projection resulted higher compared to the preoperative situation in the study group than in the control group. The navigational platform could also contribute to decrease the learning curve.

**Conclusion:** The study demonstrated that computer-assisted techniques improves outcomes compared to conventional techniques.

## **ORAL SESSION 28: ORBITAL SURGERY**

### **THE ORBIT FIRST: TWO APPROACHES OF SECONDARY CORRECTION OF COMBINED ORBITAL-ZYGOMATIC COMPLEX FRACTURES WITH PATIENT SPECIFIC IMPLANTS**

*L. Dubois<sup>1</sup>, R. Schreurs<sup>2</sup>, J. de Lange<sup>1</sup>, A. Becking<sup>1</sup>*

*<sup>1</sup>Academic Medical Center, Oral and Maxillofacial surgery, Amsterdam, Netherlands*

*<sup>2</sup>Academic Medical Center, Oral and Maxillofacial surgery- 3D laboratory, Amsterdam, Netherlands*

#### **AIM**

In reconstruction of the zygomatic complex after trauma, small irregularities in the repositioning of the ZMC can easily appear if there is a combined ZMC and NOE fracture or if the ZMC is comminuted. These irregularities may lead to an increase in orbital volume. Adequate repositioning of the ZMC is promoted as an essential step in restoring the orbital contour. In the treatment of functional enophthalmos, suboptimal alignment can be corrected by camouflaging or re-osteotomizing the ZMC. Most authors prefer a two-staged procedure: a zygomatic osteotomy, followed by an orbital reconstruction. The aim of this study is to present a one-staged procedure, where reconstruction of the orbit guides repositioning of the zygoma.

#### **METHODS**

Backward planning combined with additive manufacturing of sawing guides and implants creates the possibility to perform the orbital reconstruction before actual repositioning of the ZMC and become independent if the realized position of the ZMC. The proof of principle is showed by two different approaches of PSI design and with intra-operative placement assisted with navigation in secondary reconstruction of orbital-zygomatic fractures.

#### **RESULTS**

Superimposition of the planning with the intra-operative scan shows that an error range < 1mm is reached in these complex reconstructions.

#### **CONCLUSION**

The combination of static (sawing guides and PSIs) and dynamic (navigation) guidance increases the predictability of complex secondary midfacial reconstructions.

**ORAL SESSION 28: ORBITAL SURGERY  
PROGNOSTIC FACTORS IN THE TREATMENT OF BLOW - OUT FRACTURE OF THE  
ORBIT, LONG - TERM EXPERIENCE**

*G. Wyszynska - Pawelec<sup>1</sup>, J. Zapala<sup>1</sup>, P. Koryczan<sup>1</sup>*

*<sup>1</sup>Institute of Stomatology of the Jagiellonian University, Dept of Cranio-  
Maxillofacial Surgery of the Jagiellonian University, Cracow, Poland*

The aim of this paper is to evaluate prognostic factors in the multidisciplinary treatment of blow-out fracture of the orbit.

Material and methods: from 1971 to 2014 in our Department 720 patients, including 219 children, with blow-out fracture of the orbit were treated. Diagnostic procedure comprised ophthalmological examination based on special chart for patients with injuries of the visual system and radiological imaging. In the treatment primary reconstruction of the orbit followed by orthoptic rehabilitation was the method of choice. In case of failure eye-muscles surgery or prismatic correction was performed. The main indication for surgery was persistent diplopia concomitant with restricted eye-ball motility. The aim of primary surgery was to achieve full passive motility of the eye-ball by freeing of entrapped tissues and to reconstruct bony walls of the orbit. The most favourable time for primary reconstruction was about 14 days following trauma (after healing of intrabulbar injuries).

Results: criteria of recovery included single binocular vision, full passive and active eye-ball motility, proper eye-ball position in the orbit. Results were evaluated in relation to age of the patients, type of diplopia, type and location of fracture, position of the eye-ball, time from injury to surgery. Full recovery was obtained in 255 (50.9%) of all patients and in 119 (54.3%) children. Lack of improvement was found in 4.2% of cases.

Conclusions: Prognostic factors in blow-out fracture of the orbit include type of fracture, type of diplopia, age of patient, time from injury to surgery and degree of enophthalmos.

## **ORAL SESSION 28: ORBITAL SURGERY**

### **USE OF 3D PRINTING FOR ORBITAL WALLS FRACTURES MANAGEMENT**

*H. Zrounba<sup>1</sup>, S. Geering<sup>1</sup>, M. Broome<sup>1</sup>*

*<sup>1</sup>Centre Hospitalier Universitaire Vaudois, Division de Chirurgie Orale et Maxillo-faciale, Lausanne, Switzerland*

**Aim:** To evaluate a simple procedure using 3D printing in order to facilitate the surgical procedure and improve outcomes in orbital wall fractures surgery

**Method:** A prospective series of 12 patients with a symptomatic isolated fracture of the floor and/or medial wall of the orbit were included in our study. In all these patients, the middle third of the face of these patients including both orbits were printed before surgery allowing a preoperative bending of a titanium mesh.

**Results:** 9 patients (75%) had isolated orbital floor fractures, 1 patient (8%) had an isolated medial wall fracture and 2 patients (17%) had both. Mean operating time was 67.5 minutes (min: 15, max : 110) with perfect anatomical reconstruction of the orbital anatomy. Mean cost of production for a 3D model was 517 Swiss francs (474 €). Printing of the model was done in a mean time of 16 hours.

**Conclusions:** The results suggest that 3D printing of the orbits is a very reliable technique in order to pre-bend titanium mesh for orbital reconstructions and can be used routinely for the management of this type of fractures.

**ORAL SESSION 28: ORBITAL SURGERY  
CRITICAL APPRAISAL OF PATIENT-SPECIFIC IMPLANTS FOR ORBITAL  
RECONSTRUCTION**

*R. Schreurs<sup>1</sup>, L. Dubois<sup>1</sup>, A. Becking<sup>1</sup>, T. Maal<sup>1</sup>*

*<sup>1</sup>Academic Medical Center- University of Amsterdam, Oral and Maxillofacial Surgery, Amsterdam, Netherlands*

**AIM**

A patient-specific implant (PSI) may produce perfect reconstruction in complex orbital fractures: shape variations, fracture extent and need for overcorrection can be included in the design. Accurate positioning is equally important to utilize the full potential. Intraoperative navigation, compulsory fit and adequate stiffness of the implant should lead to perfect intraoperative positioning.

However, small deviations between planned implant position and acquired position may be seen on evaluation. The aim of this study is to quantify acquired implant position in a series of patients and to designate the responsible factors for errors in planning, design and/or intraoperative positioning.

**METHODS**

All PSI orbital reconstructions at the Academic Medical Center Amsterdam from 2014 to date were retrospectively evaluated. The PSI was segmented on the intraoperative or postoperative (Cone-beam) CT scan. Rotations (pitch, yaw, roll) and translation between planned and resulting position were calculated. Planning, design and intraoperative phase were assessed to designate factors responsible for deviating results.

**RESULTS**

A total of 18 cases were evaluated. The mean absolute deviations from the planned position were pitch 2.0°, yaw 2.5°, roll 3.7° and translation 1.6mm. Inaccuracies in CT acquisition, processing, design and intraoperative positioning were found to be possible factors responsible for larger deviations.

**CONCLUSION**

The planning, design and positioning of a PSI needs to be perfect in order to utilize a PSI's full potential. Quantification of the surgical result and designation of responsible factors for errors provide workflow improvements and may help surgeons and/or engineers to perfect planning, design and positioning of PSIs.

## **ORAL SESSION 28: ORBITAL SURGERY**

### **ORBITAL FRACTURES RECONSTRUCTED WITH AUTOGENOUS BONE: ANALYSIS OF 20 YEARS OF ORBITAL SURGERY IN ROTTERDAM**

*E. Strabbing<sup>1</sup>, K. van der Wal<sup>1</sup>, E. Wolvius<sup>1</sup>, D. Paridaens<sup>2</sup>, M. Koudstaal<sup>1</sup>*

*<sup>1</sup>Erasmus MC, Oral and Maxillofacial Surgery, Rotterdam, Netherlands*

*<sup>2</sup>The Rotterdam Eye Hospital, Ophthalmology, Rotterdam, Netherlands*

#### **INTRODUCTION AND AIM**

Treatment of orbital fractures remains a challenge, partly because studies regarding outcome are difficult to compare. The Erasmus Medical Centre has a large historic well-documented database with orbital trauma patients mainly reconstructed with autogenous bone with adequate follow-up. What can we learn from this group regarding indication, treatment outcome and complications?

#### **METHODS**

All patients who underwent surgical repair of an orbital fracture were retrospectively analyzed. The patients were divided into two groups: group 1 contains patients where one procedure sufficed. A subgroup of patients with pure orbital fractures was analyzed. Group 2 contains patients who required a second revision reconstruction following primary surgery in another center. Indications, timing, pre- and postoperative ophthalmological sequelae, the influence of involvement of the medial wall, the difference in outcome of secondary reconstructions and complications were reviewed.

#### **RESULTS**

A total of 211 patients were included. The need for surgery is based upon the presence of persisting diplopia and enophthalmos. Group 1 contained 173 patients, with a subgroup of 60 patients with pure orbital fracture with a follow-up of at least 1 year. Group 2 contains 38 patients. The donor side morbidity of iliac crest bone harvesting is low and temporary in all cases. The subgroup of 60 patients with pure orbital fractures showed no clinically significant diplopia and 11% of enophthalmos at one-year follow-up.

#### **CONCLUSION**

Good functional and esthetic results can be obtained with orbital reconstruction using autogenous bone.

**ORAL SESSION 28: ORBITAL SURGERY  
COMPARATIVE STUDY BETWEEN NASOSEPTAL GRAFT AND TITANIUM MESH IN  
ORBITAL FLOOR RECONSTRUCTION**

*A. Abdelmabood<sup>1</sup>, M. Eid<sup>1</sup>, M. Saied Hammed<sup>1</sup>, W. Selim Amer<sup>2</sup>, O. Antar Adly<sup>3</sup>*

*<sup>1</sup>Faculty of Dentistry- Suez Canal University, Oral Maxillofacial Surgery, Ismallia, Egypt*

*<sup>2</sup>Faculty of Dentistry- Suez Canal University, Oral Radiology, Ismallia, Egypt*

*<sup>3</sup>Faculty Of Medicine -Suez Canal University, Plastic Surgery, ismallia, Egypt*

**Introduction:** Orbital fractures differ from all other facial fractures in that surgery does not typically attempt to achieve bone healing but instead aims to restore and reconstruct the shape of the orbit. Repair of orbital floor fractures may require the placement of a graft or implant both autogenous and alloplastic materials have been used for the reconstruction process.

**Aim of the study:** To compare between naso septal cartilage and Titanium mesh as reconstruction methods.

**Patients and Methods:** This study was carried on 22 patients with different types of infraorbital fracture. There were no limitations in selection of patients according to their classification of fracture nasal septal cartilage in group (1) and titanium mesh in group (2) for the repair of orbital floor defect secondary to blunt facial trauma.

**Results:** All of the cases were successfully treated by restoration of the orbital floor continuity. All grafts completely covered the defects in the orbital floor with no dead spaces, which indicate that there was no absorption or movement of the graft. Neither the donor nor the recipient sites were infected. There were no signs of herniation or graft displacement,

**Conclusions:** Nasal septal cartilage is a readily accessible autogenous material with minimal donor site morbidity, and should be considered when an autogenous orbital implant is needed for the repair of a traumatic orbital floor defect.

**ORAL SESSION 29: AESTHETICS**

**FOLLICULAR UNIT GRAFTING OF THE ALOPECIC SCARS. INDICATION AND RESULTS IN THE HEAD**

*M. Bouzaiene<sup>1</sup>*

*<sup>1</sup>University Hospital Center, Oral and Maxillofacial Surgery, Mahdia, Tunisia*

Transplantation of hair grafts is the most widespread among the surgical techniques of the treatment of male pattern baldness since it combines the advantages of local treatment with the absence of extensive manipulation and a natural aesthetic result since follicular unit method has been introduced.

Based on the same principle we tried to extrapolate and intend to apply hair transplantation for the management of scarring in hair bearing regions whether being the result of burn or secondary to the removal of benign lesions or blunt trauma. The use of tissue expanders in the scalp has benefits in most situations, but scar migration is sometimes noticed leading to a contested result. 10 years ago we asked the question if it is possible to imply hair grafting to scars. Two problems were identified opposed to hair grafting technique, the first is the state of sclerosis of the reshaped tissue that is encountered and the second is the lack of sufficient depth to shelter the implant. These disadvantaged conditions imposed technical modification to let the grafting technique succeed. Our results will be presented to show that grafting scars is possible even in the cheek. We think that hair transplantation of scalp scars could actually be adopted as a matter of camouflage to hide and reduce aesthetic discomfort by creating a transition zone inside the scar.

## **ORAL SESSION 29: AESTHETICS**

### **DOES FAT GRAFTING INFLUENCE POSTOPERATIVE EDEMA IN ORTHOGNATHIC SURGERY?**

*D. Steinbacher*<sup>1</sup>

<sup>1</sup>*Yale University, Plastic and Maxillofacial Surgery, New Haven, USA*

**Purpose:** Autologous fat grafting is a useful adjunct to orthognathic surgery. Advantages include augmentation and contour enhancement, but fat grafting may also confer anti-inflammatory properties. Edema following orthognathic surgery alone has been examined, however, the effect of fat grafting on post-operative swelling is unknown. The purpose is to 3-dimensionally analyze post-operative edema in patients who underwent autologous fat grafting with orthognathic surgery. We hypothesize that fat grafting will mitigate post-operative edema and accelerate its resolution in the context of orthognathic surgery.

**Methods and Materials:** A retrospective cohort study was performed. 3D photos from preoperative and post-procedure time-points were analyzed. Anthropometric landmarks were placed and post-operative volume changes were measured by two independent observers using Vectra and Mirror software. The data was analyzed using paired and unpaired t-tests and linear regressions to determine significant correlations.

**Results:** Sixty-two 3D photo data sets were included. The facial volume was analyzed overall and comparing each subgroup (orthognathic versus orthognathic + fat grafting group). Post-operative facial volume increase averaged 23.1% for the entire cohort. By week twelve, the swelling decreased 58.5% from baseline. In all patients, there was a statistically significant decrease in facial volume with time. In the fat-grafted group, despite adding volume, the edema was less post-operatively, and decreased to a greater extent with time (by week 12).

**Conclusion:** The majority of post-operative facial edema decreases by 3-months following orthognathic surgery. Interestingly, despite the addition of volume, concurrent fat grafting lessens postoperative edema, and leads to a greater magnitude and speed of resolution.

**ORAL SESSION 29: AESTHETICS**  
**TEN YEARS OF EXPERIENCE IN FACELIFT PLASTIC SURGERY**

*J.P. Meningaud<sup>1</sup>, B. Hersant<sup>1</sup>, R. Bosc<sup>1</sup>, P. Aguilar<sup>1</sup>*

*<sup>1</sup>APHP- Henri Mondor Hospital, Department of Plastic and Maxillofacial Surgery, Paris, France*

**Aim:** The aim of this study was to report the evolving experience of a plastic surgeon in the field of facelift over 10 years.

**Method:** The records of all consecutive patients who underwent facelift and were operated by the author were retrospectively analyzed. The primary endpoint was the assessment of the impact of procedures performed, and especially procedures secondary to facelift, on perceived rejuvenation. The analysis was performed by a naive investigator using before and after photographs. Complications and surgical sequelae were recorded.

**Result:** The influence of the associated procedures was crucial to achieve a feeling of lasting rejuvenation. These procedures were typically maxillofacial surgery procedures, including genioplasty, malar implants, salivary gland reduction. Mixed procedures such as rhinoplasty, lipofilling and dermabrasion also had a significant impact on perceived rejuvenation. In contrast, conventional facelift procedures, including subcutaneous extended dissections or extended SMAS dissections had only a limited mid-term impact. Finally, it clearly appeared that patient preoperative mental had a strong impact on the outcome. The results of patients inclined to depression, pessimism or with an unhealthy lifestyle deteriorated rapidly whereas in optimistic patients and patients with a proactive anti-aging approach, the results were maintained.

**Conclusion:** Facelift only consisting in stretching the skin is nowadays obsolete. Facelift is now part of a global approach, which combines the surgical consideration of the various volumes of the face, the skin treatment itself through injection and filling techniques, and a counselling aimed at improving the overall health condition.

**ORAL SESSION 29: AESTHETICS**  
**MESOTHERAPY WITH AUTOLOGOUS PLASMA RICH PLATELETS COMBINED TO**  
**HYALURONIC ACID FOR FACIAL SKIN REJUVENATION**

*B. Hersant<sup>1</sup>, R. Bosc<sup>1</sup>, P. Aguilar<sup>1</sup>, J.P. Meningaud<sup>1</sup>*

*<sup>1</sup>University Paris East, Maxillo Facial and Plastic Surgery, Creteil, France*

**Objectives**

To date, no data concerning the influence of the association of PRP and hyaluronic acid (HA) on skin rejuvenation exist. The purpose of this prospective study was to assess the new technology combining the effects of PRP and HA for facial skin rejuvenation.

**Materials and methods**

For this pilote and prospective study thirty one patients were included to underwent a series of three treatment sessions spaced 4 weeks apart with PRP-HA injected on facial cheeks.

The endpoints were the facial apparent overall assessed by FACE-Q questionnaires and

the improvement of skin elasticity and firmness assessed by Cutometer at baseline 1, 3 and 6 months after the last injection session. Safety was assessed by the adverse events reported.

**Results**

Out 31 patients screened for the study, were 29 females and 2 males. The mean age of patients was 51.8 ( $\pm 8.5$ ) years. Results of FACE-Q score showed significant improvement after three sessions of treatment and at 1-3 and 6 months after treatment. Objective biophysical measurements showed significant improvement in skin elasticity for R2 ( $p= 0.0003^{***}$ ) and R5 ( $p= 0.036^*$ ) from baseline. The skin viscoelastic ratio (R6) showed a significant improvement from baseline  $p= 0.021^*$ . Skin firmness was also assessed (biological elasticity R7) and exhibited significant improvement ( $p= 0.012^{**}$ ). No serious adverse effects have been reported.

**Conclusions**

Autologous platelet rich plasma in association to hyaluronic acid provided improvement in the appearance of facial. These effects appeared to be more remarkable in improving skin firmness, brightness and elasticity.

## **ORAL SESSION 29: AESTHETICS**

### **FAT - A NEW SOFTWARE TOOL FOR DIAGNOSTICS AND THERAPY PLANNING IN FACIAL ESTHETIC SURGERY**

*T. Hierl<sup>1</sup>, D. Kruber<sup>1</sup>, M. Krause<sup>1</sup>, H. Huempfner-Hierl<sup>1</sup>*

*<sup>1</sup>University Hospital of Leipzig, Oral and Maxillofacial Plastic Surgery, Leipzig, Germany*

#### ***Aims***

Software-supported planning regarding facial bony structures has been implemented within several software packages including navigated surgery. Regarding the scope of soft-tissue facial esthetic surgery, so such solution is currently available. Therefore a new toolchain was developed to support soft-tissue surgery from diagnostics to treatment outcome evaluation.

#### ***Methods***

Using the Visualization Toolkit (VTK) and optical 3D scanning data, a software was implemented which fulfilled the following tasks:

- automatic asymmetry analysis
- measurement of volume differences
- guided 3D morphing of the face with statement of changes
- virtual polyethylene facial implant placement and evaluation
- automatic pre-postsurgery comparison

Thus the software can be used for facial augmentation using autologous fat or customized polyethylene implants, rhinoplasty, genioplasty, oculoplasty etc. Regarding free fat transfer or implants, the amount of fat/size of implant and the location of injection/fixation may be seen before surgery. For genioplasty the desired change or implant can be evaluated.

#### ***Results***

The new tool has been used in patients suffering from cleft-lip-palate, posttraumatic asymmetry or after tumor surgery. By now 20 facial esthetic surgeries using 6 Medpor polyethylene implants and 12 autologous fat transfers have been successfully performed utilizing FAT software.

#### ***Conclusion***

Our novel software can help the surgeon in preoperative diagnostics and therapy planning regarding a wide spectrum of surgical soft tissue interventions. As automatic or semiautomatic routines are implemented, time for preoperative planning has been reduced as far as possible to allow the software use in a clinical setting.

**ORAL SESSION 29: AESTHETICS**  
**OBJECTIVE ESTIMATION OF PATIENT AGE THROUGH A NEW COMPOSITE SCALE FOR FACIAL AGING ASSESSMENT**

*B. Hersant<sup>1</sup>, S. La padula<sup>1</sup>, R. Bosc<sup>1</sup>, P. Aguilar<sup>1</sup>, J.P. Meningaud<sup>1</sup>*

*<sup>1</sup>University Paris East, Maxillo facial and plastic surgery, Creteil, France*

Most patients requesting aesthetic rejuvenation treatment expect to look healthier and younger. Some scales for ageing assessment have been proposed, but none is focused on patient age prediction. The aim of this study was to develop and validate a new facial rating scale assessing facial ageing sign severity.

One thousand Caucasian patients were included and assessed. The Rasch model was used as part of the validation process. A score was attributed to each patient, based on the scales we developed. The correlation between the real age and scores obtained, the inter-rater reliability and test-retest reliability were analysed. The objective was to develop a tool enabling the assigning of a patient to a specific age range based on the calculated score.

All scales exceeded criteria for acceptability, reliability and validity. The real age strongly correlated with the total facial score in both sex groups. The test-retest reliability confirmed this strong correlation.

We developed a facial ageing scale which could be a useful tool to assess patients before and after rejuvenation treatment and an important new metrics to be used in facial rejuvenation and regenerative clinical research.

## **ORAL SESSION 29: AESTHETICS**

### **AUTOLOGOUS FAT TRANSPLANTATION: REGENERATIVE POTENTIALS & PAINKILLING PROPERTIES**

*R. Tieghi*<sup>1</sup>

*<sup>1</sup>S. Anna Hospital and University, Unit of Cranio Maxillofacial Surgery, Ferrara, Italy*

Adipose Derived Stem Cells (ADSC) are multipotent autologous mesenchymal stem cells. These multipotent cells are recognized as a potential regenerative tool that may be beneficial in a wide variety of medical therapies in reconstructive surgery and other medical disciplines.

This study was performed to qualitatively and quantitatively investigate the effects of centrifugation on stem cells present in adipose tissue.

The results demonstrate that centrifugation induces a different distribution of stem cells in three layers. The high density layer showed the highest expression of mesenchymal markers and a vascular stem cell lineage. The low-density fat layer exhibited an enrichment of multipotent stem cells.

This information is useful for surgeons who may apply the different layers in different situations. For example, the layer with the bigger quantity of stem cells and vascular potential could be used for regenerative purposes; the medium and lower density layers, with more differentiated cells, could be useful for volume increasing. Stem cells promote nerve repair secreting various growth factors and cytokines inducing the formation of new vessels and stimulating nerve regeneration.

Appropriate centrifugation concentrates ADSC in different layers, with varying characteristics that influence lipoaspirate persistence, properties, and quality.

This finding may influence the clinical practice of autologous fat transplantation, resulting in enhanced graft uptake. The Authors review different applications and future possible use of fat injection in alleviating neuropathic pain.

## **ORAL SESSION 29: AESTHETICS**

### **3-D SURGICAL TECHNIQUES FOR ONE-STEP FAT AND EPIDERMAL CELL SUSPENSION GRAFTING IN DYSTROPHIC SKIN RESTORATION: OUR EXPERIENCE**

*E. Migliano<sup>1</sup>, F.A. Govoni<sup>2</sup>, R. De Vita<sup>1</sup>, B. Bellej<sup>3</sup>, M. Picardo<sup>3</sup>*

*<sup>1</sup>I.S.G. Istituto San Gallicano- IRCCS, Dept. of Plastic and Reconstructive Surgery, Roma, Italy*

*<sup>2</sup>San Camillo-Forlanini Hospital, Dept. of Maxillofacial Surgery, Rome, Italy*

*<sup>3</sup>I.S.G. Istituto San Gallicano- IRCCS, Laboratory of Cutaneous Physiopathology, Roma, Italy*

#### **Aims:**

Dystrophic skin and skin graft scars need a three dimensional reconstructive approach to restore either the epidermal layer or the lost dermal/subdermal volume and vascularization. The authors report their experience on new techniques developed combining laser ablation, fat grafting and cultured epidermal cell transplantation.

#### **Methods:**

The Authors combined in one-step surgical procedure CO2 laser ablation, subdermal lipofilling according to the Coleman's technique and epidermal cell suspension autografting to correct wide depressed and dyschromic facial scars. The Authors applied this new technique on eighth dystrophic skin graft scars following skin cancer resection. Dermal and epidermal substitutes (MatriDerm®, Veloderm®) have been also applied for cellular transplantation support and postoperative dressing.

#### **Results:**

Clinical outcomes, surgical and laboratory procedures are presented and discussed, post-op follow-up varies from six to fortyeight months. Short and long term follow-up records after surgery demonstrate fully integrated grafts and good restoration of the treated area, Optimal, stable three-dimensional skin cosmetic restoration was obtained in a single stage surgical procedure.

#### **Conclusions:**

Autologous non-cultured epidermal cell suspension transplantation on an epidermal laser ablated skin area, in combination with lipofilling subdermal reconstruction, appears to be an effective, simple and time-saving method to correct skin graft sequelae, in skin cancer patients. This new technique allows to restore a three-dimensional morphological structure of the treated area and to recover a natural appearance of the skin at the same time. The Authors believe that this technique can be safely used to treat any kind of dystrophic scarring.

## **ORAL SESSION 29: AESTHETICS**

### **POST-TRAUMA AESTHETIC REJUVENATION: THE ROLE OF SURGICAL AND NON SURGICAL TECHNIQUES – 'FRACTURING THE GLASS CEILING?'**

*J. Blythe<sup>1</sup>, S.R. Myers<sup>2</sup>, S.B. Holmes<sup>1</sup>*

*<sup>1</sup>Barts Health NHS Trust, Department of Oral and Maxillofacial Surgery, London, United Kingdom*

*<sup>2</sup>Barts Health NHS Trust, Department of Plastic Surgery, London, United Kingdom*

Comprehensive reconstruction following high energy transfer to the craniofacial construct requires attention to both the skeletal aspects and the soft tissue envelope. Deformity arising from major cranio-maxillofacial trauma can have significant psycho-social sequelae and compromise self-image and inter-personal relationships. Whilst accurate bony reconstruction predictably re-establishes the anatomy of the facial skeleton, the soft tissue drape can be compromised both by failure to replace key soft tissue attachments and in addition 'trauma-pathology' affecting overlying soft tissue. These can result in significant facial asymmetries and contour irregularities. The resultant traumatic facial disharmony can be very challenging to correct. The role of 3-dimensional analysis and patient-specific printing offer "cutting edge" assessment and bespoke patient planning. Alongside the most contemporary osseo-synthesis fixation and grafting techniques, there is a growing role for surgical manipulation of the soft tissue mosaic including several suspension suture techniques, micro-lipofilling, and scar revision to optimise facial trauma patients physical outcome and prevent long term socio-psychological complications. This may be planned from the outset and actioned synchronously during primary surgery, planned secondary, or as a salvage surgery in late presenting secondary deformity. We provide a case series of post-traumatic patients, many of whom are success stories of London major trauma centre care, and describe their facial rejuvenation procedures. We share our multi-disciplinary experience and highlight the tips and pitfalls. In addition, the objective impact of post-traumatic facial deformity and the value of post-operative rejuvenation among a cohort of our patients will be reviewed.

**ORAL SESSION 29: AESTHETICS**  
**THE MODERN "FACELIFT": HOW FAR HAVE WE COME?**

N. Hayek<sup>1</sup>

<sup>1</sup>*Nermin Hayek, Dentistry, London, United Kingdom*

**Aim:** To explore a timeline of the changes in how methods for anti-wrinkle techniques have advanced over time, and how technology has influenced this change of approach.

**Method:** A review of the English-language literature was performed. A search in PubMed with the following keywords was executed; "Anti-wrinkle" and "technology" from the date 1900 to present. A Google Scholar search was also performed, the search was refined to the key words "Anti-wrinkle", "techniques" and "advancements". From this, 744 articles were generated and only literature reviews were used to gather the relevant data. This enabled the identification of the evolution in anti-wrinkle technologies, from the historical origins to present time.

**Results:** From the articles reviewed, it is clear that there has been a rapid evolution in anti-wrinkle techniques, with a shift away from aggressive surgery towards minimally invasive procedures to cater for a younger demographic. Understanding the anatomy of the human face has been found to play a pivotal role in the history of the development of anti-wrinkle techniques and has paved the way to current advancements.

**Conclusions:** Newer methods such as laser and filler treatment are more commonly used and preferred over the traditional subcutaneous face lift. These techniques can be carried out under local anaesthetic and are less invasive. Anti-wrinkle technology has advanced greatly over the past century and will no doubt continue to become more sophisticated with time.

**ORAL SESSION 30: RECONSTRUCTION  
RECONSTRUCTION ACCURACY OF FOUR DIFFERENT METHODS FOR MANDIBULAR  
RECONSTRUCTIONS**

*F. Mascha<sup>1</sup>, A. Schramm<sup>1</sup>, S. Pietzka<sup>1</sup>, K. Winter<sup>2</sup>, F. Wilde<sup>1</sup>*

*<sup>1</sup>Military Hospital Ulm, Oral and Maxillofacial Surgery, Ulm, Germany*

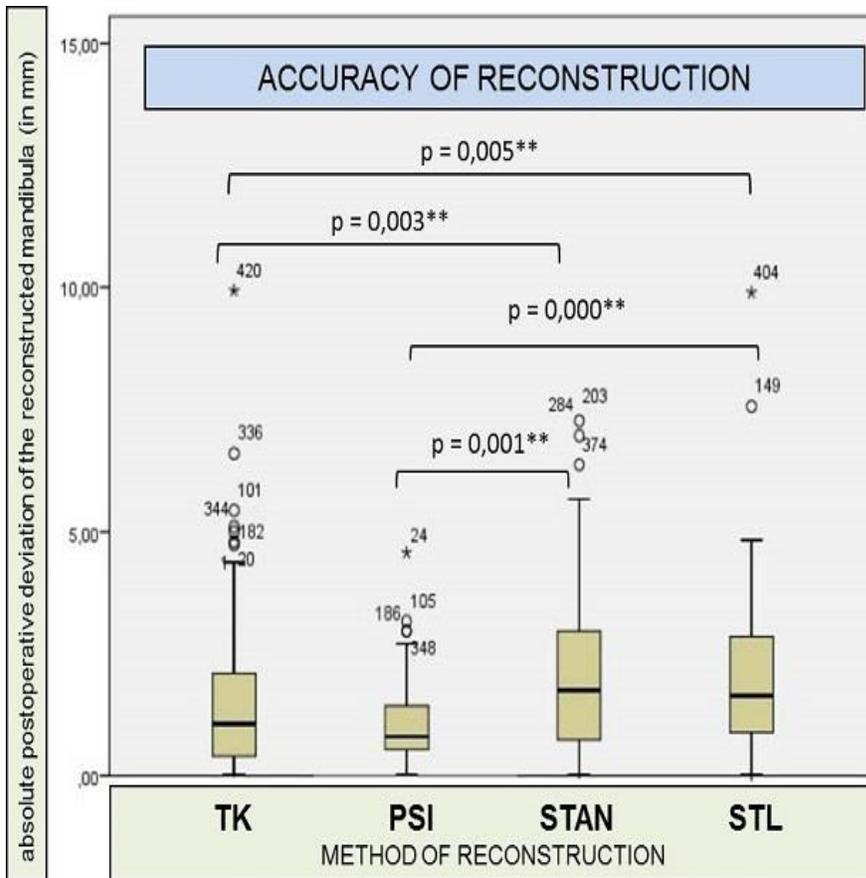
*<sup>2</sup>TRM Leipzig, Translationszentrum für Regenerative Medizin, Leipzig, Germany*

Intraoperative bending of standard titanium reconstruction plates is still common standard in mandibular reconstruction (STAN-method). Pre-bending of these plates by using 3D-models of the jaw is considered to save time during the operation and improve reconstruction accuracy (STL-method). To ease the intraoperative fixation of the pre-bend plate and increase reconstruction accuracy a transfer-key method was established by Wilde et al. [1]. These transfer-keys were hand-made preoperatively with composite on the base of the 3D-models (TK-method). Another new method, using fully virtual planned und computer-manufactured patient specific mandibular reconstruction plates, has been described recently (PSMP-method). This method also uses transfer-keys as cutting- und drilling-guides, which are virtually planed und computer-manufactured as well (CAD/CAM-Guides).

69 cases of alloplastic mandibular reconstruction have been analysed by measuring pre- and postoperative CT-scans to compare the accuracy of reconstruction between these four groups.

The study showed no difference in accuracy of reconstruction between the STAN-method (n=22) and the STL-method (n=16). Using TK-method (n=21) or PSMP-method (n=10) accuracy improved significantly compared to STL-method and TK-method. However there was no difference in accuracy of reconstruction comparing PSMP-method und TK-method.

Preoperative bending of reconstruction plates seems to have no benefit for accuracy of mandibular reconstruction. However, the use of transfer-keys – either hand-made or using CAD/CAM-guides – can improve reconstruction accuracy significantly.



1. **Wilde et al.:** Mandible reconstruction using patient-specific pre-bent reconstruction plates: comparison of standard and transfer key methods. *Int J Comput Assist Radiol Surg*, 10: 129-140 (2015)

**ORAL SESSION 30: RECONSTRUCTION  
MINI-INVASIVE APPROACH VS. CLASSICAL APPROACH FOR FREE FIBULA FLAP  
HARVESTING IN HEAD AND NECK RECONSTRUCTION**

*A. Bolzoni<sup>1</sup>, L. Pallotta<sup>1</sup>, E. Segna<sup>1</sup>, C. Baserga<sup>1</sup>, A.B. Gianni<sup>1</sup>, A. Baj<sup>1</sup>*

*<sup>1</sup>IRCCS Fondazione Ca' Granda- Ospedale Maggiore Policlinico di Milano,  
U.O.C. Chirurgia Maxillo Facciale ed Odontostomatologia, Milano, Italy*

The fibula free flap (FFF) is one of the methods used for reconstructing mandibular, maxillary or segmental long bone defects<sup>1</sup>. Nonetheless, possible donor site functional morbidity should be attentively considered together with the advantages of facial bones reconstruction. From 2013, in our Operative Unite, we are using a conservative technique for the harvesting of FFF that considers the real bone necessity for the reconstruction.

Between 2011 and 2015, 46 patients underwent reconstruction of head and neck defects with FFF: in 11 cases, a mini-invasive approach were used. For the evaluation, we utilized 3 questionnaires: two for the evaluation of morbidity of donor site (WOMAC and BODDE2003) and one for the evaluation of the quality of life (SF-36).

Only 2 flaps had not excellent results in patients who went to surgery using the classical approach.

Patients that underwent to reconstruction with FFF using mini-invasive approach showed better results, both in term of morbidity of the donor site and in terms of quality of life, under psychological and physical aspects.

The results of this study and the opportunity to combine the mini-invasive technique to the virtual reconstruction system, encourage us to promote the use of this conservative approach for withdrawing the lower bone amount for the reconstruction, saving the great part of muscular inserction which not required dissection.

**ORAL SESSION 30: RECONSTRUCTION  
PRE AND POST SURGERY GAIT ANALYSIS IN PATIENT TREATED WITH FREE FIBULA  
FLAP FOR MANDIBULAR RECONSTRUCTION**

*L. Pallotta<sup>1</sup>, M. Zago<sup>2</sup>, A. Baj<sup>1</sup>, I. Annoni<sup>2</sup>, A. Bolzoni<sup>1</sup>, A.B. Gianni<sup>1</sup>, C. Sforza<sup>2</sup>*

*<sup>1</sup>IRCCS Fondazione Ca' Granda- Ospedale Maggiore Policlinico di Milano,  
U.O.C. Chirurgia Maxillo Facciale ed Odontostomatologia, Milano, Italy*

*<sup>2</sup>Università degli Studi di Milano, Dipartimento di Morfologia Umana, Milano, Italy*

Many surgical treatments for tumors of the oral cavity involve mandibular resection. The reconstruction of the mandibular contour, the occlusal relationships and the position of the condyles are essential targets for satisfactory results. The free fibula flap is one of the most used and best effective reconstructive techniques, and nowadays further improvements can be obtained with CAD/CAM systems.

During 17 months (October 2014- March 2016), in collaboration with the Department of Biomedical Sciences for Health (University of Milan), we have been collecting and analyzing information about 27 patients submitted to mandibular resection and reconstruction with a free fibula flap.

In particular, the patients underwent a gait analysis by using a 3D motion capture system working with infrared sensitive cameras. The system is not invasive and can assess free movements well mimicking daily activities. Gait parameters were assessed before and six month after surgery. At the moment, 4 cases are completed.

The preliminary results show no significant differences in stance, swing, cadence, step length, double support, speed and range of movement angles of hip, knee and ankle.

Also, esthetical and subjective perception of functional results were good.

In conclusion, we can confidently assume, in agreement with the literature, that the free fibula flap leads to no significant morbidity at the donor site and optimal results at the receiving site.

**ORAL SESSION 30: RECONSTRUCTION**  
**MORPHOLOGICAL RESULTS OF CUSTOMISED MICROVASCULAR MANDIBULAR**  
**RECONSTRUCTION: A COMPARATIVE STUDY**

*F. Bolognesi<sup>1</sup>, A. Tarsitano<sup>1</sup>, F. Contedin<sup>2</sup>, R. Ciprian<sup>2</sup>, A. Pizzigallo<sup>1</sup>, C. Marchetti<sup>1</sup>*

*<sup>1</sup>Operative Unit of Oral and Maxillofacial Surgery- University of Bologna,*

*Head and Neck Department- Sant'Orsola-Malpighi University Hospital- Bologna, Bologna, Italy*

*<sup>2</sup>Operative Unit of Plastic Surgery- University of Bologna, Head and Neck Department-  
Sant'Orsola-Malpighi University Hospital- Bologna, Bologna, Italy*

**Aim:** Virtual planning and guided surgery with customised reconstructive plates are becoming more and more common for mandibular reconstruction with fibular free flaps. Although the literature describes many potential applications, no systematic analyses have been made about morphological results regarding computer-aided reconstruction compared to traditional freehand bent plate.

**Methods:** In the present study, we propose a comparative study in this innovative field, analysing a case series of 20 CAD/CAM reconstructed mandibles, compared to traditional reconstructed mandibles, in terms of morphological results. All patients were evaluated by pre-operative and a post-operative CT scan. To evaluate the morphological results, several anatomical landmarks were measured on CT scan: 1) the midline deviation; 2) the amplitude variation, in grades, of the mandibular angle; 3) the bi-gonial diameter of the mandibular and 4) the chin protrusion.

**Results:** The mean differences registered between pre-operative and post-operative CT scan were significantly better for test group regarding mandibular angle ( $p=0.034$ ), bi-gonial diameter ( $p=0.041$ ), chin protrusion ( $p=0.05$ ). No significative differences were registered for midline deviation (0.092).

**Conclusion:** CAD/CAM reconstructive technique appears to be a valid method to accurately restore the pre-operative morphological situation.

## ORAL SESSION 30: RECONSTRUCTION

### MANDIBULAR RECONSTRUCTIONS USING COMPUTER-AIDED DESIGN/COMPUTER-AIDED MANUFACTURING: A DEFECT-BASED RECONSTRUCTIVE ALGORITHM

*A. Tarsitano<sup>1</sup>, L. Ciocca<sup>2</sup>, R. Scotti<sup>2</sup>, R. Cipriani<sup>3</sup>, F. Contedini<sup>3</sup>, A. Pizzigallo<sup>1</sup>, C. Marchetti<sup>1</sup>*

*<sup>1</sup>Maxillofacial Surgery Unit- University of Bologna- Italy,*

*Department of Biomedical and Neuromotor Science, Bologna, Italy*

*<sup>2</sup>University of Bologna, - Department of Biomedical and Neuromotor Sciences- Alma Mater Studiorum University of Bologna - Italy, Bologna, Italy*

*<sup>3</sup>S. Orsola Hospital, Head and Neck, Bologna, Italy*

**Aim:** CAD-CAM can be used to plan reconstructive surgery, optimising aesthetic outcomes and functional rehabilitation. However, although many such applications are available, no systematic protocol yet describes a reconstructive algorithm. A universally accepted reconstructive CAD-CAM algorithm might help one choose the best reconstructive option.

**Methods:** Using CT data, a reconstructive bony plate is designed using the original external cortical bone as a template. Direct-metal laser-sintering yields a patient-specific plate devoid of errors introduced during manual modelling. A custom-made cutting guide for a fibular flap allows the surgeon to precisely segment the osseous free flap. The straight flap is contoured to resemble a neo-mandible using a surgical cutting guide that is virtually planned to guide surgery on the fibular fragment, optimising the orientation of future implant insertion.

**Results:** We have identified four main mandibular defects (Table 1). Class I defects should be reconstructed by restoring the vertical corner of the mandibular angle (Fig. 1). To treat Class II defects, we restore both of the corners between the symphysis and the body by performing at least two osteotomies (Fig. 2). Finally, Class III defects should be reconstructed by restoring the vertical corner of the mandibular angle and one or two of the horizontal corners of the symphysis, thus necessitating at least three osteotomies

**Conclusion:** The system reflects defect complexity and the requirements for reconstruction.

<b>Class of defect</b>	<b>Mandibular subsites</b>	<b>Number of osteotomies needed</b>
I	R+B	1
Ic	C+R+B	1
II	B+S+B	2/3
III	R+B+S	3/4

B= body; R= ramus; C= condyle; S= symphysis.

**ORAL SESSION 30: RECONSTRUCTION  
MORPHOSTRUCTURAL ANALYSIS OF FIBULA BONE OSTEOTOMIES WITH  
PIEZOSURGICAL DEVICE IN JAWS RECONSTRUCTION: A MIRROR OF A NEW FASTER  
PIEZOELECTRICAL OSTEOTOME .**

*A. Anesi<sup>1</sup>, M. Casade<sup>2</sup>, S. Negrello<sup>2</sup>, L. Chiarini<sup>1</sup>*

*<sup>1</sup>Azienda Ospedaliero-Universitaria Policlinico, Cranio-maxillo-facial Unit, MODENA, Italy*

*<sup>2</sup>Azienda Ospedaliera Universitaria Integrata di Verona, Maxillo-facial Unit, Verona, Italy*

**BACKGROUND:**

Segmentation of vascularized bone flaps with piezoelectrical device is a valuable alternative to conventional cutting methods because it improves the intraoperative safety of the procedure. The time needed for completion of a single osteotomy with the piezoelectric device is longer than with the oscillating saw. However, the time normally needed to dissect and protect both the periosteum and the pedicle at each osteotomic site is greatly reduced.

In 2015 a new piezoelectrical device suitable for highly mineralised bone and significantly efficient through all the cutting depth was engendered. Hardness and thickness of human fibula bone cortex may be fitting for this new piezoelectrical osteotome.

**AIM:** We present and discuss the use a new generation of the piezoelectric bone-cutting device in microvascular free bone flap for the reconstruction of jawbone defects. The aim of this study was to evaluate on human fibula the time required for completion of each osteotomy comparing new piezoelectrical device and previous commercial device. A comprehensive study that evaluates and compares histomorphometry and histology of bone surfaces created with two piezosurgical devices is carried out.

**MATERIALS AND METHOD:** In 2016 seven consecutive patients underwent microsurgical reconstruction of the jaws. One specimen from each fibular bone diaphysis was harvested with the piezoelectric device and histologically evaluated.

**CONCLUSIONS:** The new generation piezoelectrical device halves the time needed for linear and wedge osteotomies on human fibula flap compared to traditional piezoelectrical device. No significant histological and histomorphometrical differences are detected between bone surfaces osteotomized with both devices.

## **ORAL SESSION 30: RECONSTRUCTION**

### **CLASSIFICATION OF MANDIBULAR DEFECT: A GUIDE FOR RECONSTRUCTION BASED ON 15 YEARS EXPERIENCE**

*V. Valentini<sup>1</sup>, M. della monaca<sup>1</sup>, A. Battisti<sup>1</sup>, V. Terenzi<sup>1</sup>, G. barbera<sup>1</sup>, G.M. Prucher<sup>1</sup>, A. Cassoni<sup>1</sup>*  
*<sup>1</sup>La Sapienza, Maxillo - Facial Surgery Unit, Roma, Italy*

**AIMS:** composite mandibular defect results in deep functional and aesthetic deformity. Several classification schemes have been suggested through years but none of them gained universal acceptance. Based on their 15 years- experience the Authors proposed a brand new classification system and treatment algorithm.

**METHODS:** a retrospective review of all the patients subjected to mandibular resection and reconstruction from 2000 and 2015 was performed. Causes of mandibular defects included tumors, osteoradionecrosis, trauma and congenital deformity. Only patients who underwent microvascular reconstruction were considered. Each defect was classified based on: 1) extension of resected bone; 2) entity of soft tissue involvement; 3) availability or not of ipsilateral vessels.

**RESULTS:** based on the concept that defect in different mandibular segment determines different functional needs, a treatment algorithm based on composite mandibular defects and microvascular reconstruction was developed. The extension of bone deficit was identified with the letter B and subdivided in four different types. The extension of the soft tissue involvement was identified with the letter M and subdivided in four different types. Finally, the availability of ipsilateral vessel in the neck was identified with letter V and subdivided in two different types. Based on the combination of the three different defects features (BMV), the best reconstruction option was suggested.

**RESULTS:** the suggested novel classification system allows a consistent a reliable method of addressing composite mandibular defects and guide to best reconstructive option.

## **ORAL SESSION 30: RECONSTRUCTION**

### **MICROVASCULAR MANDIBLE RECONSTRUCTION IN THE PEDIATRIC PATIENT**

*M. Redondo<sup>1</sup>, I.I. García Recuero<sup>1</sup>, A.I. Romance García<sup>1</sup>, P. López Fernández<sup>1</sup>,  
V. Zafra Vallejo<sup>1</sup>, I. Ruiz Martín<sup>1</sup>, G. Sánchez Aniceto<sup>1</sup>*

*<sup>1</sup>Hospital Universitario 12 de Octubre, Oral and Maxillofacial Surgery, Madrid, Spain*

#### **AIMS**

Nowadays, the free fibula flap remains the gold standard for microsurgical mandible reconstruction because of its adaptability and reliability, achieving very good cosmetic and functional outcomes. Yet, its use in the pediatric population is still not well established. The aim of this study is to present our experience and conclusions.

#### **METHODS**

We conducted a retrospective analysis of a consecutive series of 12 pediatric patients who underwent mandible reconstruction with free fibula flaps in our Oral and Maxillofacial Unit. There were 5 males and 7 females, and the mean age was 7 years. The indications for reconstruction included craniofacial microsomia presenting Pruzansky mandible types III and severe IIb (n=9), postsurgical resection of juvenile ossifying fibroma (n=1), fibrous dysplasia (n=1) and giant cell granuloma (n=1). Virtual planning was done to reduce operating time and improve outcomes.

#### **RESULTS**

Twelve free fibula flaps were transferred to the mandible, achieving successful integration of all of them except for one that was lost in the early postoperative period, though it grew new bone thanks to the preservation of the periosteum after the resection of the giant cell granuloma. No other severe complications were found. Adequate mandibular contours, bone union and functional outcomes were accomplished.

#### **CONCLUSIONS**

Mandible reconstruction with free fibula flap in the pediatric population in selected patients is increasing due to the reliability and safety of the procedure, providing the necessary to achieve satisfactory aesthetics, functional occlusion and maxillomandibular growth.

## **ORAL SESSION 30: RECONSTRUCTION**

### **THE "IBERIC GRAFT" AS A RELIABLE METHOD FOR CLOSURE OF THE RADIAL FOREARM FREE FLAP DONOR-SITE. OUR EXPERIENCE IN 100 CONSECUTIVE CASES**

*R. González-García<sup>1</sup>, M. Moreno-Sánchez<sup>1</sup>, L. Ruiz-Laza<sup>1</sup>, C. Moreno-García<sup>1</sup>*

*<sup>1</sup>University Hospital Infanta Cristina, Department of Oral and Maxillofacial-Head and Neck Surgery, Badajoz, Spain*

**Aims.** To assess postoperative complications of the radial forearm free flap (RFFF) donor-site and also to evaluate the morbidity in terms of aesthetics and function following the use of the "Iberic graft", a new technique consisting in a combined local triangular full-thickness skin graft obtained from the neighbour forearm skin.

**Materials and Methods.** A prospective study of patients who underwent reconstruction of head and neck defects using a RFFF was conducted from July 2008 through December 2014. The donor-site was covered by the use of a combined local triangular full-thickness skin graft, as described previously in the literature. Color match, quality of the scar, presence of necrosis, dehiscence of the suture or tendon exposure, and presence of dysesthesia were recorded and analyzed using the statistical software SPSS®21.0.

**Results.** One hundred consecutive patients (71 male and 29 female) undergoing RFFF harvesting were included. RFFF donor-site defects ranged from 15 to 70 cm<sup>2</sup>; Five patients (5%) had small dehiscences of the forearm skin graft, whereas 2 cases (2%) presented tendon exposure. Otherwise, partial skin graft loss occurred in 7% of the patients. In all cases, these sites healed secondarily by conservative management, with no final impairment of function. Aesthetic results were considered excellent in 87%, good in 11%, and suboptimal in 2% of the cases.

**Conclusions.** The "Iberic graft" is a reliable method for closing most of RFFF donor-site defects as it provides excellent color match and pliability, while obviates the need for a second surgical site.

**ORAL SESSION 30: RECONSTRUCTION  
INTRAORAL TRANSPORT-DISK DISTRACTION OSTEOGENESIS FOR RECONSTRUCTION  
OF SEGMENTAL MANDIBULECTOMY DEFECTS IN THE PAEDIATRIC PATIENT**

*J. Collier<sup>1</sup>, R. Young<sup>1</sup>*

*<sup>1</sup>Chelsea & Westminster Hospital, Department of Craniofacial Surgery, London, United Kingdom*

Segmental mandibulectomy defects in pre-school children pose difficult reconstructive problems. The effects of disease control, access, scarring and donor-site morbidity as well as future growth and dental rehabilitation must all be considered. Treatment protocols have evolved from non-vascularised to vascularized techniques – each with their own limitations.

We present a case of a 5-year-old child treated with segmental mandibulectomy for an aggressive giant cell tumour. The resection measured 8cm from distal body to contralateral canine. Intraoral placement of a device for transport-disk distraction osteogenesis (TDDO) was used to reconstruct from body to ipsilateral canine (6cm) with the final anterior segment filled subsequently with non-vascularised cancellous graft. External contour, mandibular height and keratinized mucosal cover were all preserved at the end of distraction. External facial scarring was limited to a single transbuccal stab incision, which was also used as the distraction port.

To our knowledge, TDDO placed intraorally for mandibular reconstruction has not previously been described in the literature for pre-school children. The presentation will describe the planning steps, pearls and pitfalls of our experience as well as a critical review of the clinical outcome.

**ORAL SESSION 31: RECONSTRUCTION POST TRAUMATIC  
SURGICAL RECONSTRUCTION OF POSTTRAUMATIC COMPOUND COMPLEX FRONTO-  
BASAL CRANIAL VAULT FRACTURE IN A NEUROSURGERY PRACTICE IN NIGERIA**

*A. Adeleye<sup>1</sup>, A. Olusanya<sup>2</sup>*

*<sup>1</sup>University of Ibadan - College of Medicine / University College Hospital -,  
Department of Surgery, Ibadan, Nigeria*

*<sup>2</sup>College of Medicine- University of Ibadan- Ibadan and University College Hospital- UCH,  
Department of Oral and Maxillofacial Surgery, Ibadan, Nigeria*

**Background** The extant literature on the surgical treatment of posttraumatic compound, complex frontal basal calvarial skull fracture suggests that this be a staged procedure. This is usually not feasible in low-resource regions of the world.

**Methods** A one-stop single stage operative procedure for the surgical treatment of these fractures in a neurosurgery practice in Nigeria is here annotated. The technique involves generous, if fastidious, debridement and irrigation of the fracture fragments, and autologous osteosynthesis. Next, we present an observational outcome analysis of this surgical technique in a prospective consecutive cohort of patients.

**Results** Fourteen patients, all males, mean age 33.9 years (SD, 6.6) underwent this surgical procedure over a 6-year period. Twelve of them followed road accidents. Majority were late neurosurgical referrals, hence median time to surgery was 96 hours (range 48-2160). Twelve patients (85.7) had history of loss of consciousness, median duration of 34 hours; 7 (50%) had associated brain contusions; 6 (43%) significant pneumocephalus; and acute extradural and subdural haematoma in 4 and 2 cases respectively. The surgery was successful in all; 13 (93%) had normal outcome on the Glasgow outcome scale at hospital discharge; 12 have been followed up for 1-72 months, median 33. Seven of these were for 30 months or more. There was no case of surgical site infection in the perioperative or the follow-up period to date. The aesthetic outcome was also acceptable.

**Conclusion** The pragmatic surgical technique herein annotated is effectual in the operative treatment of compound, complex frontal basal cranial vault fracture.

**ORAL SESSION 31: RECONSTRUCTION POST TRAUMATIC  
PATIENT-SPECIFIC IMPLANTS IN SECONDARY RECONSTRUCTION OF THE  
ORBITOZYGOMATIC COMPLEX**

*H. Essig<sup>1</sup>, T. Gander<sup>1</sup>, P. Schumann<sup>1</sup>, D. Lindhorst<sup>1</sup>, M. Rücker<sup>1</sup>*

*<sup>1</sup>University Hospital Zürich, Clinic for Oral and Maxillofacial Surgery, Zürich, Switzerland*

Open reduction and internal fixation in fractures of the midface is indicated in case of functional and aesthetic impairment. Limited surgical access and three-dimensional complexity of the midface can lead to an aesthetically and functionally inadequate postoperative result. Sequelae of malpositioning of the orbitozygomatic complex could include reduced anteroposterior projection of the zygomatic body, asymmetry of the midface, enophthalmos and hypoglobus. There are various surgical techniques described to correct posttraumatic deformities of the orbitozygomatic complex.

The use of individually designed, patientspecific titanium implants allows for the correct positioning of the osteotomized zygoma and thus could restore the ideal position of the outer facial frame. DICOM data of computed tomography is processed using iPlan 3.0.5 (Brainlab, Feldkirchen, Germany) and digital three-dimensional reconstruction is planned. Existing plates and screws of prior treatment could be integrated as references for patient-specific implants and thus for positioning the osteotomized zygoma. The design of patient-specific implant is verified in iPlan 3.0.5 by superimposing. Manufacturing is done by laser melting (KLS Martin Group, Tuttlingen, Germany).

The technique allows the integration of three-dimensional information into the patient-specific implant and facilitates surgical correction in secondary reconstruction of the orbitozygomatic complex.

**ORAL SESSION 31: RECONSTRUCTION POST TRAUMATIC  
ACCURACY OF ORBITAL WALL RECONSTRUCTION USING 3D-PRINTED PREDRILLING  
GUIDES WITH POROUS TITANIUM IMPLANTS**

*M. Benassarou<sup>1,2,3</sup>, N. Sigaux<sup>1</sup>, C. Bertolus<sup>1,2</sup>, T. Schouman<sup>1</sup>*

*<sup>1</sup>Hôpital de la Pitié-Salpêtrière, Oral and Maxillofacial Surgery Department, PARIS, France*

*<sup>2</sup>Sorbonne Universités, UPMC Paris 6, PARIS, France*

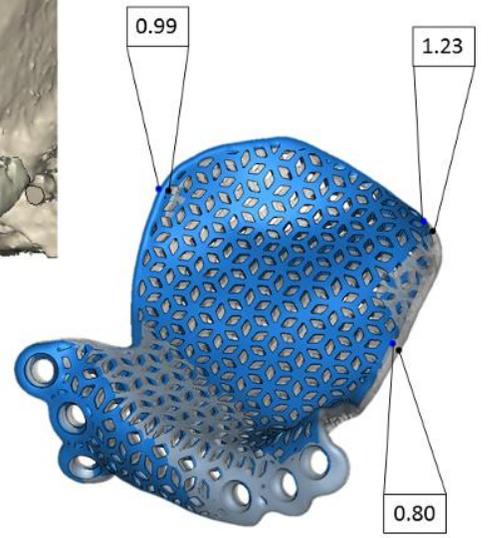
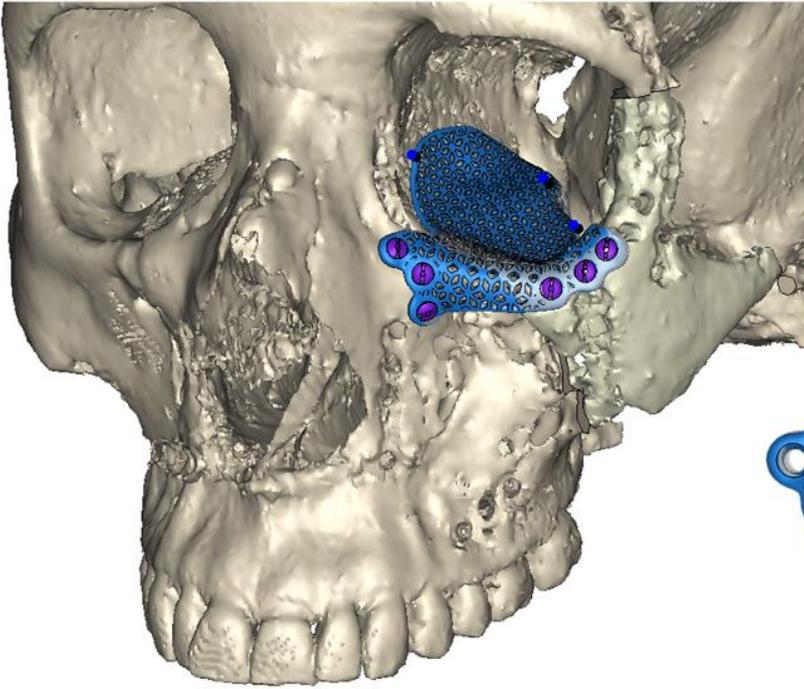
*<sup>3</sup>EA4266 Nanomedicine Lab, Univ Bourgogne Franche-Comté, BESANCON, France*

**Aims:** To assess the accuracy of post-traumatic orbital wall reconstruction using 3D-printed patient-specific titanium implants and predrilling guides.

**Methods:** All patients who underwent an orbital reconstruction using custom-made implants and predrilling guides in our department between 2013 and 2016 were included. The postoperative CT-scans were segmented and superimposed on the preoperative planning. The position of the implant achieved postoperatively was compared to the preoperative planning and to the position of the orbital contours of the mirrored healthy side.

**Results:** Eight implants in 7 patients were included. Mean deviation between planned and actual position of the implant was 1.03 mm [0.42 ; 1.88] at the lateral landmark, 0.84 mm [0.24 ; 1.67] at the medial landmark, and 1.28 mm [0.72 ; 2.53] at the posterior landmark. Compared to mirroring, the deviations were 0.45 mm [0.12 ; 0.91] laterally, 0.18 mm [0.07 ; 0.64] medially and 0.79 mm [0.03 ; 1.93] posteriorly.

**Conclusions:** The combination of custom-made titanium predrilling guides and orbital implants allows achieving accurate reconstruction of the orbital walls. The predrilling template acts as a positioning guide. Intraoperative navigation checking is therefore not needed. Further study is required to validate these results.



**ORAL SESSION 31: RECONSTRUCTION POST TRAUMATIC  
RECONSTRUCTION OF COMPLEX ORAL&MAXILLOFACIAL DEFECTS USING PEEK AND  
TITANIUM CUSTOM-MADE IMPLANTS**

*A. Rachmiel<sup>1</sup>, O. Emodi<sup>1</sup>, D. Shilo<sup>1</sup>, O. Blanc<sup>1</sup>, A. Wolff<sup>1</sup>, Y. Leiser<sup>1</sup>*

*<sup>1</sup>Rambam Health Care Center, Oral&maxillofacial Surgery, Haifa, Israel*

**Aims:** Reconstructing the craniofacial complex is extremely challenging due to the unique anatomy, presence of vital structures and the diversity of defects. In craniofacial reconstruction, restoration of aesthetics and function is the primary goal. Auto-grafts are the gold standard for craniofacial skeletal reconstruction. However auto-grafts have few disadvantages, which led to the research of alloplastic materials. Development of computer assisted design and computer assisted manufacturing systems allows for precise preoperative planning and designing of patient specific implants preoperatively.

**Methods:** Four cases of facial bone reconstruction are presented. Orbital floor and zygoma deficiencies were reconstructed using polyetheretherketone implants. Two mandibular defects were reconstructed using titanium implants shaped as a crib, thus allowing addition of artificial and autogenous bone grafts for future dental implant placement.

**Results:** Mandibular defects were reconstructed using titanium for strength and function and exhibited proper mouth opening, function and aesthetics. In one of the patients dental implants were designed as part of the patient specific implant thus allowing for future implant supported dental rehabilitation not requiring support of the bone graft. Orbital floor reconstruction resolved the observed late enophthalmos. Zygoma reconstruction successfully eliminated cheek bone deformity.

**Conclusions:** Individual computer assisted design & computer assisted manufacturing systems for pre-existing facial defects is becoming a popular alternative to auto-grafts. Results are promising and exhibit excellent aesthetic and functional outcomes, while reducing operating time and avoiding donor site morbidity. This procedure provides a simple way to reconstruct complex three-dimensional structures with precision that is difficult achieving with standard methods.

**ORAL SESSION 31: RECONSTRUCTION POST TRAUMATIC  
FEASIBILITY OF CARBON FIBER REINFORCED POLYMER FIXATION PLATES FOR  
TREATMENT OF ATROPHIC MANDIBULAR FRACTURE: A FINITE ELEMENT ANALYSIS**

*N. Diker<sup>1</sup>, B. Bayram<sup>1</sup>*

*<sup>1</sup>Baskent University, Oral and Maxillofacial Surgery, Ankara, Turkey*

**Aim:** The objective of the present study was to conduct a computational assessment of the biomechanical stability of locking fixation plates with different thickness, made of titanium alloy and carbon-fiber reinforced polyetheretherketone (CFR-PEEK) in Class III atrophic mandibular fractures.

**Methods:** Class III atrophic mandibular models were constructed with three dimensional finite element models. After simulation of fracture on the left side, plates with different thickness (1.0, 1.5, 2.0 and 2.5 mm) were adapted to models and 3 locking screw on each side of fracture were used for fixation. For simulation of incisal and molar clenching tasks, vertical displacement of models were restricted in incisal and molar regions. Titanium and CFR-PEEK material properties were applied to all plate models respectively.

**Results:** Highest Von Mises stress values were observed for the 1.0 mm plate and values decrease gradually with plate thickness to the 2.5 mm plate. Von Mises stress values of screws and plates were lower in models of CFR-PEEK plates. In buccal cortical bone around the screw that proximal to fracture, physiological limit of compressive stress exceeded in some areas. Compressive stresses around screws were lower in models of CFR-PEEK plates. On the other hand, CFR-PEEK plates allow more displacement between bone segments compared with titanium plates.

**Conclusion:** With their young modulus similarity with cortical bone, CFR-PEEK materials seems to be suitable for rigid fixation devices. In spite of current usage of CFR-PEEK materials in the field of orthopaedic surgery, usage of CFR-PEEK materials in the maxillofacial region need further investigation.

**ORAL SESSION 31: RECONSTRUCTION POST TRAUMATIC  
STRUCTURAL AND MECHANICAL IMPLICATIONS OF PMMA IMPLANT SHAPE AND  
INTERFACE GEOMETRY IN CRANIOPLASTY – A FINITE ELEMENT STUDY**

*A. Ridwan<sup>1</sup>, P. Marcián<sup>2</sup>, L. Borák<sup>3</sup>, N. Narra<sup>4</sup>, J. Wolff<sup>1</sup>, T. Forouzanfar<sup>1</sup>*

*<sup>1</sup>VU Medical Center, Oral and Maxillofacial Surgery, Amsterdam, Netherlands*

*<sup>2</sup>Institute of Solid Mechanics- Brno University of Technology, Mechatronics and Biomechanics,  
Brno, Czech Republic*

*<sup>3</sup>Institute of Solid Mechanics- Brno University of Technology, Mechatronics and Biomechanics,  
Brno, Czech Republic*

*<sup>4</sup>Tampere University of Technology- BioMediTech,  
Department of Electronics and Communications Engineering, Tampere, Finland*

**Purpose:** To investigate the influence of different skull defect shapes and the angle of the bone-implant interface on the stress distribution within PMMA implants.

**Methods:** In this study, four different skull defect shapes and three different cranioplasty osteotomy geometries (bone-implant interface orientation) were analysed using finite element models. A total of 15 configurations – combinations of implant shapes and interface orientations – were simulated under static loads of 50N. Subsequently the stresses in the implants, strains in the adjacent bone and stresses in the fixation device components were calculated.

**Results:** Configurations with negative bone osteotomy demonstrated the largest stresses in the implant (275 MPa), in the fixation devices (1258 MPa) and strains (0.04) in the surrounding bone. The most favorable configurations were found to be the circular implant with zero and positive osteotomie with the following, maximum observed magnitudes – implant stress (1.2 MPa and 1.2 MPa), fixation device stress (11.2 MPa and 2.2 MPa), bone strain (0.218e-3 and 0.750e-4).

**Conclusion:** The simulation results suggest that the preparation of skull defect sites is a critical procedure. Of the greatest importance is the angle at which the edges of the defect are sawed. If under an external load, the implant has no support from the interface, the stresses are transferred to the fixation devices. This, in addition to endangering their material integrity, can lead to unphysiological strains in the adjacent bone that endangers the bone morphology required for anchoring. These factors can ultimately weaken the stability of the entire implant assembly.

**ORAL SESSION 31: RECONSTRUCTION POST TRAUMATIC  
COMPUTER GUIDED 3D PLANNING IN MID FACE RECONSTRUCTION USING TWO  
DIFFERENT TECHNIQUES- PRELIMINARY STUDY**

*H. Shaheen<sup>1</sup>, E. Helmy<sup>1</sup>, M. Ahmed<sup>1</sup>, M. Ghanem<sup>1</sup>, H. Abdel Hameed<sup>1</sup>*

*<sup>1</sup>Naser Institute Hospital, Craniomaxillofacial, Cairo, Egypt*

Mid face reconstruction remains a challenging dilemma for craniomaxillofacial surgeons, some of these complicating factors are inherent to the 3D complexity of the mid face. the depth as well as the width of the mid face is dramatically affected by the meticulous reconstruction of each facial unit as well as the facial symmetry...in the current study we present our experience in the reconstruction of the mid face using 3D dynamic one piece pre-contoured titanium mesh and 3D contoured calverial bone graft

**Material and methods:** 20 patients were included in the current study, 10 patients post traumatic and 10 patients with pathological conditions..preoperative CT scans for each patient was used to prepare a Stereolithographic model for mesh adaptation or calverial bone graft adaptation ..patients were assessed clinically and radio graphically for facial symmetry, width, and projection..

**Results:** In 18 patients the clinical assessment as well as the post operative CT scans with 3D reconstruction compared to the preoperative scans showed adequate restoration of the mid face in the three planes.

**Conclusion :**The reconstruction of the mid face using pre-contoured one piece titanium mesh or 3D contoured calverial bone graft in conjunction with Stereolithographic models could present a good tool for reliable reconstruction, however, well planned clinical trials are recommended.

**ORAL SESSION 31: RECONSTRUCTION POST TRAUMATIC  
TRANSANTRAL DRAINAGE IN MANAGEMENT OF UNILATERAL ANTERIOR WALL  
FRONTAL SINUS FRACTURES. CASE SERIES STUDY**

*H. Shaheen<sup>1</sup>, M. Hakam<sup>1</sup>, E. Helmy<sup>1</sup>, M. Ahmed<sup>1</sup>, M. Gengehy<sup>1</sup>*

*<sup>1</sup>Naser Institute Hospital, Craniomaxillofacial, Cairo, Egypt*

Frontal sinus fractures pose interesting and challenging problem, optimal treatment strategies remain controversial. These fractures peculiarity is that a wrong treatment not only could encompass functional or aesthetical problems but also more dangerous complications. Various techniques have been advocated to repair or remove frontal sinus that largely depend on the mechanism and extent of injury and status of the nasofrontal duct (NFD). This study focused on conservative management of comminuted anterior table fractures of the frontal sinus affecting nasofrontal duct achieving transantral drainage to assess the efficacy of such modality.

**Patients & Methods:** This study was carried out on 20 patients suffering unilateral anterior wall fracture of their frontal sinuses approximating the nasofrontal duct and having intact posterior walls of their frontal sinuses. Patients received transantral drainage; where inter sinus septum (a) was removed to the level of the sinus floor and thus rendering the injured sinus in patent communication with the intact sinus. Clinical & computerized tomography (CT) radiographic evaluations were carried out at immediate post-operative, at 6 & 12 months post operatively.

**Results:** In the current study 90% of the included subjects were males, mean age was 34years. In 60% of the studied sample the frontal sinus fracture was associated with other maxillofacial fractures, other 40% was not associated with other fractures. When the technique was evaluated ,15 % of studied sample revealed complications. The results of this study indicated that transantral drainage could be a valid and conservative alternative in management of unilateral anterior frontal sinus fractures.

**ORAL SESSION 31: RECONSTRUCTION POST TRAUMATIC  
MURINE MOTOR DEFICIT ASSESSMENT OF CRANIECTOMY AND CRANIOPLASTY**

*B. Andrews<sup>1</sup>, A. Lydick<sup>1</sup>, S. Barbay<sup>1</sup>, R. Nudo<sup>1</sup>*

*<sup>1</sup>University Of Kansas Medical Center, Department of Plastic Surgery, Kansas City, USA*

Introduction: Hemi-craniectomy is a common surgical procedure which allows the brain to swell and herniate utilized to treat traumatic brain injury (TBI). Long-term consequences of hemi-craniectomy calvarial bone defects result in neurocognitive deficits termed "syndrome of the trephined". We hypothesize that a mouse animal model can be developed demonstrating long-term motor deficits attributed to a long standing skull defect similar to humans with syndrome of the trephined.

METHODS: C57 mice were randomized to three groups: Group 1= control group (sham surgery), Group 2= hemi-craniectomy only, and Group 3= hemi-craniectomy with immediate cranioplasty. Motor deficits were studied using a Beam Walk test. Statistical comparison of differences amongst the three groups was performed.

RESULTS: 30 mice were randomized amongst three groups (Control group, Craniectomy group, Cranioplasty group). Beam Walk test results demonstrated the Craniectomy group had a statistically higher contralateral footfault slip/step ratio when compared to the Control group ( $p < 0.05$ ). Comparison of the Control group and the Cranioplasty group demonstrated contralateral footfault slip/step ratio that were statistically different for 7 days post-operative but no statistical differences thereafter. Comparison of the Craniectomy group and the Cranioplasty group demonstrated statistically significant differences for 14 days, however motor deficits were not statistically different than baseline thereafter. No ipsilateral footfault deficits were detected in this study.

CONCLUSION: Motor deficits that are attributed to hemi-craniectomy bone defects alone are demonstrated in a mouse animal model. Cranioplasty prevents these same deficits. These deficits mimic those seen in the human syndrome of the trephined.

**ORAL SESSION 31: RECONSTRUCTION POST TRAUMATIC  
DIGITAL WORKFLOW IN FACIAL TRAUMATOLOGY AND RECONSTRUCTION: THE  
COMBINATION OF ADDITIVE MANUFACTURING AND NAVIGATION**

*M.C. Donders<sup>1</sup>, R. Schreurs<sup>1</sup>, T.J.J. Maal<sup>1</sup>, L. Dubois<sup>1</sup>, A.G. Becking<sup>1</sup>*

*<sup>1</sup>AMC, OMFS, Amsterdam, Netherlands*

Preoperative virtual surgery planning is the most important step in Computer Assisted Surgery (CAS). It is possible to transfer the preoperative planning to surgery with the use of helpful guides in order to exactly achieve the planned result. Static guidance is delivered with the use of additive manufactured templates, which are inserted during surgery and define the planned position and orientation. In dynamic guidance image-guided navigation is used.

The combination of these two concepts delivers additional and extraordinary benefits for surgery. Templates may be rigidly positioned with navigation and will deliver control at local level, eg acting as a sawing or drilling mall. Navigation can subsequently be used to assess the overall result in surgery.

We share our experiences and promising results of simultaneous static and dynamic guidance in patients with complex post-traumatic reconstructions.

**ORAL SESSION 31: RECONSTRUCTION POST TRAUMATIC  
EVALUATION OF COMPUTER –ASSISTED ORBITOZYGOMATIC RECONSTRUCTION  
USING CUSTOMIZED ALLOPLASTIC IMPLANTS**

*Y. Nassar<sup>1</sup>, A. Helmy<sup>1</sup>, M. Hakam<sup>1</sup>*

*<sup>1</sup>Cairo University, Oral & Maxillofacial Surgery, Cairo, Egypt*

**AIM :**

This study aimed at evaluating the efficacy of customized Polyetheretherketone implants in reconstruction of orbitozygomatic defects.

**METHODS:**

Seven patients with secondary posttraumatic defects underwent orbital or zygomatic reconstruction using patient-specific PEEK implants following computer-assisted virtual simulation. Three implants were fabricated via milling techniques while the other 4 were fabricated utilizing injection molding techniques. Follow-up period ranged from 6 months till 2 years.

**RESULTS:**

All implants showed satisfactory fit intraoperatively with no or minimal adjustments. Wounds healed perfectly in 6 cases with no complications and only one case developed complications that required implant removal. Post-operative clinical assessment and CT data revealed good aesthetic outcomes and reproducibility of the virtual plan.

**CONCLUSIONS:**

Within the limitations of the relatively small sample size, patient-specific PEEK implants allowed adequate reconstruction in patients with orbitozygomatic defects with good cosmetic results while avoiding donor site morbidities and reducing the intraoperative surgical time.

**ORAL SESSION 32: TISSUE ENGINEERING AND CELL THERAPY  
DEVELOPMENT OF A SCREENING METHOD BY FLOW CYTOMETRY TO CHARACTERIZE  
DIVERSE SOURCES OF HUMAN MSCS AND TO EVALUATE THEIR POTENTIAL FOR BONE  
AND CARTILAGE ENGINEERING**

*H. Fabre<sup>1</sup>, M. Ducret<sup>2</sup>, J. Rodriguez<sup>3</sup>, E. Perrier-Groult<sup>2</sup>, E. Aubert-Foucher<sup>2</sup>, O. Degout<sup>4</sup>,  
N. Forraz<sup>4</sup>, G. Atzeni<sup>4</sup>, C. McGuckin<sup>4</sup>, F. Mallein-Gerin<sup>2</sup>, A. Mueller<sup>5</sup>*

*<sup>1</sup>University of Basel, Department of Biomedical Engineering, Allschwil, Switzerland*

*<sup>2</sup>Institute for the Biology and Chemistry of Proteins, Cartilage Biology and Engineering, Lyon,  
France*

*<sup>3</sup>Edouard Herriot Hospital, Laboratory for Skin Substitutes, Lyon, France*

*<sup>4</sup>CTI-BIOTECH, CTI-BIOTECH, Meyzieu, France*

*<sup>5</sup>University Hospital Basel, Department of Maxillo-Facial Surgery, Basel, Switzerland*

**Aims:** One main project of our laboratory is to identify the best sources and subpopulations of Mesenchymal Stem Cells (MSCs) for bone and cartilage repair.

**Methods:** In this study, we compared MSCs isolated from Whartons' jelly, adipose tissue, dental pulp, and bone marrow. MSCs were cultured in entirely xeno-free conditions, allowing more easily their use in clinical application. A polychromatic panel of 30 surface markers was developed from the literature that includes conventional positive or negative selection markers of MSCs and a set of additional markers of interest regarding their skelettogenic potential. Those markers were used for the sorting of putative skeletal progenitors. The assessment of chondrogenesis was achieved by fluorescently labeling the procollagen IIB, the only chondrocyte-specific isoform of this type of collagen, and measuring its internal expression by chondrogenically-induced MSCs with flow cytometry.

**Results:** We demonstrate here that MSCs subpopulations from various adult or perinatal tissues, even though cultured in the same xeno-free conditions, show significant differences in the expression of specific markers of interest and in their chondrogenic and osteogenic potentials. We also show for the first time that the anti-collagen-IIB antibody can be used in flow cytometry to reveal intracellular IIB procollagen expression in MSCs and therefore be applied as a quality control tool to quantitatively assess the degree of MSCs' chondrogenic conversion.

**Conclusion:** The results of our study will help to select the most appropriate source and population of MSCs, capable of producing high quality bone or cartilage matrix in a clinically-translatable protocol.

**ORAL SESSION 32: TISSUE ENGINEERING AND CELL THERAPY  
MUSCLE-DERIVED STEM CELLS CAN TRANSFORM INTO CELLS WITH SCHWANN CELL  
PHENOTYPES AND FUNCTIONAL MYELINATION PROPERTIES**

*J. Lopez*<sup>1</sup>, *J. Escalante*<sup>1</sup>, *A. Quan*<sup>1</sup>, *H. Wang*<sup>1</sup>, *Q. Guo*<sup>1</sup>, *L. W.P. Andrew*<sup>1</sup>, *G. Brandacher*<sup>1</sup>,  
*A. Kumar*<sup>1</sup>

<sup>1</sup>*Johns Hopkins Hospital, Plastic & Reconstructive Surgery, Baltimore, USA*

**Purpose:**

Muscle-derived stem cells (MDSCs) are a distinct population of immature progenitors cells with pronounce pluripotent potential. Previous findings from our laboratory have demonstrated that MDSCs have special osteogenic, vascular, and endothelial potential. However, few studies have explored the schwann-cell differentiation potential of MDSCs *in-vitro*.

**Methods:**

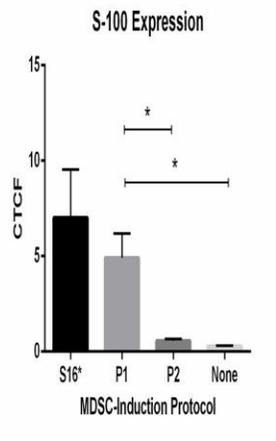
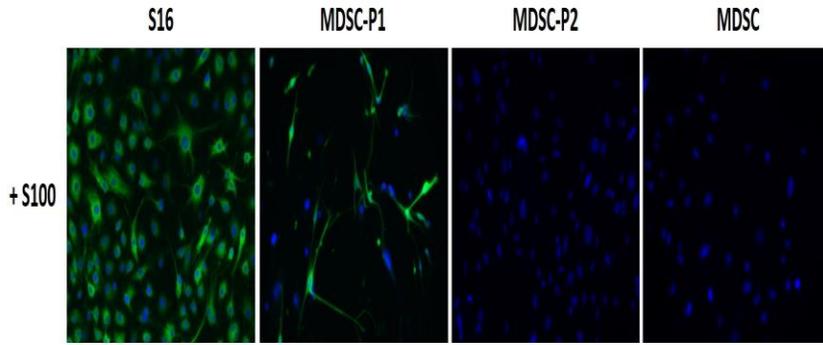
MDSCs were isolated from 4-8 weeks old C57BL/6J mice using a previously described pre-plate technique. Two mesenchymal-stem cell (MSC) neurogenic induction protocols (P1 vs P2) composed of various glial growth factor combinations were used for Schwann cell differentiation of MDSCs. A Schwannoma cell line (S16) was used as a positive control for all experiments. Immunocytochemistry and flow cytometry were performed to assess the expression of schwann-cell markers including S-100 and p75 in schwann-cell-induced MDSCs. *In vitro* myelination assays were performed to assess the functional capabilities of these schwann-cell-induced MDSCs.

**Results:**

The two MSC induction protocols showed statistically significant differences in their Schwann cell induction potential ( $p = 0.004$ ). Schwann cell differentiation for twelve days using the P1 protocol led to an upregulation in the fraction of cells expressing S100 compared to the P2 protocol and the untreated MDSCs controls (CTCF 4.9 vs 0.5 vs 0.28,  $p = 0.002$ ). Furthermore, unstimulated and P2 stimulated MDSCs demonstrated no myelination capacity while P1-induced MDSCs showed myelination capabilities *in vitro*.

**Conclusion:**

MDSCs can be differentiated into Schwann cells with functional capabilities *in vitro*. These *in vitro* findings suggest that MDSCs may have a potential application for cellular therapy in peripheral nerve regeneration.



**ORAL SESSION 32: TISSUE ENGINEERING AND CELL THERAPY**  
**EFFECT NANO PGA TO TISSUE ENGINEER CARTILAGE WITH HUMAN MICROTIA**  
**CHONDROCYTES**

*H. Nakao<sup>1</sup>, T. Morotomi<sup>1</sup>, Y. Itani<sup>1</sup>, N. Hirano<sup>1</sup>, T. Fukuda<sup>1</sup>, H. Nishiwaki<sup>1</sup>, T. Nakao<sup>2</sup>, R. Jacquet<sup>3</sup>, W. Landis<sup>4</sup>, N. Isogai<sup>1</sup>*

*<sup>1</sup>Kinki University Faculty of Medicine, Department of Plastic and Reconstructive Surgery, Osaka-sayama, Japan*

*<sup>2</sup>Kinki University Faculty of Medicine, Department of Emergency & Critical Care Medicine, Osaka-sayama, Japan*

*<sup>3</sup>University of Akron, Department of Polymer Science, Akron, USA*

*<sup>4</sup>The University of Akron, Department of Polymer Science, Akron, USA*

**Aims:** Previous regeneration studies of auricle-shaped cartilage by tissue engineering leave unresolved whether the chondrocyte phenotype from human auricular chondrocytes seeded on polymeric scaffolds is retained over long term and whether microtia remnants may be a viable cell source for auricular reconstruction.

**Methods:** Chondrocytes were isolated from human ears, either normal conchal ear or microtia cartilage remnants, expanded in vitro and seeded onto nanofiber polyglycolic acid (nanoPGA) sheets. These tissue-engineered constructs were implanted into athymic mice for up to 40 weeks. At harvest times of 5, 10, 20 and 40 weeks, samples were documented by gross morphology, histology and reverse transcription-quantitative polymerase chain reaction (RT-qPCR) analysis.

**Results:** Neocartilages generated from the two types of surgical tissues were similar in appearance of their extracellular matrices and positive staining for elastin and proteoglycans. In the 5-40 week time interval, there was an increasing trend in gene expression for type II collagen, elastin and SOX5, important to normal cartilage phenotype, and a decreasing trend in gene expression for type III collagen, a fibroblast and dedifferentiation marker. Over 40 weeks of implantation, the original nanoPGA scaffold dimensions (1 cm x 1 cm x 80 µm) were generally maintained in tissue-engineered cartilage length and width while thickness was statistically significantly increased.

**Conclusions:** Auricular cartilage can be regenerated over long term (40 weeks) from surgical remnants by tissue-engineering techniques incorporating nanoPGA scaffolds. Based on the present assays, microtia neocartilage very closely resembles tissue-engineered cartilage regenerated from chondrocytes isolated from normal conchal cartilage.

**ORAL SESSION 32: TISSUE ENGINEERING AND CELL THERAPY  
PLATELET RICH PLASMA, AN AUTOLOGOUS SOURCE OF CONCENTRATED PLATELETS.  
ANALYSIS OF DIFFERENT HARVESTING TECHNIQUES, EFFICACY AND  
CONTROVERSIES IN MAXILLOFACIAL SURGERY**

*M. Shahla<sup>1</sup>, D. Dequanter<sup>1</sup>, Y. Deniz<sup>1</sup>, C. Aubert<sup>1</sup>, A. Lemaitre<sup>1</sup>, P. Lothaire<sup>1</sup>*

*<sup>1</sup>Vesale University Hospital, Department of Cranio-maxillofacial & Head and Neck Surgery,  
Rhode Saint Genese, Belgium*

Platelet rich plasma is an autologous source of concentrated platelets, obtained by a 4-5 times concentration of autologous blood. Thus obtaining high levels of available growth factors shown to be involved in bone matrix formation such as IGF, TGF- $\beta$ , VEGF and PDGF.

PDGF has been detected in early stages of the bone healing process and fracture sites.

The presence of high concentrates of platelets and thus growth factors would increase bone healing and decrease bone resorption after tooth extraction, autologous bone grafts and/or heterologous bioactive composite scaffolds.

The widespread use of PRP is well documented in the literature. The efficacy of the use of PRP in bone healing and regeneration with both autologous bone grafts and bone substitutes in maxillofacial surgery has been widely studied and reported. However the results are somewhat inconsistent in both animal and human models.

We sought to scrutinize all recent studies in both animal and human models and to:

1. Establish whether there is a common ground in these studies or are they all somewhat different
2. Evaluate the causes of inefficacy in some models in contrast with significant amelioration in others.
3. Determine which factors contribute to these differences and what was not done appropriately and mainly what contributes to bone regeneration enhancement with regards to PRP use?
4. Confirm if all animal models comply with a common methodology in PRP use?  
Which co-factors contribute either positively or negatively on the outcome?
5. Verify activating factor(s) and method(s) utilized to evaluate bone regeneration.

**ORAL SESSION 32: TISSUE ENGINEERING AND CELL THERAPY  
ATTRACTIVE OSTEOPROMOTIVE POTENTIAL OF RECOMBINANT HUMAN (RH)BMP-9  
COMPARED TO RHBMP-2 FOR BONE TISSUE ENGINEERING**

*M. Kobayashi<sup>1</sup>, E. Kobayashi<sup>1</sup>, N. Saulacic<sup>1</sup>, B. Schaller<sup>1</sup>, M. Mottini<sup>1</sup>, T. Iizuka<sup>1</sup>, R. Miron<sup>1</sup>*  
*<sup>1</sup>University of Bern, Department of Cranio-Maxillofacial Surgery, Bern, Switzerland*

**Aims:** Bone morphogenetic protein 9 (BMP9) has previously been characterized as one of the most osteogenic growth factors of the BMP-family, however, up until now, these experiments were demonstrated using adenovirus-transfection experiments (gene therapy). With the recent development of recombinant human (rh)BMP9, the aim of the present study was to investigate its osteopromotive potential versus rhBMP2 utilizing both in vitro and in vivo models.

**Methods:** First, ST2 stromal bone marrow cells were seeded onto 1)control; 2)rhBMP2-low(10ng/ml); 3)rhBMP2-high(100ng/ml); 4)rhBMP9-low(10ng/ml); and 5)rhBMP9-high(100ng/ml) onto porcine collagen membranes or deproteinized bovine bone mineral(DBBM). Furthermore, 5mm calvarial defects were created in rabbits and loaded with rhBMP2 and 9 at both low(5µg) and high(20µg) per defect loaded with DBBM particles and investigated for new bone formation via micro-CT and histomorphometry.

**Results:** It was first observed that rhBMP9-high significantly increased ALP activity (5-fold increase) and alizarin red staining (3-fold increase) when compared to rhBMP2. In addition, real-time PCR results of collagen1a1, osteocalcin and ALP demonstrated similar up-regulations consistently favouring rhBMP9. The results from the animal model demonstrated that rhBMP9 (20µg) significantly promoted new bone formation as assessed by micro-CT when compared to rhBMP2.

**Conclusion:** rhBMP9 significantly induced higher bone-inducing cell activity in vitro and new bone formation in vivo when compared to rhBMP2. Furthermore, lower doses of rhBMP9 could be utilized when compared to rhBMP2 to reach a similar bone-inducing response (10x in vitro, and 4x in vivo). These results indicate that rhBMP9 may be a suitable growth factor for future regenerative procedures in bone biology.

## **ORAL SESSION 32: TISSUE ENGINEERING AND CELL THERAPY**

### **NOVEL SILK PROTEIN BARRIER MEMBRANES FOR CRANIAL DEFECT REGENERATION**

*H. Hanken<sup>1</sup>, C. Knabe<sup>2</sup>, M. Rheinnecker<sup>3</sup>, A. Gröbe<sup>1</sup>, M. Heiland<sup>1</sup>, A. Kolk<sup>4</sup>, R. Zehbe<sup>5</sup>,  
M. Sachse<sup>6</sup>, C. Große-Siestrup<sup>5</sup>, M. Wöltje<sup>3</sup>, R. Smeets<sup>1</sup>*

*<sup>1</sup>University Medical Center Hamburg-Eppendorf, Department of Oral and Maxillofacial Surgery, Hamburg, Germany*

*<sup>2</sup>Philipps University Marburg, Department of Experimental Orofacial Medicine, Marburg, Germany*

*<sup>3</sup>Spintec Engineering GmbH, Spintec Engineering GmbH, Aachen, Germany*

*<sup>4</sup>Klinikum rechts der Isar der Technischen Universität München, Department of Oral- and Cranio-Maxillofacial Surgery, Munich, Germany*

*<sup>5</sup>BLS Laboratories GmbH, BLS Laboratories GmbH, Berlin, Germany*

*<sup>6</sup>Technische Universität Dresden,*

*Institute of Textile Machinery and High Performance Material Technology, Dresden, Germany*

This study assesses biocompatibility of novel silk protein membranes with and without modification, and evaluates their effect on facilitating bone formation and defect repair during guided bone regeneration. Two calvarian bone defects of 12mm in diameter were created in each of a total of 38 rabbits and four different types of membranes, (silk-, hydroxyapatite-modified silk-,  $\beta$ -TCP-modified silk- and conventional collagen-) were implanted to cover one of the two defects in each animal. Hematology, body weight and general health were monitored throughout the 10 weeks of study period which were all within the normal range for all animals and histologic analysis did not show any adverse reactions in any of the defect sites demonstrating good biocompatibility of all silk protein membranes. After 10 weeks, the collagen membrane was resorbed in all cases, while the silk membrane was still visible in 1/5 (20%) and hydroxyapatite-silk membrane in 4/5 (80%) cases in the micro CT scans.  $\beta$ -TCP-modified silk membranes remained visible in all cases. Histomorphometric evaluation revealed significantly ( $p=0.002$ ) higher new bone ingrowth into defects covered with  $\beta$ -TCP modified silk membranes compared to new bone ingrowth into defects without any barrier membrane cover. Also micro-CT analysis showed greatest new bone ingrowth into defects protected with  $\beta$ -TCP silk membranes. None of the other membranes showed a comparable effect on guided bone regeneration with respect to promoting significantly greater bone regeneration and defect bridging.

**ORAL SESSION 32: TISSUE ENGINEERING AND CELL THERAPY  
PLASMA-RICH IN GROWTH FACTORS IN RECONSTRUCTION OF FACIAL BONE  
DEFECTS: CLINICAL AND RADIOLOGICAL STUDY**

*V. Rybak<sup>1</sup>, A. Kopchak<sup>1</sup>*

*<sup>1</sup>The O.O. Bogomolets National medical university, Maxillo-facial Surgery, Kiev, Ukraine*

**Aims.** To evaluate the efficacy of additional plasma-rich in growth factors (PRGF) application in management of facial bone defects treated with autogenous bone grafts.

**Materials and methods.** 40 patients with posttraumatic (30%) and postoperative bone defects were randomized into 2 groups. In the 1-st group (control) the traditional reconstruction procedures with autogenous bone grafts were used. In the 2-d (main) group the additional PRGF preparation was applied for enhancing the regeneration process. Iliac crest was used for grafting in 87.5% cases, other donor sites were fibula or cranial bones. Early and delayed results of the bone reconstructions were evaluated clinically and radiologically. Follow up period - 1.5 years. Radiological examination included CT data analysis for volumetric changes of the bone defect and graft, as well as the bone density inside the graft and surrounding bone.

**Results.** In early terms after reconstruction the soft tissue healing significantly improved in the main group by accelerating the wound closure and scar formation. However the changes in the bone volume and density of the graft and recipient zone after 1.5 years were not significant. Complications in early and late postoperative period developed in 17.5%. There were no significant differences in complication rates between groups.

**Conclusions.** PRGF improved the soft tissues regenerating process in early terms after bone reconstruction procedures with autogenous bone grafts, at the same time no significant differences were found in infection rates, bone regeneration and remodeling in the patients, but have no significant influence on bone regeneration and remodeling in patients with facial bone defects.

**ORAL SESSION 32: TISSUE ENGINEERING AND CELL THERAPY  
HISTOMORPHOLOGICAL EFFECTS OF REPETITIVE rhBMP-2 APPLICATION INTO HA-  
SCAFFOLDS IN HETEROTOPIC BONE INDUCTION**

*B. Beck-Broichsitter<sup>1</sup>, S.T. Becker<sup>2</sup>, S. Hermann<sup>3</sup>, J. Wiltfang<sup>2</sup>, P.H. Warnke<sup>2</sup>*

*<sup>1</sup>University Medical Center Hamburg-Eppendorf, Oral and Maxillofacial Surgery, Hamburg, Germany*

*<sup>2</sup>Schleswig-Holstein University Hospital, Oral and Maxillofacial Surgery, Kiel, Germany*

*<sup>3</sup>Rostock University, Fluid Technology and Microfluidics, Rostock, Germany*

The timepoint of administering bone morphogenic protein-2 (BMP-2) may be important for the final outcome of engineered bone tissue. This study aims to evaluate the impact of repetitive rhBMP-2 injections on the morphology of hard and soft tissue in heterotopic bone induction.

A prefabricated HA-scaffold was implanted into the latissimus dorsi muscle in 40 female Lewis rats. BMP-2 injections were performed at defined time points. The cumulative dosage was 200 µg per animal. The control group received solely a scaffold with no BMP-2. Fluorescence markers were injected intraperitoneally after operation. CT-scans and histological examination were performed after 8 weeks at the end of the study.

Significant differences for the outcome of bone density were determined in groups who received delayed injections at two separate time points in comparison to those with simultaneous BMP-2 application ( $p = 0.0038$ ;  $p = 0.0063$ ) and the control group ( $p = 0.017$ ,  $p = 0.0284$ ). The amount of blood vessels was significantly higher in groups with multiple injections when compared with control group and simultaneous BMP-2 injections. Two different types of soft tissue were determined with different patterns of distribution among the study groups. Fluorescence labeling indicated active bone remodelling after 4 to 5 weeks in all groups with BMP-2 injections.

The efficiency of multiple repetitive injections was higher compared to simultaneous application regarding bone and blood vessel density indicating time-dependent effects of BMP-2. BMP-2 application had long lasting effects even weeks after application on new bone formation processes.

**ORAL SESSION 32: TISSUE ENGINEERING AND CELL THERAPY  
MESENCHYMAL STEM CELLS GRAFTED FROM ILIAC CREST BONE TO IMPROVE  
ATROPHIC MANDIBULAR FRACTURES TREATMENT IN ELDERLY PATIENTS**

*G. Spinelli<sup>1</sup>, F. Arcuri<sup>1</sup>, M. Conti<sup>1</sup>, T. Agostini<sup>1</sup>, G. Mannelli<sup>2</sup>*

*<sup>1</sup>Maxillo-Facial Surgery Unit, Neurosensorial Department, Florence, Italy*

*<sup>2</sup>University of Florence, Surgery and Translational Medicine, Florence, Italy*

**Introduction.** Treatment of fractures in old patients with bone atrophy is characterized by high morbidity due to local and general factors. Treatment basic principles include open reduction and internal fixation, but results are often affected by minor surgical experience and high morbidity rate. This study aimed to assess the advantages of autologous mesenchymal stem cells (MSCs) use for atrophic mandibular fractures treatment in comparison to standard technique.

**Materials and Methods.** 35 patients were treated for fractures of atrophic mandibles between January 2011 and December 2014. Surgical technique provided mini-invasive open reduction with or without immediate homologous bone graft, whilst selected patients received autologous stem cells graft in addition to the standard treatment.

**Results.** Patients were sorted according to use of MSCs, leaving 17 patients treated with standard technique and autologous stem cells (Group A) and 18 treated with standard osteosynthesis only (Group B). 26 out of 35 had bilateral fractures; immediate bone graft was used in 37.1% of patients. Complications occurred in 5 patients (14.3%).

**Conclusions.** Despite the advanced age and medical co-morbidities of the vast majority of patients, mini-invasive open approach with autologous bone graft ensure a fast and excellent recover. Moreover, the management of atrophic mandibular fractures by autologous stem cells is a safe and useful procedure which has a lower complication rate when compared to standard technique.

### **ORAL SESSION 33: RECONSTRUCTION**

#### **DEEP INFERIOR EPIGASTRIC ARTERY PERFORATOR FLAP IN HEAD AND NECK RECONSTRUCTION**

*M. Koraitim<sup>1</sup>, J. Borhamy<sup>1</sup>, A. Habib<sup>1</sup>, P. Brennan<sup>2</sup>, A. Medra<sup>1</sup>*

*<sup>1</sup>Faculty of Dentistry- Alexandria University, Maxillofacial and Plastic Surgery, Alexandria, Egypt*

*<sup>2</sup>Portsmouth Hospitals NHS Trust, Oral and Maxillofacial Surgery, Portsmouth, United Kingdom*

*Background:* The deep inferior epigastric flap is a modification of the rectus abdominis flap in which the abdominal skin is harvested based on the paraumbilical perforators without sacrificing the rectus abdominis muscle. In this study, we evaluated the role of deep inferior epigastric artery perforator (DIEP) flap in head and neck reconstruction.

*Methods:* A prospective study was performed on 11 patients with head and neck defects that were reconstructed with the deep inferior epigastric artery perforator (DIEP) flaps between June 2012 and October 2015. Data collected included patient demographics, etiology and site of the defect, reconstructive technique, flap size, recipient vessels, complications, reconstructive technique, and clinical follow-up.

*Results:* Recipient sites were subdivided into glossectomy defects (N = 3), skull base and three dimensional defects of face +/- oral cavity (N = 3), cheek (N = 1), facial defects (N = 2), and facial contour deformities (N= 2). Average age was 44 years. The average flap size was 10 x 7 cm. The overall free flap success rate was 82% (9/11). Two DIEP free flap were lost due to thrombosis at the venous anastomosis and internal jugular vein. No abdominal bulge or hernia were observed in the donor site.

*Conclusion:* DIEP flap is an attractive option for oro-facial reconstruction providing a large skin paddle, a long pedicle with minimal donor site morbidity, and more cosmetically pleasing to the patient.

## **ORAL SESSION 33: RECONSTRUCTION**

### **PERONEAL ARTERY PERFORATOR FLAP (PAP) IN HEAD AND NECK RECONSTRUCTION**

*S. Mattine*<sup>1</sup>

<sup>1</sup>*Worcestershire Acute Trust, Head & Neck/Maxillofacial Surgery, Worcester, United Kingdom*

#### Introduction:

Reconstruction of Complex and through and through head and neck defects may require bone and multiple soft tissue paddles often necessitating two free flaps for the best outcome, thus increasing the risk of morbidity and complications.

The author will present a series of cases where a PAP fasciocutaneous flap is successfully harvested either as a free flap or in a chimeric form in combination with a traditional osseocutaneous composite fibular flap, thus facilitating reconstruction of composite through and through defects.

#### Methods:

Ten patients requiring reconstruction with bone and 2 soft tissue paddles were included in this study. A chimeric flap composed of a PAP flap based on the proximal perforators along with a traditional osteocutaneous fibula based on distal perforators was raised. The proximal skin paddle was based on the proximal perforator and not achieved by division of the distal skin paddle as described by some previous reports in the literature.

#### Conclusion

The PAP flap proved to be anatomically reliable and highly effective, particularly in a chimeric combination with a composite fibular flap for reconstruction of composite through and through defects. It offers a large, thin and pliable tissue that can overcome some of the restrictions with other chimeric flaps such as the DCIA or sub-scapular system. Where additional bulk was required, parts of soleus or flexor hallucis longus were successfully added. This technique of chimeric flaps described here offers a wide distance between the two skin paddles, facilitating free range of movements with no tension when reconstructing distant soft tissue defects.

**ORAL SESSION 33: RECONSTRUCTION  
CHALLENGING RECONSTRUCTION IN VESSEL-DEPLETED NECK**

*S. Mattine<sup>1</sup>*

*<sup>1</sup>Worcestershire Acute Trust, Head & Neck/Maxillofacial Surgery, Worcester, United Kingdom*

**Introduction:**

The commonly used recipient vessels in head and neck reconstruction can be significantly compromised, non-viable and in some cases completely absent in patients exposed to previous surgery and/or chemoradiotherapy.

**Method:**

The author aims to present a review of microvascular reconstructive surgery for osteoradionecrosis in a small group of patients with vessel depleted neck.

**Results:**

All patients apart from one, had undergone bilateral resection and reconstruction for bilateral oropharyngeal cancers, completed chemoradiotherapy with some having further attempts at reconstruction with pedicled flaps. The only case with unilateral oropharyngeal cancer had subsequently presented with a new laryngeal carcinoma, thus requiring a total laryngectomy, bilateral neck dissections and additional radiotherapy. One patient presented with a discrete SCC in addition to his pre-existing osteoradionecrosis, thus requiring multiple flaps.

The options for successfully addressing the challenges of reconstructive surgery in a vessel depleted neck will be demonstrated. Our strategy to achieve arterial supply included exploration and anastomosis to contralateral neck vessels, the transverse cervical artery and the superficial temporal artery. Venous Anastomosis was achieved with the superficial temporal vein, smaller thyroid veins and vein grafts.

**Conclusion:**

The superficial temporal vessels, transverse cervical artery and smaller veins in the neck such as the thyroid veins represent reliable alternatives in the vessel-depleted neck. Vein grafts should be used freely when required. The superficial temporal vessels should perhaps be considered as the primary choice for recipient vessels even in non-compromised necks, particularly when reconstructing cranial and mid-facial defects. This is likely to result in reduced morbidity and better outcome.

**ORAL SESSION 33: RECONSTRUCTION  
ANTEROLATERAL THIGH FLAP HARVEST WITHOUT PREOPERATIVE PERFORATOR  
LOCATING**

*A. Karpenko<sup>1</sup>, R. Sibgatullin<sup>1</sup>, L. Roman<sup>1</sup>*

*<sup>1</sup>Leningrad regional oncologic dispensary, Head and Neck Surgery, Saint-Petersburg, Russia*

The aim of the study is to describe our results with the anterolateral thigh flap used for the reconstruction of postablation defects in the head and neck area.

Methods. Since 2011, 74 patients with oral cavity (53 cases), oropharyngeal (14), hypopharyngeal (3), maxillary sinus (2) and skin cancer (2) aged between 36 and 78 years were operated on. The reconstruction was primary in all but 3 cases. No attempt was made to map perforators preoperatively.

Results. 43 fasciocutaneous and 31 musculocutaneous flaps were raised. Musculocutaneous perforators prevailed over septocutaneous – 76,5 vs 23,5%. There were 63 typical (including 4 cases of the oblique branch anomaly) and 11 (14,9%) atypical flaps with 4 distinct types of vascular anatomy. One of those atypical types with a perforator running through the rectus femoris muscle is generally considered as not suitable for microsurgical anastomosis. 3 other types are frequently cited in the literature. The source vessels were descending, transverse and oblique branches of the lateral circumflex femoral artery in 63, 7 and 4 cases. Those 74 flaps were raised out of 77 attempts, so the rate of failure (3,9%) is comparable with that reported by other surgeons. In all 3 failed cases the contralateral thigh was successfully used. 4 flaps (5,4%) were lost due to arterial (2 cases) and venous (2) thrombosis. The rate of partial flap necrosis was 2,7%.

Conclusions. Conventional methods of mapping of perforators can not predict the course and source vessel of the perforator and are not essential for flap harvest.

### ORAL SESSION 33: RECONSTRUCTION

#### ANALYSIS ON FACTORS AFFECTING TO SALVAGE RATE OF COMPROMISED FREE FLAPS IN HEAD AND NECK RECONSTRUCTION

*Y.C. Kim<sup>1</sup>, J.W. Choi<sup>1</sup>, W.S. Jeong<sup>1</sup>, T.S. Oh<sup>1</sup>, K.S. Koh<sup>1</sup>*

*<sup>1</sup>Asan Medical Center- University of Ulsan College of Medicine, Plastic Surgery, Seoul, Republic of Korea*

**INTRODUCTION:** The relationship between venous drainage system and rate of thrombosis is still controversial in several studies. In this study, the correlation between number of venous anastomosis and salvage rate of free flaps was analyzed in head and neck reconstruction with arterial anastomosis to proximal branch of carotid artery.

**MATERIALS AND METHODS:** A total of 449 patients underwent free flap reconstruction after head and neck cancer ablation surgery in our institution from 2006 to 2015 and 350 of 449 were included. All donor arteries were anastomosed to proximal branches of carotid artery. Details of salvage attempt, flap characteristics and association between timing of exploration and number of venous anastomoses were analyzed.

**RESULTS:** Total flap survival rate was 97.1% and 21 patients were explored for suspected vascular compromise in postoperative period. The salvage rate of total revision operations was 57.1%. Although correlation between number of venous anastomosis and flap salvage rate was not statistically significant ( $p=0.84$ ), time to revision surgery was delayed significantly in cases with multiple venous anastomoses ( $p=0.03$ ). The average time to revision was 42.7 hours when single anastomosis was performed and 71.9 hours when multiple anastomoses were performed.

**CONCLUSION:** Times to surgical exploration when flap compromise is suspected tend to be delayed when multiple venous anastomoses were performed. Therefore, careful monitoring is also needed until postoperative 3 days.

Table 1. Characteristics of suspected flap compromise cases

		Total case	Salvage case
Total case		350	340 (97.1%)
Anastomosis type	Single anastomosis	10	5 (50%)
	Multiple anastomoses	11	6 (54.5%)
Flap type	RFFF	11	8 (72.7%)
	ALT FF	4	1 (25%)
	MSP FF	4	1 (25%)
	Fibular FF	1	1 (100%)
	Jejunal FF	1	0 (0%)
Time to revision	< 1 day	6	4 (66.7%)
	1 day to 3 days	7	3 (42.6%)
	3 days to 7 days	8	4 (50%)
Assumed cause of flap compromise	Arterial insufficiency	3	1 (33.3%)
	Venous congestion	18	10 (55.6%)
Final result	Flap salvage	11	52.4%
	Revision to other flap	10	47.6%

RFFF: radial forearm free flap, ALT FF: anterolateral thigh free flap, MSP FF: medial sural artery perforator free flap, Fibular FF: fibular free flap, Jejunal FF: jejunal free flap

**ORAL SESSION 33: RECONSTRUCTION**  
**DONOR SITE MORBIDITY AFTER SCAPULAR TIP FREE FLAPS IN HEAD-AND-NECK**  
**RECONSTRUCTION**

*A. Varazzani<sup>1</sup>, B. Bianchi<sup>1</sup>, A. Ferri<sup>1</sup>, S. Ferrari<sup>1</sup>, L. Salvagni<sup>1</sup>, E. Contadini<sup>1</sup>, E. Sesenna<sup>1</sup>*

*<sup>1</sup>Azienda Ospedaliero Universitaria, Maxillofacial Surgery, Parma, Italy*

**Aims**

Purpose of this presentation is to evaluate shoulder function in a series of patients underwent scapular tip free flaps for the reconstruction of the head and neck area.

**Introduction**

Recently, the scapular tip free flap has been popularized as a valuable option for bone reconstruction of the head and neck area. Analyses of perioperative and long-time morbidity are crucial to enable complete comprehension of this technique.

**Methods:** Perioperative and long-term morbidity of scapular tip flaps harvesting were analyzed in a cohort of 19patients. Local complications and ambulation-time were used to assess perioperative results, while Constant–Murley and DASH scores were used to evaluate long-term morbidity on shoulder functions.

**Results:** Local perioperative complications were minimal (three cases of seroma and two wound dehiscence). Ambulation time ranged between 2 and 4 days (mean 2.7 days). Constant–Murley scores ranged between 66 and 100 (mean 92.2). The DASH score ranged between 39 and 85 (mean 48.6).

**Conclusion:** Harvesting a scapular tip free flap resulted in very low shoulder morbidity, without interfering the patient's daily activities.

**ORAL SESSION 33: RECONSTRUCTION**  
**PERFORATOR ANATOMY OF THE RADIAL FOREARM FREE FLAP VERSUS THE ULNAR FOREARM FREE FLAP FOR HEAD AND NECK RECONSTRUCTION**

E. Van Cann<sup>1</sup>

<sup>1</sup>*University Medical Center Utrecht, Department of Head and Neck Surgical Oncology, Utrecht, Netherlands*

**Aim:** to investigate the vascular anatomy of the distal forearm in order to optimize the choice between the radial forearm free flap or the ulnar forearm free flap and to select the best site to harvest the flap.

**Methods:** The radial and ulnar arteries of 7 fresh cadavers were injected with epoxy resin (Araldite®) and perforating arteries were dissected.

**Results:** The number of clinically relevant perforators from the radial and ulnar arteries was not significantly different in the distal forearm. Most perforators were located in the proximal half of the distal one third, making this part probably the safest location for flap harvest. Close to the wrist, i.e. most distally, there were more perforators on the ulnar side than on the radial side. The ulnar artery stained 77% of the skin surface area of the forearm, whereas the radial artery stained most of the skin of the hand (see Figure).

**Conclusions:** The ulnar forearm free flap is more suitable than the radial forearm free flap for the reconstruction of large defects.



**ORAL SESSION 33: RECONSTRUCTION**  
**DONOR-SITE MORBIDITY AFTER FREE FIBULA FLAP**

*J. Diefenbach<sup>1</sup>, D. Schmermund<sup>1</sup>, J.F. Wilbrand<sup>1</sup>, H. Schaa<sup>2</sup>, H.P. Howaldt<sup>1</sup>, S. Attia<sup>1</sup>*

*<sup>1</sup>University Hospital Giessen, Oral and Maxillofacial Surgery, Giessen, Germany*

*<sup>2</sup>MKG am Theater, Maxillofacial Surgery, Giessen, Germany*

**Aims** The free fibula flap is common for defect reconstruction in oral and maxillofacial surgery. The goal of this study is to examine the donor limb in order to determine its morbidity with an emphasis on balance and stability.

**Methods** The study is designed as a retrospective clinical study. A total of 40 Patients who underwent a fibula flap surgery for oral reconstruction from 2002 to 2015 were examined. The main parts of the examination were the Star Excursion Balance Test (SEBT) and the Foot and Ankle Disability Index (FADI). The SEBT is an orthopaedic test for measuring postural control of persons with lower limb or ankle injury. With the FADI affection of the quality of life of a patient suffering from lower limb injury can be assessed. Furthermore, general and specific medical data regarding the donor site were collected aided by a questionnaire.

**Results** SEBT overall performance of the donor leg was 96,7% +- 1,9% (arithmetic mean) or 97% +-2,9% (median) compared to the healthy leg. The average FADI score was 91,1% with 13 patients reporting no limitations and scoring 100%. Donor site complications were found in 24 out of 40 patients, mostly wound healing deficits (n=15). Average pain after surgery was 3,6 on scale 0-10 (max) and lasted for an average of 8,4 weeks.

**Conclusions** The donor site morbidity following free fibula flap surgery appears to be generally low, with good performance in balance and stability, as recorded via SEBT.

**ORAL SESSION 33: RECONSTRUCTION  
COOK-SWARTZ-DOPPLER-PROBE FOR EVALUATION OF PERFUSION OF  
MICROVASCULAR FLAPS**

*P.J. Voss<sup>1</sup>, A.A. Füßinger<sup>1</sup>, E. Mic<sup>2</sup>, M. Metzger<sup>1</sup>, G. Bittermann<sup>1</sup>, R. Schmelzeisen<sup>1</sup>*

*<sup>1</sup>University Hospital Freiburg, Department of Oral and Maxillofacial Surgery, Freiburg, Germany*

*<sup>2</sup>University of Rome "Sapienza", Unit of Maxillo-Facial Surgery, Rome, Italy*

Microvascular reconstructions are clinical routine in maxillofacial surgery. In the literature, transplants are revised in 4-16% cases, and loss rates are between 0 and 6%. While transplant survival is primarily dependent on perfusion of the flaps' vessels, different methods have been described to control flap perfusion. The implantable Cook-Swartz-Doppler-Probe consists of a piezo crystal that is attached to a silicone strap. This strap can be easily placed on the transplant vessel, the probe is connected to a doppler device via a simple wire.

In a single centre observational study, the Cook-Swartz-Doppler-Probe was implanted in 40 consecutive patients that needed a microvascular reconstruction in the maxillofacial region (mean age 62, range 15-81).

In 27 patients, a flap was placed after tumor resection, 10 patients had an osteoradionecrosis, 3 had other diseases. 12 radial-forearm-flaps, 10 latissimus-dorsi-flaps, 12 combined latissimus-dorsi-scapula-flaps, 5 fibula flaps and 1 vascularized iliac crest flaps were used. 39 probes were put on the artery, one on the vein. In 6 patients the position of the vessels were corrected during wound closure. Two salvage operations were conducted successfully. In patient with radial forearm flap the probe was damaged during the operation and couldn't be used. Following, the transplant was lost. A combined latissimus dorsi-scapula transplant necrotised even though the Doppler signal was positive.

Discussion: The direct control of the vessel perfusion during wound closure enables direct corrections. In the postoperative setting, the probe facilitates early salvage surgeries. Wrong positive doppler signals are possible. Further investigations in larger collectives are suggested.

**ORAL SESSION 34: PAIN**

**A COMPARATIVE STUDY BETWEEN LIDOCAINE AND METHYL SALICYLATE PATCHES IN TREATMENT OF MYOFASCIAL PAIN**

*A. El-swify<sup>1</sup>, A. Atef<sup>2</sup>, E. El-Sharawy<sup>3</sup>, M. El- Sholkamy<sup>3</sup>*

*<sup>1</sup>Faculty of Dentistry, Oral&Maxillofacial Surgery, Ismailia, Egypt*

*<sup>2</sup>Faculty of Dentistry -Sinai University, Oral&Maxillofacial Surgery, North Sinai, Egypt*

*<sup>3</sup>Faculty of Dentistry Suez Canal University, Oral&Maxillofacial Surgery, Ismailia, Egypt*

Abstract: Objectives the aim of this study was to to compare lidocaine versus methyl salicylate patches in treatment of myofascial pain. Patients and methods: thirty patients suffered from myofascial pain in head and neck muscles were divided randomly into three groups: Group one (10 patients): was treated with methyl salicylate patch. Group two (10 patients): was treated through lidocaine patch .Group three (10 patients): was acted as a controlled group through the application of plain patches without any active ingredient. Each patient has received one patch that had replaced by the patient every 12 hours; the patient informed to remove the last patch 12 hours before the visit on day five. All evaluations (pain intensity, degree of mouth opening, range of motion, disability) repeated on day five (12 hours after removal of the last patch) and on day nine (after four days of follow up). Results significant reduction in pain intensity, significant increase in mouth opening and lateral movement with a significant improvement in quality of life with methyl salicylate and lidocaine patches. Conclusions: Methyl salicylate and Lidocaine patches are effective in treatment of Myofascial pain. Keywords: Myofacial Pain, Methyl Salicylate Patches, Lidocaine Patches

## **ORAL SESSION 34: PAIN**

### **ELECTROMYOGRAPHIC EVALUATION OF BOTULINUM TOXIN (BOTOX) VERSUS ULTRASOUND THERAPY AS METHODS OF TREATMENT OF MYOFASCIAL PAIN**

*A. El-swify<sup>1,2</sup>, M. Elsholkamy<sup>3</sup>, M.S. Hamed<sup>3</sup>*

*<sup>1</sup>Faculty of Dentistry, Oral&Maxillofacial Surgery, Ismailia, Egypt*

*<sup>2</sup>Faculty of Dentistry- Taif University, Oral&Maxillofacial Surgery, Taif, Kingdom of Saudi Arabia*

*<sup>3</sup>Faculty of Dentistry Suez Canal University, Oral&Maxillofacial Surgery, Ismailia, Egypt*

Background: myofascial pain is the most commonly reported type of masticatory muscle disorders as well as the most common type of temporomandibular disorders. Our study aimed to evaluate the ability of botulinum toxin (BOTOX) versus ultrasound therapy application to treat patients with myofascial pain. Patients and methods: Twenty myofascial pain patients were divided into 2 equal groups. Baseline masseter muscle electromyogram (E.M.G) was performed for all patients pre-treatment. Group 1 received 50 units Botox injection in each masseter muscle. Group 2 received 2 MHz ultrasound therapy, 2 sessions per week. The following parameters were assessed pre-treatment and post-treatment at 2-week intervals throughout a total study period of 8 weeks: Objective Tenderness to palpation was performed for the following structures: Temporalis muscle, Masseter muscle, Lateral pterygoid muscle, and The TMJ capsule. Finally EMG was carried out at the end of the treatment course for the patients of both groups. Statistical analysis (one-way ANOVA) and charts were performed. Results: The analysis of the scores showed statistically significant differences between pre-treatment and post-treatment values for all parameters of both groups. The comparison of post-treatment values between both groups showed significant differences only between the 3rd session values for chewing hard food, chewing soft food, and yawning. Conclusion: We concluded that both methods of treatment proved efficacy in management of myofascial pain and that Botox proved to be more superior regarding effects on chewing function.

## **ORAL SESSION 34: PAIN**

### **THE INTEREST OF BOTULINUM TOXIN IN THE TREATMENT OF CERVICAL PAIN OF DIFFERENT ORIGINS**

*D. Batifol<sup>1</sup>, P.J. Finiels<sup>2</sup>*

*<sup>1</sup>university hospital Gui de Chauliac Montpellier, Maxillofacial surgery, Montpellier, France*

*<sup>2</sup>Ales General Hospital, Neurosurgery, Ales, France*

#### **Introduction:**

The aim of this study is to show that Botulinum toxin ( BoNTA ), acting at the same time as an analgesic, an anti-inflammatory medication and a muscle relaxant, can bring relief in the case of persistent cervical pain of different origins.

We will discuss cervical pain of 3 different origins:

- occipital neuralgia,
- post-operative muscular pain of the cervical spine,
- muscle pain due to stiffness of the cervical spine following hypertonia and hyperactivity of the manducatory muscles.

#### **Material and methods:**

A total of 170 patients were treated in our institution using BoNTA– type A (Botox\*: Allergan Pharmaceuticals, Westport, Ireland): 43 patients for Arnold's neuralgia, 35 for post-operative neck pain and 92 for cervical stiffness due to bruxism.

In all 3 pathologies, cervical muscles involved were injected with doses ranging from 30 to 120 units.

Subcutaneous topping of the scalp, starting from the sub-occipital triangle and following the route of the pain, was added in cases of occipital neuralgia.

#### **Results:**

No complications were seen during follow-up.

96% of cervical pain due to bruxism was relieved.

86% of the cases of neuralgia experienced good and very good results.

82% of post-operative pain was particularly improved, as were the lordotic angles on X-rays.

All patients experienced a distinct improvement in their quality of life.

#### **Conclusion:**

For these 3 pathologies, the reference treatment until now has not been BoNTA.

Given the results obtained, and especially in light of the harmlessness of this product, it is a treatment which, should be considered immediately after medicinal treatment.

## **ORAL SESSION 34: PAIN**

### **PERI-OPERATIVE PAIN MANAGEMENT AFTER FIBULA FREE FLAP HARVESTING IN HEAD AND NECK RECONSTRUCTION USING MINI-CATHETERS FOR LOCAL ANESTHETIC INJECTION**

*A. Varazzani<sup>1</sup>, B. Bianchi<sup>1</sup>, A. Ferri<sup>1</sup>, S. Ferrari<sup>1</sup>, E. Sesenna<sup>1</sup>*

*<sup>1</sup>Azienda Ospedaliero Universitaria, Maxillofacial Surgery, Parma, Italy*

#### Aims

Purpose of this presentation is to disclose the efficacy of a mini-catheter for the injection of local anesthetic in the fibula donor-site after its harvesting for reconstructions of the head and neck area.

#### Methods

In 27 patients a mini-catheter was placed inside the donor site, at the end of the flap harvesting. Bolus of Chirocaine 0.125% 20 ml was used for the local injection through the catheter. At the end of the operation, before the patient regains consciousness, a first bolus of Chirocaine was administered through the catheter. Post-operatively, 3 consecutive injections were administered at 8<sup>th</sup>, 16<sup>th</sup> and 24<sup>th</sup> hours after surgery. Before each administration nurses evaluated pain on a Numerical Rating Scale (NRS), between 0 and 10, asking to the patient to consider only the operated leg. After 40 minutes pain evaluation was repeated to evaluate the efficacy of the procedure.

#### Results

No cases of donor site infections, wound dehiscences, complications related to the use of catheter, complications related to the administration of local anesthetic was observed. Data analysis was performed comparing the variation of pain score before and after administration of Chirocaine and revealed that the majority of patients had a statistically significant pain reduction after the injection of local anesthetic.

#### Conclusions

Despite the small number of patients enrolled and the possibility of use different drugs or schedules for anesthetic administration, the donor site infusion of local anesthetic using a mini-catheter has been demonstrated to be safe and efficacy in the control of pain after fibula osteocutaneous free flap harvesting.

**ORAL SESSION 34: PAIN**  
**REORGANISATION OF THE SOMATOSENSORY CORTEX AFTER PARTIAL**  
**GLOSSECTOMY: WHY ISN'T THERE A PHANTOM PAIN?**

*N.C. Eckstein<sup>1</sup>, F. Bauer<sup>2</sup>, K.D. Wolff<sup>2</sup>*

*<sup>1</sup>Universitätsspital Basel, Oral & Maxillofacial Surgery, Basel, Switzerland*

*<sup>2</sup>Klinikum rechts der Isar- Technische Universität, Oral & Maxillofacial Surgery, Munich, Germany*

**Aim**

First-line therapy of oral squamous cell carcinoma (OSCC) of the tongue is resection of the carcinoma according to a partial glossectomy. The tongue, with its multiple functions and broad innervation, is situated as a large area in the somatosensory cortex of the human brain. Extremities also maintain a large area of the brain's cortex. After amputations of extremities, phantom pain has often been described. After (partial) amputations of the tongue phantom pain has never been observed.

**Method**

The tongues of 10 patients after partial glossectomy due to carcinoma and those of 10 healthy controls were electrically stimulated on both sides below the pain-threshold by an individual electronic sensor. Blood-oxygen-level-dependent (BOLD) magnetic resonance responses were then recorded.

**Results**

In healthy individuals bilateral signals in the expected cortical regions were registered, whereas patients after partial glossectomy only showed a response in the right cortical hemisphere corresponding to their handedness. These signals were weaker and compared to the healthy individuals localised more medially.

**Conclusion**

The data suggest a cortical reorganisation of the adult human brain in response to a partial glossectomy with de-afferentation and neuronal change. The BOLD signals in the more medially located cortical regions during the stimulation of the tongue may also suggest the existence of another area representing the tongue in the human brain which could correspond with the handedness. The unmasking of neuronal structures during the stimulation of the tongue may represent the important joint work of the tongue and the hand for food intake.

## **ORAL SESSION 34: PAIN**

### **EFFICACY OF INTRAMUSCULAR BOTULINUM TOXIN INJECTIONS FOR THE TREATMENT OF MYOFASCIAL PAIN AND DYSFUNCTION**

*W. Abboud<sup>1</sup>, M. Joachim<sup>2</sup>, R. Yahalom<sup>1</sup>*

*<sup>1</sup>Sheba Medical Center, Department of Oral and Maxillofacial Surgery, Tel Hashomer, Israel*

*<sup>2</sup>Sheba Medical Center, Oral and Maxillofacial Surgery, Shaarey Tikva, Israel*

#### **Objectives:**

Myofascial pain and dysfunction (MPD) is the most common cause of orofacial pain. The underlying pathogenesis probably involves a dysfunction and prolonged excitation at the neuromuscular junction. Botulinum toxin (BT) is a neurotoxin that acts by temporarily inhibiting the release of acetylcholine at the neuromuscular junction, thus reversibly reducing muscular contractility. The purpose of the present study was to investigate whether reduced muscle contractility caused by intramuscular injection of botulinum toxin reduces muscle pain associated with MPD.

#### **Patients & Methods:**

Between the years 2012 and 2015, twenty-nine patients were treated at our department with intramuscular BT injections. All patients suffered from chronic MPD and were resistant to physical, occlusal, and drug therapy. The data was collected retrospectively from patients' files. The main outcome variable was subjective pain reduction as reported by the patients on a 4-digit scale (excellent, moderate, none, and worsening). Secondary outcome variables were reported analgesic use, patients' needs for re-treatment after treatment effects subside, and maximal mouth opening. Adverse events were documented.

#### **Results:**

Twenty-two patients (76%) reported pain reduction after BT injections (excellent 13, moderate 9). Mean duration of analgesic effect was 3 months (range 0-6). There were two cases of temporary paresis of the lip.

#### **Conclusion:**

Intramuscular BT injection is effective in reducing pain in a large number of patients suffering from MPD. The risk of adverse effects is minor. Future studies with larger cohorts using strict diagnostic criteria are needed to further identify the patients most probably likely to benefit from this treatment modality.

## **ORAL SESSION 34: PAIN**

### **DRY NEEDLING IN THE MANAGEMENT OF MYOFASCIAL TRIGGER POINTS IN THE OROFACIAL AREA**

*C. Faria<sup>1</sup>, M.D.P. Gonçalves<sup>2</sup>, M.J. Teixeira<sup>3</sup>, A.A. Teixeira<sup>4</sup>, J. Correia-Pinto<sup>1</sup>*

*<sup>1</sup>Centro Hospitalar de São João- EPE, Serviço de Estomatologia, Porto, Portugal*

*<sup>2</sup>Instituto Universitario de Ciências da Saúde do Norte, Departamento de Ciências, Porto, Portugal*

*<sup>3</sup>Centro Hospitalar doTâmega e Sousa, Anestesiologia, Penafiel, Portugal*

*<sup>4</sup>Faculdade de Medicina da Universidade do Porto,*

*Centro de Investigação Farmacológica e Inovação Medicamentosa, Porto, Portugal*

**Aims:** Myofascial pain in the orofacial area is a common cause of head and neck pain characterized by the presence of myofascial trigger points (MTrPs). According to recent literature, there is a need for well-designed studies concerning dry needling (DN) in the management of MTrPs. The objective of our work is to evaluate the effectiveness of DN compared to sham DN and counselling in the treatment of active MTrPs in the orofacial area.

**Methods:** We conducted a prospective, double-blinded, randomized, controlled study in which 30 patients with established MTrPs in the orofacial area were randomized into 3 groups. The study group (DN, n=10), the placebo group (sham DN, n=10) and the gold standard group (counselling, n=10). Each patient received 3 sessions with 7 days intervals. Pain intensity was rated using a visual analogic scale (VAS) and unassisted jaw opening without pain (PFJO) was assessed with a millimeter rule after each consultation and one month after the last consultation.

**Results:** Patients receiving real DN experienced a statistically significant decrease in jaw pain when compared to the other groups. PFJO scores increased significantly when compared to sham DN but not when compared to counselling which also determined an increase in PFJO.

**Conclusion:** A single session of MTrPs DN decreases myofascial pain intensity in patients with orofacial MTrPs and also increases PFJO after 3 sessions. These effects are sustained during one month. Changes in pain and mandibular range of motion support clinically relevant treatment effects.

## **ORAL SESSION 34: PAIN**

### **EVALUATION OF THE EFFICACY OF TWO DIFFERENT PATCHES IN MANAGEMENT OF MYOFASCIAL PAIN**

*M. Elsholkamy<sup>1</sup>, T. Abdelbari<sup>1</sup>*

*<sup>1</sup>Faculty of Dentistry- Suez canal University- Ismailia- Egypt., Oral and Maxillofacial Surgery, Cairo, Egypt*

**Objectives:** The aim of this study was to compare the efficacy of lidocaine versus methyl salicylate patches in treatment of myofascial pain.

**Patients and methods:** Thirty patients complaining of myofascial pain in head and neck muscles were divided randomly and equally into three groups. Pain intensity, degree of mouth opening, range of motion, and disability were assessed before management as baseline. Group one was treated with methyl salicylate patches on the masseter muscle of the affected side. Group two was treated with lidocaine patch. Group three was considered as a control group through the application of plain patches without any active ingredient. Each patient received one patch that had to be replaced by the patient every 12 hours; each patient was informed to remove the last patch 12 hours before the assessment visit on day five. All evaluation parameters (pain intensity, degree of mouth opening, range of motion, and disability) were checked on day five (12 hours after removal of the last patch) and on day nine (after four days of follow up). Statistical analysis was carried out.

**Results:** Significant reduction in pain intensity, significant increase in mouth opening and lateral movement and significant improvement in quality of life were noted with methyl salicylate and lidocaine patches.

**Conclusions:** Methyl salicylate and Lidocaine patches are effective in treatment of Myofascial pain.

**ORAL SESSION 35: NAVIGATION  
CLOCKWISE AND COUNTERCLOCKWISE LE FORT I MOVEMENTS INFLUENCE  
NASOLABIAL MORPHOLOGY DIFFERENTLY**

*D. Steinbacher<sup>1</sup>, R. Sawh<sup>1</sup>*

*<sup>1</sup>Yale University, Plastic and Maxillofacial Surgery, New Haven, USA*

**Purpose:** Le Fort I advancement impacts nasal appearance. However, no data exists assessing 3D nasal change following anterior (counterclockwise, CCW) or posterior maxillary impaction (clockwise, CW) during Le Fort I osteotomy. The purpose of this study was to analyze nasolabial changes comparing CW to CCW maxillary movements.

**Materials and Methods:** This was a retrospective cohort study of patients undergoing single-piece Le Fort I. CCW and CW movements were compared using 3D photographs and anthropometric measurements. Two observers verified each landmark. Statistical analysis involved paired *t* test for comparison of numerous pre- and postoperative nasolabial measurements for each patient in each group.

**Results:** Thirty patients were evaluated, 15 per group. CCW significantly increased alar width (3.6mm,  $P<0.001$ ), alar base width (1.6mm,  $p=0.009$ ), oral width (3.1mm,  $P=0.02$ ), and lip projection (+3.3mm,  $P=0.04$ ). Subnasion projection (2.3mm,  $p=0.08$ ) and columella width (0.58mm,  $P=0.9$ ) demonstrated trends toward significant increases. There were decreases in the nasofrontal angle (-3.05mm,  $p=0.10$ ), nasolabial angle (-3.2mm,  $p=0.5$ ), nostril height (-0.68mm,  $p=0.24$ ), columella height (-0.11mm,  $p=0.88$ ), philtrum height (-0.08,  $p=0.94$ ) but were not statistically significant. CW changes were not statistically significant. However, the largest changes in positions were alar width (2.7mm,  $p=0.07$ ) and alar base width (1.7mm,  $p=0.09$ ). Decreases in nasofrontal angle (-2.36,  $p=0.37$ ), nostril height (-0.9mm,  $p=0.09$ ), and columella height (-0.8mm,  $p=0.31$ ) were noted.

**Conclusion:** 3D nasolabial changes are more marked for CCW movements. This study suggests that soft-tissue nasolabial changes following Le Fort I are more complex than previously thought, and occlusal plane alteration significantly influences nasal form.

**ORAL SESSION 35: NAVIGATION  
COMPUTER AIDED DESIGN AND MANUFACTURING IN NON-SYNDROMIC CRANIAL  
VAULT RECONSTRUCTION IS NOT ASSOCIATED WITH IMPROVED SURGICAL  
OUTCOMES**

*J. Lopez<sup>1</sup>, R. Cho<sup>1</sup>, M. Major<sup>1</sup>, J. Berli<sup>1</sup>, R. Bello<sup>1</sup>, G. Munding<sup>2</sup>, E. Ahn<sup>1</sup>, M. Medina<sup>3</sup>,  
A. Dorafshar<sup>1</sup>*

*<sup>1</sup>Johns Hopkins Hospital, Plastic & Reconstructive Surgery, Baltimore, USA*

*<sup>2</sup>University of Washington Medical Center, Plastic & Reconstructive Surgery, Seattle, USA*

*<sup>3</sup>Cleveland Clinic - Florida, Plastic & Reconstructive Surgery, Weston, USA*

**Introduction**

The surgical correction of pediatric cranial deformities has in the past two decades undergone a large paradigm shift. The development of computer-aided design & manufacturing (CAD/CAM) has the potential to revolutionize craniofacial reconstruction. Although the adoption of CAD/CAM has rapidly expanded, there is a paucity of data exploring whether its use improves surgical outcomes over conventional methods.

**Methods:**

A retrospective cohort with matched design was conducted for patients with non-syndromic craniosynostosis (NSC) who underwent primary cranial vault remodeling from 2009-2015. Patient demographics and characteristics were recorded. Postoperative outcomes were assessed by assigning each procedure to a Whitaker category. Secondary post-operative outcomes were recorded including complications, operative time, and length of stay. We used parametric and non-parametric statistical tests for matched data to assess the association between use of CAD/CAM and surgical outcomes.

**Results:**

A total 40 patients were identified in this study period. CAD/CAM-cases (n = 20) and matched controls (n = 20) did not differ in baseline characteristics. Whitaker scores of 2 or more were more common in CAD/CAM-cases (25%), than controls (5%), which was statistically significant (p=0.046). However, among secondary outcomes, we found no difference in intra-operative and post-operative complications between CAD/CAM-cases and controls. Although use of CAD/CAM was associated with shorter length of stay (p=0.016), there was a trend towards longer operative time with the use of CAD/CAM (p=0.052).

**Conclusion:**

Our findings provide evidence that CAD/CAM may not improve the efficiency of craniofacial reconstruction and help optimize surgical outcomes.

## **ORAL SESSION 35: NAVIGATION**

### **CRANIAL BASE SUPERIMPOSITION OF CONE-BEAM COMPUTED TOMOGRAPHY (CBCT) IMAGES WITH DOLPHIN IMAGING 3D SOFTWARE: A PROTOCOL VALIDATION**

*O.L. Haas Jr<sup>1</sup>, R. Guijarro Martinez<sup>2</sup>, A. Paredes de Sousa Gi<sup>2</sup>, I. Mendéz Manjón<sup>2</sup>, A. Valls Ontañón<sup>2</sup>, R. Belle de Oliveira<sup>3</sup>, F. Hernández Alfaro<sup>2</sup>*

*<sup>1</sup>Pontifícia Universidade Católica do Rio Grande do Sul, Oral and Maxillofacial Surgery, Porto Alegre, Brazil*

*<sup>2</sup>Centro Medico Teknon, Instituto Maxilofacial, Barcelona, Spain*

*<sup>3</sup>Pontifícia Universidade Católica do Rio Grande do Sul PUCRS, Oral and Maxillofacial Surgery, Porto Alegre, Brazil*

#### **Aims:**

To analyze the accuracy, reproducibility, and efficiency of superimposing cone-beam computed tomography (CBCT) datasets with a protocol developed specifically for the Dolphin Imaging 3D orthognathic surgery virtual planning software.

#### **Methods:**

Twenty-five CBCT datasets of patients with at least one dental implant present were selected. Each base volume dataset was duplicated to create a second volume. Subsequently, both volumes were superimposed with a voxel-based protocol consisting of 3 successive steps: 1) "Side-by-side superimposition"; 2) "Overlay superimposition"; 3) "Export orientation to second volume". The protocol's accuracy was evaluated by measuring the mean distance between the apex of each dental implant on the base volume and second volume datasets. Efficiency was given by the mean time needed to complete all superimposition steps. Reproducibility was analyzed by calculating the intra-observer (same investigator at two different timepoints) and inter-observer (two independents investigators) correlation coefficients.

#### **Results:**

Mean time needed for the execution of the complete protocol was 198 seconds. The protocol had a rotational accuracy of 0.10°–0.19° and a translational accuracy of 0.20–0.24 mm. Intra-observer and inter-observer reproducibility outcomes were 1 and 0.921–1[RG1] , respectively.

#### **Conclusion:**

To our knowledge, this study represents the first attempt to validate superimposition technology for Dolphin Imaging 3D. Results suggest the tested protocol is accurate, precise, reproducible, and efficient. The validation of this method enables unbiased analysis of surgical outcomes based on a single, user-friendly software product that is widely available in academic and clinical settings.

**ORAL SESSION 35: NAVIGATION  
DENTOFACIAL ASYMMETRIES, THE STUDY OF THE MORPHOLOGICAL AND  
STRUCTURAL ASPECTS WITH TRACTOGRAPHIC IMAGING.**

*F.S. De Ponte<sup>1</sup>, G. Anastasi<sup>1</sup>, L. Catafamo<sup>1</sup>, A. Calvo<sup>1</sup>, M. Runci<sup>1</sup>*

*<sup>1</sup>University of Messina, Maxillo-Facial Surgery, Messina, Italy*

**Aim**

The aim of this work is looking for something enable to examine muscle activity in dentofacial asymmetries, in all those patients with a biomorphological and structural alteration of skeletal muscle tissue.

**Methods**

We examined 10 patients with facial asymmetries with masseteric muscle overgrowth. We assessed the volume and degree of the muscle asymmetry through a Tractographic MRI study " 3 T Philips Achieva scanner using a head coil". A muscle biopsy has been performed during the surgery. The piece of muscle has been studied with immunofluorescence. We also performed a Tractographic MRI guided cerebral investigation pre and post skeletal asymmetries correction surgery, regarding the areas of brain activation during joint movement.

**Results**

The etiology of dento-facial asymmetry is multifactorial (genetic, congenital and environmental aspects). Our study specifically focused on the latter. Clinical examination and study of the plaster models are essential aids for the diagnostic classification of these anomalies and to understand the degree of skeletal asymmetry.

**Conclusions**

Diffusion tensor tractography 3T MRI in dentofacial deformities might revolutionize all planning strategies, both surgical and orthodontic.

## **ORAL SESSION 35: NAVIGATION**

### **THE USE OF SURGICAL NAVIGATION SYSTEM IN ORTHOGNATHIC SURGERY**

*Y. Kurihara<sup>1</sup>, H. Watanabe<sup>1</sup>, T. Shirota<sup>1</sup>*

*<sup>1</sup>Showa University, Department of oral and maxillofacial surgery, Tokyo, Japan*

**Background:** Surgical navigation systems are now widely used in oral and maxillofacial surgery. It is also not an exception in orthognathic surgery.

**Objective:** Recently, advances in surgical simulation system using the image data of CT for the treatment of orthognathic surgery, it is useful for simulates three-dimensional movement of the bone, and confirm surgical simulation such changes in skeletal going on. However, the use of simulation software to the treatment planning of orthognathic surgery, it is difficult to accurately reflect the surgical results. Here, we show a computer-guided surgical navigation approach for LeFort 1 osteotomy.

**Results:** There is no significant error in the comparison of planned amount of movement by cephalometric analysis and surgery amount of movement by using real-time three-dimensional navigation surgical management. The results of our treatment to both lack and excess of facial convexity were accurate and safer, and no surgical complications were detected.

**Conculsion:** Real-time tree-dimensional navigation system is a promising tool aiming to improve the safety and precision of orthognathic surgery.

## **ORAL SESSION 35: NAVIGATION**

### **MULTIDISCIPLINARY NETWORK BETWEEN NAVIGATION-ASSISTED PLATFORM AND COMPUTER-AIDED DESIGN AND MANUFACTURING PLATFORM**

*C. Bescós<sup>1</sup>, J. Pamias<sup>1</sup>, M. Saez<sup>1</sup>, A. De Pablo<sup>1</sup>, S. Siurana<sup>2</sup>, J. Giralt<sup>3</sup>, N. Baste<sup>4</sup>, M. Alberola<sup>5</sup>, J. Masnou<sup>6</sup>*

*<sup>1</sup>Hospital Universitari Vall d'Hebron, Oral and Maxillofacial Surgery Department, Barcelona, Spain*

*<sup>2</sup>Hospital Universitari Vall d'Hebron, Radiology Department- MRI Unit, Barcelona, Spain*

*<sup>3</sup>Hospital Universitari Vall d'Hebron, Radiotherapy Department, Barcelona, Spain*

*<sup>4</sup>Hospital Universitari Vall d'Hebron, Medical Oncology Department, Barcelona, Spain*

*<sup>5</sup>Hospital Universitari Vall d'Hebron, Pathology Laboratory, Barcelona, Spain*

*<sup>6</sup>Hospital Universitari Vall d'Hebron, Radio Diagnostic Technician. Radiology Department, Barcelona, Spain*

The treatment of malignant tumors of the maxillofacial area requires an interdisciplinary approach in order to obtain an optimal balance between tumor control and quality of life of the affected patients. Although the primary intended outcome of surgery to treat head-and-neck malignancies is still the disease-free survival of the patient, health-related quality of life (HRQOL) is now seen as an essential secondary outcome.

A multidisciplinary network in assisted navigation has been well described. The advantages offered is that it can improve the interface between different specialists, surgeon, radiologist, radiation oncologist and pathologist in the field of head and neck cancer, allowing feedback between them that could be useful in points critics such as the definition of the resection margins by the pathologist and subsequent radiotherapy treatment planning.

On the other hand, the quality of live in head and neck cancer patients surgically treated depends on to a large degree in the quality of the reconstruction which is increased by the application of digital technology through virtual planning and development of customized plates and prostheses that allow greater accuracy of reconstruction and therefore an improvement in the functional and aesthetic results

The aim of our presentation is to describe the interconnection between the navigation-assisted platform and a platform of computer-aided design and manufacturing through the presentation of 3 clinical cases.

We believe that this new complex network between digital platforms can improve the transfer of information and may improve the treatment quality of our patients.

**ORAL SESSION 35: NAVIGATION  
APPLICATIONS OF COMPUTER-ASSISTED NAVIGATION IN CRANIOMAXILLOFACIAL  
SURGERY: 4 YEARS EXPERIENCE**

*S. Heredero<sup>1</sup>, J. Solivera<sup>2</sup>, A. Dean<sup>1</sup>, A. Francisco<sup>1</sup>*

*<sup>1</sup>Hospital U Reina Sofía, Maxillofacial Surgery Department, Cordoba, Spain*

*<sup>2</sup>Hospital U Reina Sofía, Neurosurgery Department, Cordoba, Spain*

**AIMS**

To present our series of patients operated using computer-assisted surgery (CAS). To review the system's indications and applications in craniomaxillofacial surgery.

**METHODS**

We reviewed all the surgical cases planned with iPlan 3.0 (BrainLab, Munich, Germany) between January 2012 and December 2015 in the Hospital Universitario Reina Sofía, Córdoba. We designed a program using Microsoft Visual Basic 6.3 to extract the information from the system to an Access database (Microsoft Corp, Redmond, USA). Statistical analysis was done with R environment 3.1.1 (CRAN, Vienna, Austria).

**RESULTS**

CAS technology was applied in 418 patients: 282 with neurosurgical disorders, 45 skull base open surgeries, 10 craniofacial deformities and 90 patients with midface / mandibular pathology. Surgical navigation was done in 89% (n=252), 80% (n=35), 20% (n=2) and 52% (n=47) of the cases in each group. CAS was used for the selection of the most appropriate approach, planning of osteotomies and resection margins, intraoperative localization of critical structures, to design trajectories and to improve the accuracy of final reconstructions. The most common diagnosis in our series was oncological disease followed by craniofacial trauma, even if we exclude the group of patients with neurological disorders (61 patients, 36 with midface / mandibular tumors and 25 patients with skull base tumors).

**CONCLUSIONS**

The development of new software tools has increased the applications of CAS. So far, this is the longest series of patients with craniomaxillofacial oncological disease treated with CAS. The ability to simulate the surgical procedure, even without intraoperative navigation, makes our results more predictable.

## **ORAL SESSION 35: NAVIGATION**

### **ANALYSIS OF 3D FACIAL PHOTOGRAPHS TAKEN FOR FACIAL SURGERY: AN ARMAMENTARIUM OF METHODS FOR DIFFERENT ROLES**

*A. Chadha<sup>1</sup>, P. Haers<sup>2</sup>*

*<sup>1</sup>King's College London, South Thames Cleft Service, London, United Kingdom*

*<sup>2</sup>St. Thomas Hospital, South Thames Cleft Service, London, United Kingdom*

#### **Aims**

3D photography provides superlative, radiation-free images. It is now highly accessible technology that can be used for diagnosis, baseline and post-operative assessment in facial surgery but it only *captures* topographical data. Objective Interpretation of images requires data analysis methods that vary in their delivery of clinically useful indices. Furthermore, different analysis methods are better suited for different sub-specialties of facial surgery depending on the ultimate goal of treatment. The aim of this scoping review is to compare and contrast methods of 3D facial analysis, illustrating applications in different contexts, including the latest use in deep phenotyping and phenotype / genotype correlations in craniofacial conditions in an era of precision medicine.

#### **Methods**

A systematic search was conducted of electronic and printed media, as well as the grey literature, on morphometric data analysis techniques as applied to facial surgery and facial conditions. Databases used included PubMed, EMBASE and the Cochrane Library. Key words and Boolean operators ('OR', 'AND' and 'NOT') were used to join related terms and disregard unrelated subjects, respectively. Search results were restricted to publication in the last 10 years with English as the language of publication.

#### **Results**

Objective facial analysis methods using 3D photography can be broadly categorised as those based on:

1. facial symmetry,
2. facial landmarks.
3. volume
4. shape and size

Within each of these categories, statistical approaches such as Principal Component Analysis (PCA) and Euclidean Distance Matrix Analysis (EDMA) also have an important role. The use of facial templates for image cropping and the non-rigid registration of images are also discussed.

**ORAL SESSION 36: RECONSTRUCTION  
SECONDARY MAXILLARY RECONSTRUCTION WITH VASCULARIZED FIBULA  
OSTEOMYOCUTANEOUS FLAP: OUR 14-YEARS' EXPERIENCE WITH LONG-TERM  
FOLLOW-UP**

*J. Sun<sup>1</sup>*

*<sup>1</sup>Ninth People's Hospital - Shanghai Jiaotong University - School of Medicine,  
Department of Oral Maxillofacial-Head Neck Oncology, Shanghai, China*

**Background:** To make a retrospective analysis of the postoperative complications and long-term results of our patients who underwent secondary maxillary reconstruction with vascularized fibula osteomyocutaneous flap (VFOF) and to reevaluate our reconstructive strategies.

**Methods:** From May of 2001 to June of 2014, 34 patients who underwent secondary maxillary reconstruction with VFOF in combination with or without titanium mesh were reviewed. The patients were divided into 2 groups of maxillary reconstruction in the guidance of 3-dimensional stereomodel and guided templates produced by virtual surgical planning according to the different modalities and technical methods. The difference of the preoperative plan, intraoperative technique, and postoperative complications and long-term results between 2 groups were analyzed.

**Results:** Similar and accurate secondary maxillary were successfully performed in 2 groups, respectively. The overall success rate for free tissue flaps was 97.7%. The incident rate for postoperative early and late complications was 66.7% in Group 1 and 50.0% in Group 2, respectively. The complications were all found in patients who underwent radiotherapy. The incident rates of postoperative complications in Group 2 were lower than that of Group 1 except for midfacial collapse ( $P > 0.05$ ).

**Conclusions:** The improvements of secondary maxillary in Group 2 should be recommended according to our acceptable results and long-term follow-up. Double flaps reconstruction may be a better choice for patients with class 3 defect and the history of radiotherapy and titanium mesh is not recommended because of the risk of exposure.

## **ORAL SESSION 36: RECONSTRUCTION**

### **THE OWN BODY AS A BIOREACTOR: PREFABRICATION OF A CUSTOM VASCULARISED BONE GRAFT IN THE GASTROCOLIC OMENTUM**

*H. Naujokat<sup>1</sup>, A. Sengebusch<sup>1</sup>, J.H. Egberts<sup>2</sup>, U. Lützen<sup>3</sup>, B. Möller<sup>1</sup>, H. Wieker<sup>1</sup>, M. Rohnen<sup>1</sup>, Y. Açıllı<sup>1</sup>, J. Wiltfang<sup>1</sup>*

*<sup>1</sup>University Hospital Schleswig-Holstein, Oral- and Maxillofacial Surgery, Kiel, Germany*

*<sup>2</sup>University Hospital Schleswig-Holstein, General- Visceral- Thoracic- Transplantation and Paediatric Surgery, Kiel, Germany*

*<sup>3</sup>University Hospital Schleswig-Holstein, Nuclear Medicine, Kiel, Germany*

#### **AIMS**

Reconstruction of critical size jaw defects still remains challenging. The standard treatment is transplantation of autologous bone grafts, which is associated with high donor site morbidity and unsatisfactory outcomes. We aimed to use the gastrocolic omentum as a bioreactor for heterotopic ossification. Free flap reconstruction can be performed in a second step with the vascularized engineered bone.

#### **METHODS**

In preclinical studies 30 rabbits were treated with bone mineral blocks and growth factors in the gastrocolic omentum for 10 weeks. Ossification was monitored by computed tomography and fluorescence microscopy. In the following our clinic treated two patients with a mandible defect after ablative surgery with a prefabricated bone graft from the omentum tissue.

#### **RESULTS**

The highest rate of ossification was observed when adding recombinant human bone morphogenetic protein 2 and bone marrow aspirate to the scaffolds in rabbits. In clinical studies reconstruction of the mandible was possible after three month of prefabrication. Radiographic examination showed increasing metabolic activity and density before and after transplantation.

#### **CONCLUSIONS**

Heterotopic bone induction to form a mandibular replacement inside the gastrocolic omentum is possible. Heterotopic prefabrication is associated with many advantages, like allowing a reduced operative burden compared with conventional techniques and good three-dimensional outcomes. Research will focus on utilizing degradable scaffolds and improving the methods of tissue engineering.

## **ORAL SESSION 36: RECONSTRUCTION**

### **ANATOMIC LANDMARKS FOR MASSETERIC NERVE IDENTIFICATION: ANATOMIC STUDY FOR THE IDENTIFICATION OF A NEW REFERENCE POINT**

*A. Manfuso<sup>1</sup>, C. Copelli<sup>1</sup>, K. Tewfik<sup>1</sup>, N. Pederneschi<sup>1</sup>, S. Catanzaro<sup>1</sup>, U. Riccelli<sup>1</sup>, L. Cassano<sup>1</sup>, R. Cocchi<sup>1</sup>*

*<sup>1</sup>Ospedale "Casa Sollievo della Sofferenza", Head and Neck, San Giovanni Rotondo FG, Italy*

The masseteric nerve is a motor branch of the trigeminal nerve often used as a donor nerve in the treatment of facial paralysis, thanks to its strong contractility and low morbidity. It has a sufficient number of axonal fibers to ensure a nervous input, the masticatory function is preserved even after its resection and, moreover it is close to the facial nerve for the anastomoses. The nerve can be used for direct motor neurotization, babysitter and double innervation techniques, and for neuromuscular transplants. Several anatomical studies have been reported for the detection of anatomical markers that can assist in the isolation of masseteric nerve. They are based on bone, vascular or neural landmarks. The main disadvantage of the until now described reference points are the anatomical variability and the changes due to the dissection.

The visualization of the zygomatic arch, the mandibular condyle or the angle, is not always possible, as the dissection is often performed on a more superficial plane. The full visualization of muscular structures, such as masseter muscle, is not always possible when using an pretragic incision. Furthermore the use of the tragus as a precise landmark is not possible when it is tractioned, in some phases of surgery.

The Authors describe an anatomical study performed to define the temporo-zygomatic branch of the facial nerve as a more practical and easily identifiable landmark, not variable during surgery.

**ORAL SESSION 36: RECONSTRUCTION**

**SECOND SUBSEQUENT FREE FLAP IN SALVAGE HEAD AND NECK SURGERY**

*K. Tewfik<sup>1</sup>, C. Copelli<sup>1</sup>, N. Pederneschi<sup>1</sup>, L. Cassano<sup>1</sup>, S. Catanzaro<sup>1</sup>, A. Manfuso<sup>1</sup>, U. Riccelli<sup>1</sup>, R. Cocchi<sup>1</sup>*

*<sup>1</sup>Ospedale "Casa Sollievo della Sofferenza", Maxillo facial Surgery, San Giovanni Rotondo FG, Italy*

**Aim:** Free flap surgery is overall considered the gold standard in head and neck reconstruction with a success rate of 95%. The management of a total flap necrosis and which solution between pedicled or a second free flap is safer for a salvage procedure is still controversial. Object of this study is to describe our management of a total free flap loss in head and neck reconstruction and compare our results to literature.

**Methods:** From January 2012 to January 2015, 127 consecutive free flaps were performed in Maxillofacial department at Casa Sollievo della Sofferenza Hospital in San Giovanni Rotondo (Italy) for head and neck reconstruction on 118 patients. Functional outcomes in terms of diet and speech have been evaluated after 6 months using a questionnaire filled by the patients.

**Results:** In a group of 127 consecutive free flaps we observed 6 flap losses (4.7%). A subsequent free flap has been successfully performed in 5 cases with good aesthetic and functional results. 1 patient refused a second free flap and the palate defect has been reconstructed using a temporalis muscle flap.

**Conclusion:** A second subsequent free flap should be considered an ideal and safe procedure in salvage surgery.

**ORAL SESSION 36: RECONSTRUCTION  
DEXAMETHASONE IN ORAL CANCER PATIENTS WITH MICROVASCULAR  
RECONSTRUCTION, NO BENEFIT, MORE COMPLICATIONS**

*S. Kainulainen<sup>1</sup>, P. Lassus<sup>2</sup>, J. Törnwall<sup>1</sup>*

*<sup>1</sup>Helsinki University Hospital, Oral and Maxillofacial Surgery, Helsinki, Finland*

*<sup>2</sup>Helsinki University Hospital, Plastic surgery, Helsinki, Finland*

**Aims**

Glucocorticoids are frequently used postoperatively in oral cancer reconstructive surgery to prevent postoperative edema, nausea and pain. However, there exists only limited data on the effect of glucocorticoids in the postoperative period in these patients.

**Material and methods**

A prospective double-blind randomized controlled trial was conducted between 12/2008 and 2/2013 at the Department of Oral and Maxillofacial Surgery and Department of Plastic Surgery, Helsinki University Hospital. Ninety-three consecutive patients with oral cancer who had a microvascular reconstruction were included. Fifty patients were randomized to receive a total dose of 60 mg dexamethasone in three days and 43 patients were given no steroids. The main primary outcome variables were the neck swelling, length of intensive care unit stay and hospital stay and duration of intubation or tracheostomy.

**Results**

There were no statistical differences between the two groups in any of the main primary outcomes. However, patients receiving glucocorticoids had more major complications during the postoperative period. These included wound necrosis, venous stasis, postoperative bleeding, postoperative tracheostomy, fistula and pneumothorax.

**Conclusions**

Our data does not support the use of peri- and postoperative dexamethasone in oral cancer patients with microvascular reconstruction.

**ORAL SESSION 36: RECONSTRUCTION  
COMPUTER ASSISTED RECONSTRUCTION WITH INTEGRATED SIMULTANEOUS  
PLACEMENT OF DENTAL IMPLANTS IN FIBULAR FREE FLAP RECONSTRUCTIONS OF  
FACIAL DEFECTS**

*D. Zweifel<sup>1</sup>, M. Bredell<sup>1</sup>, H. Essig<sup>1</sup>, T. Gander<sup>1</sup>, M. Rücker<sup>1</sup>, S. Studer<sup>2</sup>*

*<sup>1</sup>University Hospital Zurich, Oral and Maxillofacial Surgery, Zürich, Switzerland*

*<sup>2</sup>Zahn- und Kieferklinik, Spezialpraxis für Maxillofaziale und Zahnärztliche Prothetik, Zürich, Switzerland*

**Introduction**

Computer assisted design (CAD) is fast becoming a standard in microvascular fibular transplantation for mandible reconstruction as bony transfer can be performed with a high level of accuracy. Implant born prosthetic rehabilitation of these patients is however still challenging. In order to place these dental implants at the earliest possible timepoint they should be inserted simultaneous to the fibular free flap harvesting. To optimise the potential of virtual planning it is sensible to perform implant placement according to the opposing teeth/jaw and to position the mandibular bone in prosthetically optimal position, i.e. perform true backward planning as an integrated planning step along with the fibula osteotomy cuts and plate hole pre-drilling.

**Materials and Methods**

Using the Computed-Tomography data of each individual patient virtual surgery was performed in order to resect and reconstruct the mandible. Simultaneous implant placement was included in the standard planning. The positioning of these implants was determined in collaboration with a prosthodontist specialised in tumour reconstruction. The fibular bone was then repositioned according to the ideal position of the implants and cutting guides as well as a patient-specific reconstruction plate were ordered.

Intraoperatively the dental implants were placed on the still vascularised fibula and the bone segments sectioned and positioned on the plate. Exact positioning of the implant-bearing segments was performed using either an intra- or extraoral transfer splint.

**Results**

We present a fully digitized workflow for accurate dental implant placement integrated in the virtual osteotomy planning of vascularized free fibular bone grafts and implement this clinically to ensure ideal implant placement.

## **ORAL SESSION 36: RECONSTRUCTION**

### **EXPERIENCE OF RECONSTRUCTIVE SURGERY FOR SOFT PALATE DEFECTS**

*N. Lara<sup>1</sup>, J. Davrou<sup>1</sup>, C. Neiva<sup>1</sup>, A. Caula<sup>1</sup>, J. Bettoni<sup>1</sup>, S. Dakpé<sup>1</sup>, B. Devauchelle<sup>1</sup>*

*<sup>1</sup>CHU Amiens - Hôpital Sud, Maxillofacial surgery, Salouël, France*

In cancer surgery and in case of severe defect of the soft palate, reconstruction is usually not considered mandatory. If not completely neglected despite nasal food and fluid regurgitation, the use of a prosthetic device or a pharyngoplasty can improve speech and swallowing function. In the field of oral reconstructive surgery, the main goal is obviously functional recovery, therefore soft palate reconstruction should always be considered. In our department where reconstructive surgery is a field of expertise (more than 2000 free flaps), it seems that the best flap for soft palate reconstruction is the folded forearm flap, with some added procedure time to sustain it in order to recover a better swallowing, breathing and speech function. Among numerous oropharyngeal reconstructions including soft palate reconstruction, a serie of 12 patients illustrate our proposition with morphological and functional assessment. The surgical procedure will be exposed as well as the follow-up and long-term results.

## **ORAL SESSION 36: RECONSTRUCTION**

### **FIBULA FREE FLAP PEDICLE OSSIFICATION: OUR EXPERIENCE**

*C. Baserga<sup>1</sup>, A. Bolzoni<sup>1</sup>, G. Aldo Bruno<sup>1</sup>, G. De Riu<sup>2</sup>, O. Massarelli<sup>2</sup>, B. Alessandro<sup>1</sup>, D.S. Rossi<sup>1</sup>*

*<sup>1</sup>Fondazione IRCCS Ca' Granda Ospedale Maggiore Policlinico, Oral and Maxillofacial Surgery, Milan, Italy*

*<sup>2</sup>AOU Sassari, Oral and Maxillofacial Surgery, Sassari, Italy*

Fibula free flap (FFF) is a routinely used free flap for oromaxillary and oromandibular bony defects reconstruction, because of its low donor site morbidities, great length of harvested bone, a possible implant and prosthetic rehabilitation and a combination of multiple skin flaps.

Osteogenic potential of vascularized periosteum has been described in a few cases in literature and many different factors have been pointed out as plausible.

Clinically, the free flap pedicle ossification is presented as trismus, hard swelling and severe pain during movements (mastication, twisting ipsilateral neck), although the diagnosis is often fortuitous and scarce.

Our experience counts 3 patients, one male and two females, mean age 41.6 years, affected by squamous cell carcinoma and two adenocystic carcinomas of the maxilla who underwent maxillectomy and FFF reconstruction; microanastomoses were layed in a subcutaneous tunnel in the cheek. Radiotherapy was performed in 2 cases in post-op. A progressive reduction of mouth opening was noticed in the months after surgery and CT scans or Panorex showed a calcified tissue, where the pedicle was passing. Surgical revisions were performed in all 3 cases. Non recurrence were noticed.

Ossification of FFF pedicle is uncommon, but when it occurs, it has dramatic clinical consequences, so maxillofacial surgeons must be aware of this process. The clinical presentations can be very variable and there is a high risk of underestimate it. Follow-up CT scan e Panorex can be useful in diagnose.

In our experience we can say that surgery should be performed when the patient is syntomatic.

## **ORAL SESSION 36: RECONSTRUCTION**

### **ONE STEP ORBITO-CRANIAL RESECTION/RECONSTRUCTION WITH SURGICAL GUIDE AND PATIENT SPECIFIC POLYETHERETHERKETONE IMPLANTS**

*A. Amir Ghasemi<sup>1</sup>, M. Ethunandan<sup>1</sup>, N. Mathad<sup>2</sup>, E. Shenouda<sup>2</sup>*

*<sup>1</sup>University Hospital Southampton NHS Foundation Trust, Oral and Maxillofacial surgery, Southampton, United Kingdom*

*<sup>2</sup>University Hospital Southampton NHS Foundation Trust, Wessex Neurological Centre, Southampton, United Kingdom*

**Background:** Recent advances have allowed reconstruction of complex defect with patient specific implants. These are often undertaken at a later stage when defect can be accurately evaluated. We present our experience of utilizing single stage resection and reconstruction protocol using surgical guide and patient specific polyetheretherketone (PEEK) implants for complex orbito-cranial pathology/defects.

**Methods:** We undertook review of all patients managed according to the University Hospital Southampton NHS Foundation Trust protocol between 2014-2016. The factors analysed were age, grade, primary pathology, visual acuity/visual fields, degree of proptosis, previous management (Surgery/Radiotherapy), duration of operation, intraoperative complications, fit and need for adjustments of implants, postoperative complications associated with the procedure and duration of hospital stay.

**Results:** 15 patients were treated in 3 year period. They were all female with age range of 49 to 77. The most common pathology was sphenoid wing meningioma. All patients had these implants placed as planned. Modifications were necessary for most implants were minor in nature. The mean time for resection/reconstruction was 5 hours. The mean proptosis postoperatively on day one measured 2.4 mm. The average hospital stay was 4 days. Complications included CSF leak in one patient and ophthalmic trigeminal neuralgia. The visual acuity and visual fields did not change in any of the patients.

**Conclusions:** The protocol allows single stage resection/reconstruction of complex orbito-cranial defects. We use surgical guides and patient specific implants. This decreases intraoperative time and hospital stay. The results were excellent and predictable. The detailed results and implications will be discussed.

## **ORAL SESSION 36: RECONSTRUCTION**

### **ORBITAL EXENTERATIONS: RECONSTRUCTIVE TECHNIQUES**

*P. de Leyva<sup>1</sup>, M. Picón<sup>1</sup>, D. Villegas<sup>1</sup>, E. Sánchez-Jáuregui<sup>1</sup>, A. Haddad<sup>1</sup>, J. Núñez<sup>1</sup>, J. Acero<sup>1</sup>*  
*<sup>1</sup>Ramón y Cajal University Hospital, Oral and Maxillofacial Surgery, Madrid, Spain*

#### **Aims:**

Orbital exenteration, is a radical procedure that involves the removal of the contents of the orbit. This results not only in visual dysfunction but also in psychosocial disability for the patients. The reconstructive procedure should be adapted to the extent of the defect and the individual needs of the patient.

#### **Methods:**

A retrospective review of 50 consecutive patients who underwent orbital exenteration between 1990 and 2012 is presented. The reconstructive techniques used are reviewed.

#### **Results:**

Fifty patients (29 men and 21 women) with a mean age of 71 years underwent orbital exenteration. Squamous cell carcinoma was the most frequent tumor removed (30%). The eyelids were the most common site for the primary neoplasm (32.7%). The temporalis muscle flap was the main technique used for reconstruction (62.2%). Other options were the radial forearm free flap, the ALT flap, the conjunctiva-eyelid sparing technique and the reconstruction with and orbital prosthesis, which can be retained by osseointegrated implants.

#### **Conclusions:**

Orbital exenteration is a disfiguring procedure that results in functional, aesthetic and psychological impact for the patients. Its main goal is to increase survival. For these reasons, both the extension of surgery and the reconstructive technique should be carefully planned in advance. Reduced morbidity in old patients, tolerance to radiotherapy and the possibility to accommodate a prosthesis are issues that need to be taken into account.

## **ORAL SESSION 36: RECONSTRUCTION**

### **MID - TERM FACIAL PALSY: THE RIGHT CHOICE AT THE RIGHT TIME**

*V. Valentini<sup>1</sup>, M. Della Monaca<sup>1</sup>, A. Cassoni<sup>1</sup>, P. Priore<sup>1</sup>, D. Bartoli<sup>1</sup>, G. Barbera<sup>1</sup>*

*<sup>1</sup>La Sapienza, Maxillo - Facial Surgery Unit, Roma, Italy*

#### **AIM**

Postoperative facial paralysis is not an uncommon occurrence in otolaryngology–head and neck surgery and is also seen with relative frequency following neurosurgical and oral and/or maxillofacial surgical procedures. The main feature that guide the treatment of these kind of lesions is the elapsed time from the onset of the paralysis. When the palsy is present from 3 but less than 18 months (mid – term facial palsy), physicians are faced with the dilemma of whether to wait for spontaneous recovery or to proceed with early facial reanimation surgery Aim of this study is to provide a protocol for the treatment of the mid – term facial palsy.

#### **Methods**

From 2010 to 2015, 34 patients suffering facial palsy were admitted to our Department. Retrospective review of clinical chart was conducted. Inclusion criteria were: a) unilateral facial palsy; b) mid - term facial palsy c) surgical reinnervation procedure. All the patient underwent EMG/ENG at the early onset of the palsy and, since then, each 3 months. The outcome of the different surgical procedures administered were analyzed with Facegram software.

#### **Results**

Fourteen patients met the inclusion criteria. Regardless of the surgical procedures administered, all the patients, that showed no signs of improvement at six months from the onset of the palsy, had better outcome with very early procedure.

#### **Conclusion**

Based on our findings, if no signs of improvement are clearly evident at six months from the palsy, early surgical facial nerve reanimation is recommended.

**ORAL SESSION 36: RECONSTRUCTION  
SETTING UP AN 'IN HOUSE' SERVICE TO PROVIDE 3D COMPUTER PLANNING AND  
ADDITIVE MANUFACTURED SURGICAL GUIDES FOR FIBULA FREE FLAPS**

*N. Scott<sup>1</sup>, M.A. Kittur<sup>1</sup>, P. Evans<sup>1</sup>, L. Dovgalski<sup>1</sup>, S. Hodder<sup>1</sup>*

*<sup>1</sup>Morrison Hospital. ABMU Health Board, United Kingdom*

**Introduction:**

The use of the fibula osseo-cutaneous free flap to reconstruct the maxilla and mandible is well recognised and reliable. Harvesting the bone does not present any significant challenges, however, exact contouring of the fibula bone to the defect can be time consuming and always possesses the small risk of devitalising the harvested bone.

**Method:**

The authors' present 10 consecutive cases that have utilised the pre-operative 3D Computer Tomography (CT) data to plan the surgical procedure. The CT data is imported into Mimics (Materialise) and Freeform Plus (Geomagics) software, where a digital resection of the tumour can be carried out followed by digital harvesting of the fibula bone with exact contoured bone cuts to the resection margins. Additive manufactured resin (AMR) guides are then produced to allow the digital cuts at both the resection and donor site to be exactly replicated intra-operatively.

**Results:**

10 cases have now been carried out using this technique with a case mix of hemi-maxillectomies and hemi-mandibulectomies. There have been no errors with the transfer of the digital bone cuts to the AMR guides, which have fitted perfectly intra-operatively. This has dramatically decreased the free flap ischaemic and total anaesthetic time, whilst ensuring the free flap fits the resection site perfectly, with no adjustment.

**Discussion:**

The authors' describe their experience, cost implications and pitfalls of setting up this sole delivered 'in house' service. They emphasise the infrastructure and data requirements needed to deliver this service and justify its place in major head and neck units.

**ORAL SESSION 37: NASAL AND EAR SURGERY**  
**POST TRAUMATIC CLOSED RHINOPLASTY IN NORTH AFRICAN PATIENTS**

*J. Bouguila<sup>1,2,3,4</sup>, G. Besbes<sup>1</sup>, H. Khochtaï<sup>3,4</sup>*

*<sup>1</sup>La Rabta Hospital, ENT- Maxillo-facial and Aesthetic Surgery, Tunis, Tunisia*

*<sup>2</sup>El Manar University, Tunis Medical School, Tunis, Tunisia*

*<sup>3</sup>Mounastir university, Laboratory of Oral Health and Facial Rehabilitation, Mounastir, Tunisia*

*<sup>4</sup>Sahloul Hospital, Maxillo-facial and aesthetic surgery, Tunis, Tunisia*

**Aims**

The application of rhinoplasty in the treatment of traumatic nasal deformity remains one of the most challenging problems in plastic surgery.

This article presents our experiences in the reconstruction of traumatic nasal deformities using the internal rhinoplasty approach.

**Methods**

We conducted a retrospective study from January 2001 to December 2013. We included in this study all patients operated for nasal post-traumatic deformity using closed approach.

Each patient chart was reviewed with regard to: age and gender, circumstances and date of nasal trauma, timing of the rhinoplasty as well as for the functional and aesthetic outcomes.

**Results**

One hundred seventy two of these patients, including 115 males and 57 females, underwent the internal approach. The patients were, on average, 26 years old at the time of reconstruction and were followed up for an average period of 16 months. The interval from injury to the rhinoplasty procedure was 4,5 years, on average. The outcome was assessed by (an independent investigator and the patients themselves). The overall aesthetic-improvement rate was 88%, and the patient-satisfaction rate was 95%. There was no complication.

**Conclusions**

Not only is the skeletal structure severely deformed, but the soft tissue may also be disfigured by a previous injury. The closed rhinoplasty technique provides great predictability and minimal postoperative discomfort, with no aesthetic damage

**ORAL SESSION 37: NASAL AND EAR SURGERY**  
**OPEN RHINOPLASTY IN CLEFT PATIENTS AS FOLLOW UP AFTER MAXILLARY**  
**OSTEOTOMIES OR IMMEDIATE SIMULTANEOUS PROCEDURE.**

*M. Jagielak<sup>1</sup>, M. Kuczyński<sup>2</sup>, M. Rahnama<sup>3</sup>, R. Olszewski<sup>4</sup>*

*<sup>1</sup>Ortognatyka Dr Jagielak sp. z o.o. sp. komandytowa, Ortognatyka, Raszyn, Poland*

*<sup>2</sup>Ośrodek Chirurgii Plastycznej Dr. Macieja Kuczyńskiego private surgical practice,  
Ośrodek Chirurgii Plastycznej Dr. Macieja Kuczyńskiego private surgical practice, Lublin, Poland*

*<sup>3</sup>Medical University of Lublin, Department of Oral Surgery, Lublin, Poland*

*<sup>4</sup>Cliniques Universitaires Saint-Luc, Université catholique de Louvain, Brussels, Belgium*

Treatment of the post cleft deformities requires cooperation of many specialist (maxillofacial surgeon, orthodontist, plastic surgeon, speech therapist, psychologist). During growth, regardless of many plastic surgeries and reconstructions, and orthodontic care, patients frequently develop skeletal deformities associated with soft tissue especially of the nose and upper lip. Such cases require extensive reconstructions.

The authors (the team of maxillofacial and plastic surgeons) shares their experience of simultaneous treatment of skeletal and soft tissue deformities (maxillary osteotomy + open rhinoplasty and lip augmentation) shows surgical technique, discuss limitations of this method, indicates the cases where separate treatment is essential.

Our experience is based on over 300 patients operated for post cleft deformities segmental LeFort osteotomies variations of BSSO and genioplasty, accompanied by open rhinoplasties.

**ORAL SESSION 37: NASAL AND EAR SURGERY**  
**THE EFFECT OF NASAL TIP ROTATION ON UPPER LIP LENGTH**

*D. Steinbacher<sup>1</sup>, A. Shah<sup>2</sup>, A. Patel<sup>2</sup>*

*<sup>1</sup>Yale University, Plastic and Maxillofacial Surgery, New Haven, USA*

*<sup>2</sup>Yale University, Plastic Surgery, New Haven, USA*

Introduction: Increasing the nasolabial angle (NLA) with tip rotation generates the appearance of a lengthened lower facial third. In particular, the upper lip show increases following elevation of the nasal tip. The purpose of this study is to quantify the impact of tip rotation on upper lip length (ULL), and to establish a correlation between the two. Methods: A retrospective cohort study of consecutive rhinoplasty patients with increased tip rotation, using either caudal septal extension graft (CSEG) or columellar strut graft (CS), was performed. 3D photos were obtained and analyzed anthropometrically. ULL was measured. The impact of post-operative NLA to ULL was calculated. The delta between NLA and ULL at the various time points, was then compared using linear regression. Results: 150 patients were identified and 88 patients met inclusion criteria. CS and CSEG were used in 40% (n=36), and 60% (n=52), respectively, to control the tip. 3D assessment showed that as the NLA increased, the ULL increased in both cohorts. The CSEG group created a greater NLA and ULL compared to the CS cohort. Both NLA and ULL decreased over time, but remained statistically increased as compared with preoperative measurements. For every one degree of NLA increase, the ULL increases by 0.05 mm. Conclusion: Increasing nasal tip rotation in rhinoplasty (NLA) results in greater upper lip show (ULL). Both CS and CSEG can effectively increase tip rotation and ULL. A predictable correlation of nearly 0.05 mm of ULL for every 1 degree of tip rotation is shown.

**ORAL SESSION 37: NASAL AND EAR SURGERY**  
**POSTOPERATIVE EDEMA RESOLUTION FOLLOWING RHINOPLASTY: A 3D**  
**MORPHOMETRIC ASSESSMENT**

*D. Steinbacher<sup>1</sup>, V. Zhu<sup>1</sup>, S. Pavri<sup>1</sup>*

*<sup>1</sup>Yale University, Plastic and Maxillofacial Surgery, New Haven, USA*

**PURPOSE:** The final result of rhinoplasty may be masked for several months following surgery due to postoperative edema; however, no objective evidence supports this time estimate. The purpose of this study is to 3-dimensionally quantify the decrease in post-surgical nasal edema following rhinoplasty over the first postoperative year. **METHODS:** This was a retrospective, 3D morphometric study of primary, open rhinoplasty patients. Subjects with at least 3 postoperative 3D images up to one year were included. Patients were excluded for closed or secondary procedures or cleft deformities. Images were assessed using 3D stereophotogrammetry (ectra) and volumetric analysis (Geomagic). Baseline nasal volume (T0) occurred at the first postoperative visit at 1-2 weeks. All subsequent nasal volume measurements were calculated as a percentage of T0. Data points from all patients were pooled and a 6-point moving average was used to create an inverse function line of best fit. **RESULTS:** 40 patients were included, with 146 3D photographs quantified. The equation for the inverse function line of best fit of the 6-point moving average was  $y = 1.484 (1/x) 0.844$  ( $R^2=0.85$ ,  $p<0.01$ ). According to this equation, approximately two-thirds of edema resolves within the first month, 5% after six months, and .5% after one year. A plateau is reached at 84.4% of the original postoperative volume. **CONCLUSION:** This study provides quantitative evidence to predict decrement of rhinoplasty edema with time. 3D morphometric assessment demonstrated a two-thirds decrease in edema at one month, 5% decrease at six months, and .5% decrease at one year.

**ORAL SESSION 37: NASAL AND EAR SURGERY**  
**NASAL DEFORMITY AND ORTHOGNATHIC SURGERY: AN ALGORITHMIC APPROACH.**

*D. Steinbacher*<sup>1</sup>

<sup>1</sup>*Yale University, Plastic and Maxillofacial Surgery, New Haven, USA*

Intro

Dentofacial and nasal deformities are interrelated, as are their treatments. In cases of preexisting nasal deformity, maxillary advancement can worsen or improve nasal aesthetics. In cases where there is no preoperative nasal deformity, maxillary advancement can result in a nasal deformity or result in minimal changes to the nose. The potential need for and timing of rhinoplasty is contingent upon an understanding of these relationships.

Methods

We performed a retrospective study, examining patients requiring correction for dentofacial abnormalities from 2012-14. Diagnostic, morphologic, and treatment variables were stratified into an algorithmic approach.

Results

147 patients who underwent jaw surgery were reviewed. Mean age 26; 65% female. Rhinoplasty was performed in 73 (86% staged). In the remaining 74, no nasal procedures were needed as the nasal form improved or showed no change. A treatment algorithm was generated based on these presentations: (1) Le Fort-I alone improves nasal morphology, (2) Simultaneous orthognathic surgery and rhinoplasty, (3) Orthognathic surgery, followed by staged rhinoplasty.

Conclusions

Nasal deformity can occur concurrent with maxillofacial dysmorphology, or be a consequence of orthognathic surgery. In some cases a preexisting nasal deformity will improve post-jaw surgery. There is a reproducible pattern of abnormalities that can be comprehensively addressed. We present an algorithm to extensively address the naso-maxillofacial relationship.

**ORAL SESSION 37: NASAL AND EAR SURGERY**  
**CUSTOMIZED LATERAL NASAL OSTEOTOMY GUIDE: THREE-DIMENSIONAL PRINTER ASSISTED FABRICATION**

O. Keyhan<sup>1</sup>, A. Navabazam<sup>1</sup>, M.M. Nasiri<sup>1</sup>, S. Ghanean<sup>1</sup>, K. Khiabani<sup>2</sup>

<sup>1</sup>Shahid Sadoughi University of Medical Sciences, Oral and Maxillofacial Surgery, Yazd, Iran

<sup>2</sup>Jundishapour University of Medical Sciences, Oral and Maxillofacial Surgery, Ahvaz, Iran

Lateral osteotomy is a necessity in several rhinoplasty cases. However, it can be challenging for inexperienced surgeons to perform external osteotomy due to difficulties such as lack of control, inconsistent results and technical complications. The present article presents a simplified approach for external lateral nasal osteotomy by using a customized lateral nasal osteotomy guide fabricated with threedimensional printer. This technique may assist novice surgeons to perform external lateral nasal osteotomy more safely and with reduced operation time and consistent outcomes.

**ORAL SESSION 37: NASAL AND EAR SURGERY**  
**SURGICAL STRATEGY FOR THE CORRECTION OF SUBTOTAL AND TOTAL NASAL AND NASOLABIAL COMPLEX DEFECTS**

*E. Verbo<sup>1</sup>, A. Nerobeev<sup>1</sup>, L. Brusova<sup>1</sup>, K. Gorkush<sup>1</sup>, O. Moskaleva<sup>1</sup>*

*<sup>1</sup>Central Research Institute of Dental and Maxillofacial Surgery,  
Reconstructive Maxillofacial surgery, Moscow, Russia*

**Aim:** improving functional and aesthetic results of treating patients with nasal and nasolabial defects. **Materials and methods:** The authors analysed the treatment of 63 patients having total and subtotal external defects in nose and nasolabial area. In order to estimate the defect's structure and select donor areas, CT and USDG, rhinomanometry and flowmetry were used. **Results:** In case of subtotal, total nasal defects, it makes sense to apply paramedian flap from forehead. The flap positioning was made taking into account the curve of its pedicle for the nose tip's complete formation. Using a periosteal flap taken from a head frontal region to form the inner nose's lining made a full-scale formation of the nose possible by applying only that specific donor area. If using facial donor material is impossible, the optimal method for full-scale nose reconstruction is using revascularized radial flap. Contour nasal structures are formed during a second stage, using either a rib autograft or silicone implant. In case of a complex nasolabial defect, two-stage operations would make sense. Firstly – to correct the upper-lip defect. The method selection depends on the defect's size: if limited, the Abbe method should be used; if large, use a radial autotransplant. The second stage is forming the nose using a forehead flap. **Conclusions:** Selecting the method and planning reconstruction stages depend on the defect's size and consistency of surrounding soft tissues. Reasonably planned stages of surgical treatment make it possible to attain full-value aesthetic and functional results.

**ORAL SESSION 37: NASAL AND EAR SURGERY**  
**TOTAL AURICULOPLASTY: DIFFERENTIATED APPROACH TO THE CHOICE OF RECONSTRUCTION METHOD**

*G. Asirova<sup>1</sup>, T. Chkadua<sup>1</sup>, S. Frolov<sup>2</sup>*

*<sup>1</sup>Central Research Institute of Dental and Maxillofacial Surgery, Reconstructive maxillofacial surgery, Moscow, Russia*

*<sup>2</sup>Central Research Institute of Dental and Maxillofacial Surgery, Radiology department, Moscow, Russia*

**Aims:**

To optimize the total auriculoplasty by developing of differentiated approach to the choice of reconstruction method.

**Methods:**

External examination, DUS of vessels of temporal region, LDF and ultrasound of ears areas skin, and rib CT were applied as preoperative planning.

On this basis, techniques implying costal cartilage (17), silicone implant (40), costal cartilage with temporoparietal fascia (3) were used for 60 patients.

**Results:**

The results of ear reconstruction: good (65%), satisfactory (30%), unsatisfactory (5%). Unsatisfactory results are linked to the development of specific complications: in the group with rib cartilage in 1 (6%) patient, local skin necrosis was experienced. Complications when using silicone implant included extrusion with infection (1 [2,5%]), extrusion without infection (1 [2,5%]). No specific complications were observed in the group with rib cartilage and fascial flap.

**Conclusion:**

According to the examination data the treatment tactics was selected. 2-stage operation using costal cartilage is the choice in a case of sufficient development of the chest and absence of pronounced skin scarring. 1-stage operation with the use of silicone implants was performed on patients from 6-9 years old with scarring recipient area and good condition of temporoparietal fascia. 1-step operation with a framework of rib cartilage, temporoparietal fascia and skin grafts was used in the case of high risk of exposure of a silicone implant and insufficient development of the superficial temporal artery.

The best results of reconstruction were demonstrated among 6-7 years-old patients after surgery with silicone implant. The best results in the group with rib cartilage were obtained among 10-30 years-old female patients.

**ORAL SESSION 37: NASAL AND EAR SURGERY**  
**TOTAL RHINECTOMY RECONSTRUCTION: A CASE FOR CHANGE**

*B. Visavadia<sup>1</sup>, M. Gilhooly<sup>1</sup>*

*<sup>1</sup>Northwick Park Hospital, Regional Oral and Maxillofacial Unit, London, United Kingdom*

The rhinectomy defect created by trauma or infection can be managed with sequential well-documented reconstructive techniques and with subsequent predictable revision surgery to achieve form and function

With nasal cancer the surgery itself is dictated by the presenting cancer location and clearance requires a comprehensive 3D approach. This may involve the local maxillofacial complex as well as the nasal septal and mucosal structures.

At London North West Healthcare NHS Trust we have adopted a dedicated teamwork approach to the management of nasal cancer.

This case series highlights our experiences.

#### Aims

To present the developing techniques in our unit adopted for nasal reconstruction following cancer treatment.

We had to consider that each patient has specific needs and that there are significant psychological concerns associated with such treatment.

We held detailed multi-disciplinary team discussions regarding the nasal cancer location, histology and management.

The two authors treated all patients.

#### Methods

Surgery was undertaken in carefully selected patients who had aggressive nasal cancer. All treatment modalities were explored and rehabilitation methods offered. The surgical aims were to undertake complete excision and undertake an immediate reconstruction for the patients. An innovative free flap technique developed by the authors was used in addition a paramedian forehead flap provided skin coverage.

Patients were given 8-10 weeks in order to achieve further predictable revision surgery prior to planned radiotherapy.

Group support was given by expert counsellors.

#### Conclusion

Our experiences with a growing cohort of patients will be presented.

**ORAL SESSION 37: NASAL AND EAR SURGERY**  
**REFINEMENTS IN “TOTAL” RECONSTRUCTION OF THE NOSE**

*G. Colletti<sup>1</sup>, F. Giovanditto<sup>1</sup>, F. Riva<sup>1</sup>, M. Dessy<sup>1</sup>, M. Ferrari<sup>1</sup>, S. Marelli<sup>1</sup>, F. Biglioli<sup>1</sup>*

*<sup>1</sup>Ospedale San Paolo, Maxillo-Facial surgery, milan, Italy*

Oncological procedures, traumatic avulsions and substance abuse are common causes of severe nasal deformities. Rarely even congenital diseases such as arhinia require complete nasal reconstructions.

Small defects of the skin are easily repaired with local flaps or grafts. On the other hand complete reconstructions must address the inner lining, the outer lining and the skeletal framework to obtain ideal results.

“Minor” defects of the inner lining can be effectively reconstructed with mucosal flaps from the septum or the turbinate. Alternatively a previously skin-grafted forehead flap might suffice. Greater defects of the inner lining on the other hand require microvascular flaps. The forehead flap is ideal for outer lining reconstruction in terms of color and texture match and it is extremely reliable. Some crucial technical aspects however must be known and respected to have ideal predictable results.

Finally, the reconstruction of the skeletal and cartilaginous framework is of the uttermost importance. Smaller defects are reconstructed with cartilaginous grafts harvested from the septum or the ear. On the other hand, the workhorse for major nasal reconstructions is the rib graft. This allows performing composite bony and cartilaginous reconstructions with enough tissue to rebuild the dorsum and the alae.

Here the Authors present their experience with nasal reconstructions in nasal defects resulting from oncological procedures, from substance abuse and in arhinia.

**ORAL SESSION 37: NASAL AND EAR SURGERY**  
**CARTILAGE MORPHOGENESIS IN THE EXTERNAL EAR: A 3D STUDY USING**  
**SYNCHROTRON MICROTOMOGRAPHY**

*F. Simon<sup>1</sup>, A. Tucker<sup>2</sup>, P. Tafforeau<sup>3</sup>, E.N. Garabedian<sup>1</sup>, F. Denoyelle<sup>1</sup>, A. Picard<sup>4</sup>, R.H. Khonsari<sup>4</sup>*

*<sup>1</sup>Necker-Enfants Malades University Hospital, Service d'oto-rhino-laryngologie, Paris, France*

*<sup>2</sup>Dental Institute- King's College London, Craniofacial Development and Stem Cell Biology, London, United Kingdom*

*<sup>3</sup>European Synchrotron Radiation Facility, Beamline ID-19, Grenoble, France*

*<sup>4</sup>Necker-Enfants Malades University Hospital, Service de chirurgie maxillo-faciale et plastique, Paris, France*

**Aims**

The formation of the external ear is still largely misunderstood and the mechanisms which lead to malformations, such as in the EYA1 (branco-oto-renal syndrome), FGFR3 (achondroplasia) and FGF10 (LADD syndrome) mutations and unknown. Using high-resolution imagery, we have tried to understand the external ear's development.

**Methods**

We scanned mice's external ears at different embryo stages using synchrotron microtomography at sub-micronic resolutions. We first scanned E12, E14, E16 and E18 mice ears in normal embryos. We then scanned specimen with EYA1, FGFR3 and FGF10 mutations at various stages. The data was processed using segmentation softwares and 3D reproductions of the ear cartilage with corresponding muscle structures were created at each stage for normal and mutated embryo.

**Results**

The cartilaginous and muscle formation was reconstruction in the normal ear at E12, E14, E16 and E18 and compared to abnormal cartilage morphogenesis in mutant mice.

**Conclusions**

The formation of the external ear in mice depends not only of the formation of cartilaginous primordia, but also of its correct interaction with muscle insertions. Following the different steps of the 3D folding of the external ear cartilage provides the first insight on this little known morphogenetic process.

## **ORAL SESSION 38: NAVIGATION**

### **HAPTIC FEEDBACK IN CRANIOFACIAL TRAUMA SIMULATION**

*S. Girod<sup>1</sup>, S. Schwartzman<sup>2</sup>, K. Salisbury<sup>3</sup>, R. Silva<sup>4</sup>*

*<sup>1</sup>Stanford University, Surgery, Stanford, USA*

*<sup>2</sup>Moving Picture Company, R&D, London, United Kingdom*

*<sup>3</sup>Stanford University, Computer Science, Stanford, USA*

*<sup>4</sup>VA San Francisco, Dental Service, San Francisco, USA*

**Purpose:** Computer-assisted surgical (CAS) planning tools are available for craniofacial surgery, but are usually based on computer-aided design (CAD) tools that lack the ability to detect the collision of virtual objects such as bone fracture segments. We hypothesized that integration of haptics that enables surgeons to physically interact with individual, patient specific anatomy would make a CAS system easy to use for OMF surgeons.

**Methods:** We developed a novel haptic craniofacial trauma CAS system and evaluated the user experience compared to an existing CAD system. Ten surgery resident trainees received a 5 minute introduction to both the haptic and CAD systems. Users simulated mandibular fracture reduction in three clinical cases within a 15-minute time limit for each system, and completed a questionnaire to assess their subjective experience. Standard measurements between the simulated results and the actual surgical outcome were compared using standard measurements.

**Results:** With 5 minutes of verbal introduction to the haptic CAS system and 15 minutes of simulation time, the surgeons achieved virtual fracture reductions in 3 clinical cases that showed no significant difference in comparison with the postoperative result. In contrast, CAD results significantly differed from both the haptic simulation and actual postoperative results.

**Conclusion:** The haptic system enabled a fracture repair simulation that was similar to the actual postoperative result. All surgeons reported that the system was intuitive and that they would be comfortable integrating it into their daily clinical practice for trauma cases.

## **ORAL SESSION 38: NAVIGATION**

### **A CONTEMPORARY VIRTUAL THREE-DIMENSIONAL METHOD USING MIRRORING AND SURFACE BASED MATCHING TECHNIQUES FOR MEASURING ZYGOMATICOMAXILLARY COMPLEX SYMMETRY**

*J.P. Ho<sup>1</sup>, R. Schreurs<sup>2</sup>, D. Milstein<sup>1</sup>, L. Dubois<sup>1</sup>, T. Maa<sup>2</sup>, J. de Lange<sup>1</sup>, A. Becking<sup>1</sup>*

*<sup>1</sup>Academic Medical Center, Department of Oral and Maxillofacial Surgery, Amsterdam, Netherlands*

*<sup>2</sup>Academic Medical Center, 3D Laboratory Oral and Maxillofacial Surgery, Amsterdam, Netherlands*

#### **AIM**

The aim of this study is to validate a new semi automatic mirroring method (SAMM) to quantify hard tissue symmetry of the zygomaticomaxillary complex (ZMC) and to objectively analyze ZMC fractures.

#### **METHOD**

Four examiners reconstructed virtual three-dimensional hard-tissue models from computed tomography (CT) datasets of 26 healthy individuals with a SAMM. The models were mirrored and superimposed through surface base matching techniques. The absolute average distance (AD) and 90th percentile distance (NPD) were used to measure overall and maximal symmetry respectively. The Intraclass Correlation Coefficient (ICC) was calculated to measure interobserver consistency. In order to determine if this technique is able to diagnose ZMC fractures, two examiners examined 10 CT datasets of individuals with a unilateral ZMC fracture.

#### **RESULTS**

For the unaffected group the mean AD was  $0.84 \pm 0.29$ mm (95% CI 0.72-0.96) and the mean NPD was  $1.58 \pm 0.43$ mm (95% CI 1.41-1.76). The ICC was 0.97 (0.94-0.98 as 95% CI), indicating almost perfect agreement between observers. In the affected group the mean AD was  $2.97 \pm 1.76$ mm (95% CI 1.71-4.23) and the mean NPD was  $6.12 \pm 3.42$ mm (95% CI 3.67-8.57). The affected group showed a near perfect interobserver agreement with an ICC of 0.996 (0.983-0.999 as 95% CI).

#### **CONCLUSION**

The new SAMM proved to be accurate and reproducible. The use of landmarks, symmetry planes, perfect head positioning and patient oriented axis systems was circumvented with the use of mirroring and surface base matching techniques. The method is believed to be clinically usable for the objective analysis of the ZMC and ZMC fractures.

## **ORAL SESSION 38: NAVIGATION**

### **THE EFFECTS OF 3D PREOPERATIVE PLANNING ON IMPLANT POSITION IN ORBITAL RECONSTRUCTION: A HUMAN CADAVER STUDY**

*J. Jansen<sup>1</sup>, R. Schreurs<sup>2</sup>, L. Dubois<sup>1</sup>, T. Maaß, P. Gooris<sup>1</sup>, A. Becking<sup>1</sup>*

*<sup>1</sup>Academic Medical Centre of Amsterdam- University of Amsterdam- Academic Centre for Dentistry ACTA, Department of Oral and Maxillofacial Surgery, Amsterdam, Netherlands*

*<sup>2</sup>Academic Medical Centre of Amsterdam- University of Amsterdam- Academic Centre for Dentistry ACTA, 3D Laboratory Oral and Maxillofacial Surgery, Amsterdam, Netherlands*

**Aims:** Computer Assisted Surgery (CAS) and intraoperative navigation improve the predictability of implant position in orbital reconstruction. 3D preoperative planning is an integral part of CAS. It allows the surgeon to adequately assess the fracture and perform virtual surgery. The goal of this study was to evaluate the effects of preoperative planning on implant position in orbital floor and medial wall reconstruction.

**Methods:** In 10 cadaveric heads, complex fractures were created in 19 orbits. First, all fractures were reconstructed without preoperative planning (control group) and at a later stage the reconstructions were repeated with preoperative planning. Two experienced OMF surgeons performed the reconstructions with preformed titanium mesh plates. They were allowed to examine the planning intraoperatively. CT-scans were obtained before and after creation of the orbital fractures and postoperatively. Using a paired t-test, implant placement accuracy (translation and rotations) of both groups were evaluated by comparing planned implant location with the location of the implant on the postoperative scan.

**Results:** Implant position improved significantly ( $P < 0.05$ ) for translation, yaw and roll in the group with preoperative planning (Table 1). Pitch did improve, but not significantly ( $P = 0.78$ ).

**Conclusions:** The use of 3D preoperative planning in orbital floor and medial wall fractures has a positive effect on implant position. This is due to better overview of the fracture, possibility of virtual surgery and because the planning can be used as a guide intraoperatively. The surgeon has more control in positioning the implant related to the rim and other landmarks.

**Table 1 Implant position with and without preoperative planning**

	Without planning		With planning		P-value
	Mean	SD	Mean	SD	
Translation	4.98mm	2.19mm	2.64mm	1.69mm	<0.001
Pitch	-1.29°	3.05°	-1.12°	2.18°	0.78
Yaw	17.81°	10.91°	5.24°	6.77°	<0.001
Roll	-9.81°	9.09°	-4.53°	3.52°	0.006

## **ORAL SESSION 38: NAVIGATION**

### **MAXILLOFACIAL SURGEON'S/ DENTIST'S ETHICAL BEHAVIOUR TOWARDS RADIATION AND THE USE OF CBCT/ OPG**

*B.I. Berg<sup>1</sup>, C. Botton<sup>2</sup>, N. Brun<sup>3</sup>, N. Eckstein<sup>4</sup>, J. von Jackowski<sup>4</sup>, S. Hassfeld<sup>5</sup>, P. Juergens<sup>6</sup>*

*<sup>1</sup>University Hospital Basel, Cranio- Maxillofacial Surgery, Basel, Switzerland*

*<sup>2</sup>University of Basel, Hightech Research Center of Cranio-Maxillofacial Surgery, Basel, Switzerland*

*<sup>3</sup>University Hospital Basel, Clinical Trial Unit / CTU, Basel, Switzerland*

*<sup>4</sup>University Hospital Basel, Cranio-Maxillofacial Surgery, Basel, Switzerland*

*<sup>5</sup>University Witten/Herdecke & Städt. Kliniken Dortmund, Dept. of Cranio-Maxillofacial Surgery, Dortmund, Germany*

*<sup>6</sup>University Hospital Basel, Cranio- Maxillofacial Surgery, Basel, Switzerland*

#### **Aims**

The aim of this survey was to assess the ethical behaviour towards the use of cone beam computed tomography (CBCT) and orthopantomogram (OPG) among German and Swiss maxillofacial surgeons/ oral surgeons/ dentists. The hypothesis of the survey aims to test whether the increasing number of CBCT devices promotes a less ethical behaviour towards the application of radiation; this change in radiation application might not be exclusively for better diagnostics but also due to an economical/ competitive behaviour.

#### **Methods**

Participants from Switzerland and Germany were selected by searching the www. 752 participants with a CBCT available in their practice were matched with two practitioners (1507) from the same city with no CBCT. A standardized questionnaire maintaining a general part (12 questions) and 16 partly ethical questions concerning use and attitude towards OPG/ CBCT/ Radiation (Likert scale) was posted.

#### **Results:**

485 dentists (332 male, 153 female) answered the survey. 439 had an OPG available and 186 had also a CBCT scanner. A significant difference male/ female was found for the task: convincing patients who are afraid of radiation to agree to a CBCT scan. In 10 out of 16 questions, a significant difference was found between participants who had a CBCT scanner available vs no scanner available ( $p <= 0.05$ , chi square test).

#### **Conclusion**

The survey demonstrated that most of the dentists showed an ethical behaviour towards the use of the CBCT. In some questions, the availability of a CBCT scanner in the participant's practice seems to have an influence on the answers.

## **ORAL SESSION 38: NAVIGATION**

### **PREPARING VIRTUAL MODELS FOR 3D PRINTING: A COMPARISON OF 5 FREE SOFTWARE SOLUTIONS**

*M. Benassarou<sup>1,2,3</sup>, E. Weber<sup>4</sup>, B. Chatelain<sup>4</sup>, C. Meyer<sup>3,4</sup>*

*<sup>1</sup>Hôpital de la Pitié-Salpêtrière, Oral and Maxillofacial Surgery Department, PARIS, France*

*<sup>2</sup>Sorbonne Universités, UPMC Univ Paris 06, PARIS, France*

*<sup>3</sup>EA4662 Nanomedicine Lab, Univ Bourgogne Franche-Comté, BESANCON, France*

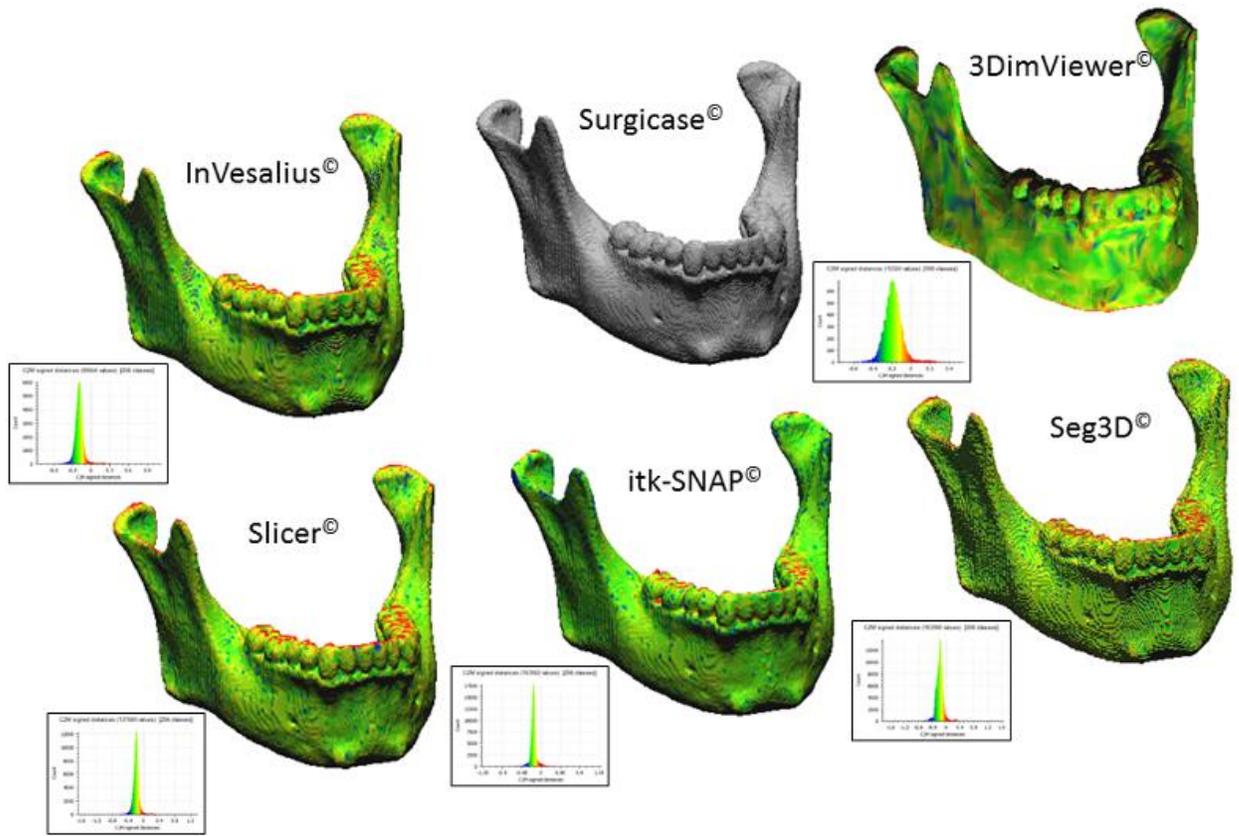
*<sup>4</sup>CHRU de Besançon, Oral and Maxillofacial Surgery Department, BESANCON, France*

**Aims:** To assess and compare the accuracy of free software solutions available for building STL models for 3D printing.

**Methods:** Free software provided to convert DICOM data to STL files was used. CT scan imaging data of a patient's mandible was converted into a 3D mesh with each software. A reference model was built using Surgicase 5.01 (Materialise, Leuven, Belgium). The models were analyzed using Netfabb Basic 6.4 (Netfabb GmbH, Parsberg, Germany). Each mesh was finally compared to the reference file using CloudCompare 2.6.2 (<http://www.cloudcompare.org/>, Paris, France).

**Results:** Five software solutions were downloaded from the internet. Using a thresholding segmentation method in each freeware program, 3D mesh models could be built and saved as STL files. Mean number of triangles used in meshes was 220174 [20944 ; 368244]. Mean volume of the models was 67.81 cm<sup>3</sup> [66.28 ; 73.73]. Compared to the reference, all models had a lower volume related to a decrease in length and width, in spite of an increase in height.

**Conclusion:** With the growing interest in 3D printing in maxillofacial surgery, the use of reliable software to convert DICOM data to STL meshes is mandatory. More and more free software packages are made available online. However, results vary according to the application used. Further study is required to determine which algorithm provides the closest results to the real anatomy.



## **ORAL SESSION 38: NAVIGATION**

### **DELIVERING A SUCCESSFUL CADAVERIC SURGICAL SIMULATION WORKSHOP: OUR 3 YEAR EXPERIENCE**

*L. Hanu-Cerna<sup>1</sup>*

*<sup>1</sup>University Hospitals Coventry and Warwickshire HNS Trust, Oral and Maxillofacial Surgery, Coventry, United Kingdom*

The Cranio-maxillofacial Surgery Cadaver Workshop in Coventry has been running successfully for the last three years and so far 6 workshops have been delivered with 133 international and UK delegate participation.

The organizational steps starting with identifying the target group of trainees, designing the workshops format, formulating the curriculum, gathering reliable lecturer and demonstrator faculty and then booking and planning the use of laboratory facilities, cadaveric material, negotiating commercial sponsorship with funds and materials, arranging catering and accommodation and managing the financial aspects of the courses are critically discussed and presented.

The experience with advertising the workshops, managing a large volume of tentative enquiries and finally dealing with the genuine registrations in the context of limited dissector places is also described with emphasis on difficulties and pitfalls of such processes. Aspects relating to obtaining BAOMS CPD recognition and EACMFS integration into the Rolling Educational Programme are also discussed.

There were only 27 UK out of 133 course delegates and the reasons for this disappointing level of national interest are explored. Course delegates' demographics with details of level of experience and structured feedback findings are analyzed and presented.

**ORAL SESSION 38: NAVIGATION  
PROGRESSING OSTEORADIONECROSIS OF THE JAW: NEW COMPUTER ASSISTED  
ASSESSMENT OF NECROTIC CHANGES IN THE MANDIBULAR BONE**

*C. Kober<sup>1</sup>, G. Kjeller<sup>2</sup>, B.I. Berg<sup>3</sup>*

*<sup>1</sup>HAW Hamburg, HAW Hamburg, Hamburg, Germany*

*<sup>2</sup>The Sahlgrenska Academy, Oral & Maxillofacial Surgery, Gothenburg, Sweden*

*<sup>3</sup>University Hospital, Cranio- Maxillofacial Surgery, Basel, Switzerland*

**Aims**

Osteoradionecrosis (ORN) is a serious side effect of oncologic radiotherapy. ORN is characterized by severe pathological alterations in the skeletal tissue. In clinical diagnosis, necrotic changes, infection, or tumor relapse are to be differentiated. This abstract is about recent research results focused on CT-/CBCT-based visualization of necrotic changes due to progressing mandibular ORN.

**Methods**

Long-term cancer patients often present numerous radiological data with highly varying quality. All CT-/CBCT data are registered on a suitable reference. Mostly, standard algorithms provide satisfactory results. After several refined image processing and programming steps, the data are subjected to slice oriented direct volume rendering with various (mostly logarithmic) transfer functions specially designed for this purpose.

For ORN, destructive as well as sclerosing skeletal changes are observed. The first phenomenon corresponds to decreased Hounsfield values whereas sclerosis is indicated by increasing ones. Therefore, up to now, 4 visualization approaches with different focus and requirements have been developed.

**Results**

Referring to CT as well as CBCT, severe destructive changes of the mandibular cortical shell due to progressive ORN after high dose radiation therapy can be visualized in high detail. In spite of severe streak artifacts of the helical CT, geometrical changes are well displayed. On the other hand, besides pathological changes of the outer cortical shell, detailed sclerosing processes within trabecular structure can be captured.

**Conclusion**

For removal of necrotic bone, surgical resection is often indicated. There, the new visualization helps the surgeon to capture the skeletal changes and to efficiently plan the resection.

**ORAL SESSION 38: NAVIGATION  
INTERNALIZATION OF 3D DESIGNING AND PRINTING FACILITATES RECONSTRUCTIVE  
MAXILLOFACIAL SURGERY**

*P. Aguilar<sup>1</sup>, R. Bosc<sup>1</sup>, K. Rem<sup>1</sup>, H. Chatel<sup>1</sup>, B. Hersant<sup>1</sup>, J.P. Meningaud<sup>1</sup>*

*<sup>1</sup>Centre Hospitalier Intercommunal De Creteil, Plastic Reconstructive And Aesthetic Surgery, Creteil, France*

**Aims**

Three-dimensional (3D) printing, a crucial surgical tool, is currently mostly carried out by industrial for profit groups. The internalization of this process in the hospital could drastically reduce costs for the patients and practitioner time, and allow the application of this personalized reconstructive tool to a high number of cases.

**Methods**

Using high-resolution CT scans and freely accessible computer-aided design (CAD), we generated 3D models of the patient's anatomy and 3D cutting guides which were then printed using the fused deposition modeling method with Acrylonitrile Butadiene Styrene. The resulting models were sterilized with the Sterrad Sterilization System, tested for bacterial contamination, and used to guide oncological, congenital malformation, post-traumatic and aesthetic surgeries. Parameters of production were monitored for 3D cutting guides. The printed models were also used for teaching purposes.

**Results**

We used the printed 3D guides to reconstruct eight mandibular tumors, three orbitotemporal neurofibromas, five post-traumatic zygomatic deformations, and to achieve four facial feminization procedures. The mean length of each step of the production of the 3D guides was of 8 hours for the generation of the CAD, 3 hours for the printing and 2 hours for sterilization. The entire process to generate a cutting guide took less than three days and had a cost of 300 euros per patient.

**Conclusions**

The internalization of the production of patient-specific 3D surgical guide models is feasible, safe, low cost, and represents a substantial gain of time. This hospital-based process can be applied to a large spectrum of cases to facilitate maxillofacial reconstruction.

## **ORAL SESSION 38: NAVIGATION**

### **REPLICA-GUIDED TRAUMA SURGERY (RGTS) IN POST-TRAUMA RECONSTRUCTION**

*F. Laganà<sup>1</sup>, A. Bardazz<sup>2</sup>, D. Rossi<sup>3</sup>, A. Spinzia<sup>1</sup>, A.B. Gianni<sup>3</sup>*

*<sup>1</sup>IRCCS A.O.U. San Martino, Maxillofacial Surgery, Genoa, Italy*

*<sup>2</sup>ASST Papa Giovanni XXIII, Maxillofacial Surgery, Bergamo, Italy*

*<sup>3</sup>Fondazione IRCCS Ca' Granda Ospedale Maggiore Policlinico, Maxillofacial Surgery, Milan, Italy*

*Aim:* To describe an innovative 3D technology and its application on facial reconstruction; to objectively assess the outcomes of the first series of patients treated with Replica-Guided Trauma Surgery technique (RGTS) and validate its use in middle third facial reconstruction.

*Methods:* 20 patients with post-trauma middle third facial deformities were treated by the Authors with the Replica-Guided Trauma Surgery (RGTS). The technique consists in the manufacture of custom-made synthesis devices containing the 3D informations required to anatomically reduce facial fractures during surgery.

Each surgical procedure was performed by producing an anatomical replica of the patient's skeleton using a SOMOS family resin (which can be sterilised utilising the Sterrad procedure), containing the informations of the fractures and the required movements to anatomically reduce them. Once sterilised, the replica can be used in theatre to contour absorbable osteosynthesis plates before starting the actual procedure.

*Results:* A perfect anatomical reconstruction of the skeleton was obtained in all patients with minimal biological costs in terms of surgical access and length of procedure compared to the traditional approach.

*Conclusions:* The combined use of stereolithographic model technologies and absorbable synthesis devices allows a new surgical approach based on transferring the action from the patient to the model and, using synthesis devices from the model to the patient, overcoming many of the limits of conventional techniques. The anatomical reduction documented in all patients of this series validate the RGTS technique as a useful and reliable approach to the most complex post-trauma facial reconstructions.

## **ORAL SESSION 38: NAVIGATION**

### **ARTIFACTS IN EXPERIMENTAL MULTIMODAL IMAGING OF ZIRCONIUM AND TITANIUM DENTAL IMPLANTS**

*R. Smeets<sup>1</sup>, M. Schöllchen<sup>1</sup>, H. Hanken<sup>1</sup>, G. Aarabi<sup>2</sup>, T. Gauer<sup>3</sup>, M. Heiland<sup>1</sup>, A. Gröbe<sup>1</sup>, J. Fiehler<sup>4</sup>, S. Siemonsen<sup>4</sup>*

*<sup>1</sup>University Medical Center Hamburg-Eppendorf, Department of Oral and Maxillofacial Surgery, Hamburg, Germany*

*<sup>2</sup>University Medical Center Hamburg-Eppendorf, Department of Prosthetic Dentistry, Hamburg, Germany*

*<sup>3</sup>University Medical Center Hamburg-Eppendorf, Department of Radiotherapy and Radio-Oncology, Hamburg, Germany*

*<sup>4</sup>University Medical Center Hamburg-Eppendorf, Department of Diagnostic and Interventional Neuroradiology, Hamburg, Germany*

#### **Background**

Zirconia implants (ZI), as an alternative to titanium (TI), exhibit advantages such as tooth-like color and superior biocompatibility and are implanted with increasing frequency. Magnetic resonance imaging (MRI), computed-tomography (CT) and cone beam computed-tomography (CBCT) are increasingly important in imaging the maxillo-facial region but can be severely impaired by extraneous material.

#### **Purpose:**

We sought to compare artifacts induced by zirconium and titanium dental implants.

#### **Methods:**

ZI, TI and Roxolid (RI=85% titanium, 15% zirconia) implants (Straumann, diameter: 4.1 mm, length: 10 mm) were embedded in gelatin and MRI, CT and CBCT were performed. Standard protocols were used for each modality. For MRI, line-distance-profiles were plotted to quantify the accuracy of size-determination. For CT and CBCT, a circular ROI was defined 20 voxels from the implant's surface and the percentage of voxels outside the reference mean  $\pm 1.5$  standard deviations (sd) determined.

#### **Results:**

While TI and RI induced extensive signal-voids in MRI due to strong susceptibility, ZI were clearly definable with only minor distortion artifacts. For TI and RI, the MR signal was attenuated up to 10.5 mm distant from the implant. In CT TI and RI presented with less severe streak artifacts in comparison to ZI. The percentage of voxels outside the defined interval in CT was 59% for TI, 63% for RI and 83% for ZI and in CBCT 73% for RI, 45% for TI and ZI.

#### **Conclusion:**

Excellent contrast and limited artifacts indicate that MRI might be a valuable imaging-tool for patients with zirconia implants. In comparison, Titanium and Roxolid exhibit minor artifacts in CT examinations.

## **ORAL SESSION 38: NAVIGATION**

### **DIAGNOSTIC ACCURACY OF COMPUTED TOMOGRAPHY (CT) AND MICRO-COMPUTED TOMOGRAPHY (MICRO-CT) IN THE ASSESSMENT OF MALIGNANT INVASION OF THE MANDIBLE: A PILOT STUDY**

*D. Jelovac<sup>1</sup>, P. Milovanovic<sup>2</sup>, D. Antonijevic<sup>3</sup>, M. Djuric<sup>4</sup>, M. Petrovic<sup>5</sup>, Z. Rakocevic<sup>6</sup>, M. Saban<sup>7</sup>, V. Konstantinovic<sup>7</sup>*

*<sup>1</sup>School of Dental Medicine- University of Belgrade, Clinic for Maxillofacial Surgery, Belgrade, Serbia*

*<sup>2</sup>School of Medicine- Univerisity of Belgrade, Laboratory for Anthropology- Institute of Anatomy, Belgrade, Serbia*

*<sup>3</sup>School of medicine, Laboratory for Antrhopology- Institute of Anatomy, Belgrade, Serbia*

*<sup>4</sup>School of Medicine, Laboratory for Anthropology- Institute of Anatomy, Belgrade, Serbia*

*<sup>5</sup>School of Dental Medicine, Clinic for Maxillofacial Surgery, Belgrade, Serbia*

*<sup>6</sup>School of dental medicine, Institute for Radiology, Belgrade, Serbia*

*<sup>7</sup>School of dental medicine, Clinic for Maxillofacial Surgery, Belgrade, Serbia*

It is not known whether micro-CT may be useful for evaluation of the tumor invasion of the mandible. We hypothesized that postoperative micro-CT analysis of excised mandibular bone segments could improve preoperative computed tomography (CT) assessment of bone invasion. The purpose of this study was to perform micro-CT for assessment of bone invasion in the maxillofacial region by malignancies and to compare it with CT. The first part of this prospective study comprised direct comparison of preoperative CT and postoperative micro-CT, along with histopathological verification as golden standard in the assessment of malignant osseous invasion of the mandible. A total of 8 patients were included in the study. After tumor ablation, the excised bone segment with suspect bone changes was scanned using high-resolution micro-CT system (Skyscan 1172). Overall, data were obtained with specially designed individualized protocol and the following parameters analyzed: gender, age, clinical stage, tumor localization, histopathology, depth of tumor invasion, characteristics of CT and micro-CT bone involvement as well as visual estimation of bone destruction. Combination of two DICOM softwares for clinical CT and a special micro-CT related software (Ct.An, Skyscan) were used to assess the pattern of bone invasion (erosive, mixed and invasive). In particular, the micro-CT characteristics of bone invasion were defined that should advance CT estimation of bone invasion. Indeed, micro-CT investigation of bone could improve surgeon's ability to predict treatment modalities more precise in relation to other diagnostic modalities, which is important for improving final outcome.

**ORAL SESSION 38: NAVIGATION**

**APPLICATION OF A NEW DESIGNED NAVIGATION GUIDED DISTRACTION DEVICE IN MANDIBULAR DISTRACTION OSTEOGENESIS: A PRELIMINARY ANIMAL STUDY**

*M. Cai<sup>1</sup>, G. Shen<sup>1</sup>, X. Wang<sup>1</sup>*

*<sup>1</sup>Shanghai Ninth people's hospital, Oral & Craniomaxillofacial Surgery, Shanghai, China*

**Aim:** The purpose of this study is to evaluate the accuracy of mandibular distraction osteogenesis by using a new designed navigation guided distraction device.

**Methods:** Five adult goats were included in this study. Computed tomography (CT, 0.625 mm slices) were performed after placement of 5 marking screws in mandible. The 3D simulation distraction osteogenesis were carried out in TBNavis-CMFS navigation system (Multifunctional Surgical Navigation System, Shanghai, China). The surgical plan was to lengthen a unilateral mandibular body by 5,9,13mm respectively. A specific designed mandibular distraction device with the detachable digital reference frame for navigation surgery was used for animal study. Image-guided distraction osteogenesis was performed on the goat hemi-mandible by using a new designed navigation guided distraction device. The 3-D skeletal measurements of presurgical plan and postsurgical outcome was compared statistically.

**Results:** Navigation assisted distraction osteogenesis was successfully performed in and the new designed distraction devices worked uneventful. The accuracy of intra-operative registration was less than 0.8 mm. The distractor axel angle and osteotomy plan showed no significant differences between simulation distraction and post-operative 3-D measurements ( $p>0.05$ ).

**Conclusions:** A new designed navigation guided distraction device can be used in mandibular distraction osteogenesis with high accuracy by using the TBNavis-CMFS navigation system.

**ORAL SESSION 39: RECONSTRUCTION**  
**SIMPLE APPROACH TO HARVESTING PERONEAL ARTERY PERFORATOR FLAP (PAP)**

*S. Mattine*<sup>1</sup>

<sup>1</sup>*Worcestershire Acute Trust, Head & Neck/Maxillofacial Surgery, Worcester, United Kingdom*

Introduction:

The PAP flap has gained some popularity in recent years. The aim of this study was to provide a simple method of identifying the anatomical location of the first reliable proximal perforator of the peroneal artery that can be used to harvest an independent fasciocutaneous free flap or a chimeric flap in combination with an osseocutaneous fibular flap based on the distal perforators.

Methods:

Fourteen patients requiring a composite fibular flap for reconstruction of head and neck defects were included. Ten of these patients required 2 soft tissue paddles in addition to the segment of bone. Anterior approach to the fibula was used to identify the perforators and harvest the flaps. The origin, location and course of the most proximal and clinically viable perforator of the peroneal artery in these fourteen patients was examined and matched against the corresponding doppler marking on the skin and recorded.

Results:

The 1st reliable perforator of the peroneal artery was found to maintain a relatively constant anatomical position. This perforator was used successfully to harvest a second soft tissue flap (PAP flap) when needed. The exact location of this perforator and the techniques to identify it will be demonstrated in detail during the presentation. Additionally, all perforators were found to originate from the peroneal artery and followed a musculocutaneous course.

Conclusion:

Such anatomical knowledge facilitates a safer approach to harvesting the PAP flap using simple anatomical landmarks. The clinical implications and technical aspects are discussed in detail.

**ORAL SESSION 39: RECONSTRUCTION  
THE INFRAHYOID MUSCULOCUTANEOUS FLAP FOR THE ORAL CAVITY  
RECONSTRUCTION**

*A. Karpenko<sup>1</sup>, R. Sibgatullin<sup>1</sup>, A. Boyko<sup>1</sup>, L. Roman<sup>1</sup>*

*<sup>1</sup>Leningrad Regional Oncologic Dispensary, Head and Neck Surgery, Saint-Petersburg, Russia*

The aim of the present study is to analyze the results of the reconstruction of oncologic defects of the oral cavity with the infrahyoid musculocutaneous flap.

Materials and methods. Since 2009 till 2015 41 patients with oral cavity cancer (floor of the mouth – 33, tongue – 4, lower gingiva – 3 and retromolar trigone – 1) aged between 45 and 73 year were operated on. 11 patients had T1, 18 – T2, 1 – T3 and 11 – T4 tumors. 17 patients were N positive. Marginal and segmental mandibulectomy was performed in 18 and 1 cases, respectively. Neck dissection was performed in all patients being bilateral in 16 cases. Traditional vertical design of the flap was used in the first 22 cases (group 1), further on only horizontal design was employed (19 cases, group 2). In 4 cases motor innervation via ansa cervicalis was preserved.

Results. Partial flap loss was observed in 10 cases (24,4%): 8 – in group 1, 2 – in group 2. Muscular portion of the flap survived in all cases resulted in a low salivary fistula rate of 2,4%. Neck wound breakdown occurred in 9 patients (8 – in group 1, 1 – in group 2). Esthetic results were much better in group 2.

Conclusions. Infrahyoid musculocutaneous flap is a safe option for the reconstruction of certain, relatively immobile sites of the oral cavity. The donor site morbidity is very low.

**ORAL SESSION 39: RECONSTRUCTION**  
**MELOLABIAL FLAP IN ORAL RECONSTRUCTION**

*S. Benazzou<sup>1</sup>, M. Boulaadas<sup>1</sup>*

*<sup>1</sup>Avicenne hospital- Mohammed V University, Maxillofacial Surgery, Rabat, Morocco*

**Aims**

We investigated the indications, the advantages and limits in oral reconstruction using melolabial flap after tumour excision in oral cancers.

**Methods**

The study included 19 patients. All were operated due to oral squamous cell carcinoma and underwent defect reconstruction using inferiorly based melolabial flap. Because of abundant tissue usually available in the melolabial area and its good supply from perforating branches of the facial artery, melolabial flaps if properly designed and executed, will rarely fail in suitable host.

**Results**

Twenty two flap procedures were performed in 19 patients. Sixteen, underwent unilateral melolabial flap for a small sized oral defect of the floor of the mouth in 8 cases, of the lateral border of the tongue in 5 cases, of the vermilion in 2 cases and of the internal face of the cheek in 1 case. Three patients underwent bilateral melolabial flap : two for medium sized defect of the anterior floor of the mouth and one for total defect of the vermilion. Neck lymph nodes dissection was performed for all the patients. With a mean follow-up of 25 months, almost the patients showed excellent aesthetic and fonctionnal results.

**Conclusion**

Melolabial flaps are useful in the repair of small to medium sized defects of the oral cavity.

These flaps are reliable, simple to harvest, thin and resistant to radiation therapy. Melolabial flaps are limited primarily by the size of the donor defect, wich should be closed primarily ; the scar is usually easily hidden in this area.

**ORAL SESSION 39: RECONSTRUCTION  
CLINICAL AUDIT AND NATIONAL SURVEY ON THE ASSESSMENT OF COLLATERAL  
CIRCULATION PRIOR TO ELEVATION OF THE RADIAL FOREARM FREE FLAP**

*M. Bajwa<sup>1</sup>, S. Patel<sup>2</sup>, A. Abdullakaty<sup>1</sup>, J. D'souza<sup>1</sup>*

*<sup>1</sup>Royal Surrey County Hospital, Oral and Maxillofacial Surgery, Guildford, United Kingdom*

*<sup>2</sup>Poole Hospital NHS Foundation Trust, Oral and Maxillofacial Surgery, Poole, United Kingdom*

**AIMS**

Controversy exists regarding the use of Duplex Ultrasound (DUS) in addition to the Modified Allen's Test (MAT) for the assessment of collateral circulation prior to elevation of the Radial Forearm Free Flap (RFFF). A survey of UK Maxillofacial Surgeons and a completed local audit was undertaken to assess the need for DUS.

**METHODS**

A survey on the use of DUS was conducted in 2013 amongst members of the British Association of Oral & Maxillofacial Surgeons. During the initial audit both MAT and DUS was performed. Data was collected retrospectively between 2010 – 2013. The results of the survey and initial audit led to a change in practice and DUS was no longer requested. A re-audit was performed prospectively between 2013 – 2015.

**RESULTS**

The survey showed that all respondents performed MAT and DUS was performed 'always' by 40%, 'sometimes' by 13.3% and 'never' by 46.7%. Table 1 summarises the results of the audit. In the initial audit 5 cases had an abnormal DUS but normal MAT and went on to have their ipsilateral RFFF raised without suffering ischaemic complications. No patients in the re-audit suffered ischaemic complications.

**CONCLUSION**

Routine use of DUS did not provide any additional information above the MAT in identifying patients at risk of ischaemic complications.

Audit Period	No. of Cases	Abnormal MAT	Abnormal DUS	Contralateral RFFF raised	Type of flap changed	Ischaemic complications
Initial Audit	41	1	6	1	0	0
Re-audit	48	2	-	2	0	0

Table 1. Summary of audit findings.

**ORAL SESSION 39: RECONSTRUCTION  
INCIDENCE AND PREDICTORS OF MAJOR CARDIOVASCULAR COMPLICATIONS IN HEAD  
& NECK MICROVASCULAR FLAP RECONSTRUCTION**

*N. Ghazali<sup>1</sup>, S. Caldroney<sup>2</sup>, T. Duckworth<sup>3</sup>, H. Khosa<sup>2</sup>, D. Dyalram<sup>2</sup>, J. Lubek<sup>2</sup>*

*<sup>1</sup>University of Maryland- Baltimore, Oral-Maxillofacial Surgery, Baltimore- MD, USA*

*<sup>2</sup>University of Maryland, Oral-Maxillofacial Surgery, Baltimore, USA*

*<sup>3</sup>University of Maryland, School of Dentistry, Baltimore, USA*

**Aims:** To determine the incidence, predictors and treatment of major cardiovascular complications in head & neck microvascular flap reconstruction.

**Methods:** A series of 217 microvascular flaps performed over 3-year period (2012-15) for reconstruction of head and neck defects were retrospectively analyzed to identify incidence and outcome of major cardiovascular complications during hospital stay. Revised Cardiac Risk Index (CRCI) and the Charlson comorbidity index scores were calculated. Major cardiovascular complications were defined as cardiac death, nonfatal myocardial infarction (MI), heart failure and persistent cardiac arrhythmias. Multivariate regression analysis was undertaken for predictive factors of outcomes.

**Results:** Twenty-one patients developed major cardiovascular complications (9.7%). Amongst major cardiovascular complications, cardiac arrhythmia was the most frequent (15/217, 6.9%) followed by nonfatal MI (6/217, 2.8%). Cardiac death and heart failure were not noted. Multivariate analyses showed that a higher CRCI score and age >70 years were associated with an increased risk for major cardiovascular complications. All nonfatal MI cases consisted of non-ST elevation MI, where 3 patients underwent cardiac catheterization without compromise to flap viability in-hospital. All cardiac arrhythmias requiring cardiology input were managed medically. All patients who developed major cardiovascular complications were alive at most recent follow up (mean, 313; range 228-1359 days).

**Conclusions:** The incidence of major cardiovascular complications, including MI, is low in head and neck microvascular flap reconstruction surgery, and does not translate into patient mortality. The Revised Cardiac Risk index may be a useful tool in aiding preoperative patient optimisation and surgical decision-making.

## **ORAL SESSION 39: RECONSTRUCTION**

### **BUCCINATOR MYOMUCOSAL FLAP IN HEAD AND NECK RECONSTRUCTION**

*D. Villegas Toro<sup>1</sup>, F. Perez-Flecha<sup>1</sup>, E. Baranda<sup>1</sup>, A. Haddad<sup>1</sup>, F. Almeida<sup>1</sup>, J. Nuñez<sup>1</sup>, M. Picón<sup>1</sup>, J. Acero<sup>1</sup>*

*<sup>1</sup>Ramón y Cajal University Hospital, Oral and Maxillofacial Surgery, Madrid, Spain*

#### **Back ground**

Reconstruction of traumatic, oncologic or genetics defects of oral cavity are a challenge for Head and Neck surgeons. Several reconstructive techniques have been described. The buccinator musculomucosal flap, an axial-pattern flap based on the buccal or the facial artery is one of them. We present our experience with this flap and review its surgical anatomy, surgical techniques and clinical applications in oral cavity reconstruction.

#### **Materials and methods:**

We retrospectively reviewed all patients who had a buccinator myomucosal flaps as reconstructive method operated on from January 2010 to November 2015 in the Department of Oral and Maxillofacial Surgery at the Ramon y Cajal University Hospital (Madrid, Spain). 30 patients (18 women and 12 men) were included in the review. We evaluated parameters such as age, type of oral defect, nature of tumor or lesion, type of buccinator myomucosal flap used and complications.

#### **Results:**

All 30 flaps were harvested and transposed successfully. There were two cases of partial flap dehiscence which required reintervention. We encountered venous congestion in the immediate postoperative period in 3 FAMM flaps that resolved spontaneously; there were no cases of necrosis, infection, facial paralysis or trismus due to donor site scarring.

#### **Conclusions:**

The buccinator myomucosal flap is a versatile and dependable flap for oral cavity reconstruction. Its minimal donor site morbidity, pliability, ease of elevation, and flexible usage while offering optimal functional and cosmetic results make it a viable option for select defects.

## **ORAL SESSION 40: HISTORY & ART**

### **TUTANKHAMUN'S PHYSIOGNOMY: AMARNA ARTISTIC STYLE OR MALOCCLUSION?**

*N. Pausch<sup>1</sup>, F. Naether<sup>2</sup>, K.F. Krey<sup>3</sup>*

*<sup>1</sup>University Hospital of Leipzig, Craniomaxillofacial Surgery, Leipzig, Germany*

*<sup>2</sup>University of Leipzig- Institute of Egyptology, Egyptian Museum „Georg Steindorff“, Leipzig, Germany*

*<sup>3</sup>University Hospital Greifswald, Department of Orthodontics, Greifswald, Germany*

Background: Tutankhamun was a Pharaoh of the 18th Dynasty (New Kingdom) in ancient Egypt. Many artifacts show the pharaoh's face. However, the ancient portrayals are influenced by the style of the Amarna period, which represents a strange, androgynous esthetic. There are some remarkable discrepancies between his portrayals and the medical and radiological findings of the skull of the mummy. Regarding the jaw relation, a maxillary prognathism, a mandibular retrognathism and a micrognathism have been discussed previously.

Methods: A cephalometric analysis from a lateral X-ray of the mummy's skull was carried out using the software OnyxCeph 3TM, (Image Instruments, Chemnitz, Germany). Additionally, a facial soft tissue reconstruction according to the same radiograph was produced using the MorphMan 4.0 software (Stoik Imaging Ltd, Moscow, Russia). Superimposition of X-ray and face reconstruction was performed and compared with artifacts.

Results: This soft tissue reconstruction of the pharaoh reveals the typical appearance of Angle class II malocclusion. The result of the cephalometric analysis confirms a mandibular retrognathism (SNB 77.8°). Most of the ancient portrayals do not depict this jaw alignment.

Conclusion: Our finding suggests that the maxillofacial skull architecture of Tutankhamun fits in the series of retrognathic average values of Egypt's pharaohs. Except the famous golden mask, which displays a gracile lower face, most of the ancient portrayals are idealizations and do not represent the real face of the pharaoh.

## **ORAL SESSION 40: HISTORY & ART**

### **RICHARD WISEMAN (1621-1676), SERGEANT-SURGEON TO KING CHARLES II: HIS CONTRIBUTION TO CRANIOMAXILLOFACIAL TRAUMATOLOGY**

*A. Mylonas<sup>1</sup>, E. Poulakou-rebelakou<sup>2</sup>, F. Tzerbos<sup>3</sup>, E. Papadopoulou<sup>4</sup>*

*<sup>1</sup>METROPOLITAN Hospital / National and Kapodistrian University of Athens School of Dental Medicine / National and Kapodistrian University of Athens School of Medicine, Department of Oral and Maxillofacial Surgery / Department of History and Philosophy of Medicine, Piraeus / Athens, Greece*

*<sup>2</sup>National and Kapodistrian University of Athens School of Medicine, Department of History and Philosophy of Medicine, Athens, Greece*

*<sup>3</sup>National and Kapodistrian University of Athens School of Dental Medicine / METROPOLITAN Hospital, Department of Oral and Maxillofacial Surgery, Athens / Piraeus, Greece*

*<sup>4</sup>"P. D. Marinopoulos" Pharmacy, Pharmacy, Alimos- Athens, Greece*

#### Aims

The purpose of this study is to highlight the contribution of the eminent 17<sup>th</sup> century surgeon Richard Wiseman (1621-1676), who was sergeant-surgeon to King Charles II (1672-1676), to craniomaxillofacial traumatology.

#### Methods

Richard Wiseman's book "Severall Chirurgicall Treatises" (London, 1676), was investigated in relation to craniomaxillofacial surgery, aiming at identifying opinions and surgical techniques regarding craniomaxillofacial injuries, due to his expertise and knowledge as a military surgeon.

#### Results

Richard Wiseman, described in 1676 the reduction of a maxillary fracture in a boy who had been kicked in the face by a horse. First, he pulled the maxilla forward with a finger behind the uvula, and then used a blunt, hooklike instrument to continue to provide forward traction. The mother and several servants were instructed to maintain anterior traction until callus formed.

Also typical of Wiseman's vivid writings is a case report in his section on wounds regarding traumatic brain injuries, where he described the management of a foot-soldier whose skull fractured into many pieces after a cannon-shot. The soldier lived for 17 days after the war injury and the surgical treatment, and presumably died of tetanus.

#### Conclusions

Richard Wiseman, the most prominent royalist surgeon during the English Civil War (1642-1651), was occupied with craniomaxillofacial traumatology. In his book "Several Surgical Treatises", which is considered now as a landmark in English Surgery, outlining over 600 surgical procedures in general, Richard Wiseman wrote some observations and detailed remarks on the treatment of maxillary fractures and gunshot traumatic brain injuries, that are undoubtedly superb.

**ORAL SESSION 40: HISTORY & ART**  
**THE WORK OF MEDICAL ILLUSTRATORS AT THE FACIAL INJURIES UNIT QUEEN MARYS**  
**HOSPITAL SIDCUP 1917 - 1921**

M. Davidson<sup>1</sup>

<sup>1</sup>*Ulster Hospital Belfast- Northern Ireland, Oral and Maxillofacial Surgery, Taunton, United Kingdom*

The Facial Injury Unit at Queen Marys Hospital Sidcup was the innovative unit managing British and British Empire troops with facial injuries sustained during the First World War. To facilitate clinical records and enable the cascade of new techniques medical illustration was a key part of the unit's activity.

Henry Tonks is the name that comes to the fore when the artists involved recording the patients of the unit are discussed, but he was not alone. During and immediately following the First World War, his iconic works were part of a major collection of several gifted artists and photographers. Their work is not only a poignant reminder of the trauma of war but also shows how surgical techniques were developed and shared among a multidisciplinary team.

The presentation will give examples of all the contributors to the visual records of patient care at the unit as well as brief biographies. How their work contributed to clinical papers and textbooks is included.

**ORAL SESSION 40: HISTORY & ART  
HENRY PERCY PICKERILL. A FORGOTTEN POINEER IN ORAL AND MAXILLOFACIAL  
SURGERY?**

*M. Davidson<sup>1</sup>*

*<sup>1</sup>Ulster Hospital Belfast, Oral and Maxillofacial Surgery, Taunton, United Kingdom*

Henry Pickerill was one of the British Empire surgeons who advanced facial trauma management during the later stages of the First World War, predominately with his work at the Facial Injury Unit, Queen Marys Hospital Sidcup.

Unlike many of his British contemporaries prior to volunteering for overseas military service in 1916 he had already carved out a career in orofacial surgery as well as dental education and research in his adopted country of New Zealand.

His book "Facial Surgery" in many ways rivals Sir Harold Gillies work "Plastic Surgery of the Face" as a practical clinical handbook for facial trauma management. Following the war he returned to New Zealand. His career continued in various units and for some time he was the only facial surgery specialist in Australasia.

The presentation outlines his career and highlights his contributions to oral and maxillofacial surgery. However he is mainly forgotten outside New Zealand. I offer suggestions as to why this might be the case.

**ORAL SESSION 40: HISTORY & ART  
AN ARTIST RESIDENCY IN WARTIME TRAUMA AND HEALING**

*S. Hall<sup>1</sup>*

*<sup>1</sup>University Hospitals Bristol NHS Foundation Trust, South Bristol Academy, Bristol, United Kingdom*

The Blond McIndoe Research Foundation (Queen Victoria Hospital) are a research charity pushing the boundaries of burns and wound healing research since their foundation by Sir Archibald McIndoe after WWII. During the 50th anniversary of the organisation a novel interdisciplinary artist residency was created.

The author utilised simultaneous roles as a clinician and artist, allowing unique opportunities to blur disciplinary boundaries. The residency created public engagement events to open access to current research, support public learning opportunities, open dialogue between professionals and communicate the poignant history of the famous badly burned WWII servicemen, the 'Guinea Pig Club'. The outcomes of the project were realised through a series of interdisciplinary symposia, art workshops, dissection room art classes and the exhibition of new contemporary artwork.

By inviting other disciplines into the discussion, facial disfigurement and burns can be explored in a socially responsive manner and provide innovative educational opportunities for the trainee clinician. In nurturing close relationships between artists and clinicians, the paradigm within which individuals work can shift in order to gain an enriched overview of their subject from the aesthetic, philosophical and scientific.



**ORAL SESSION 40: HISTORY & ART**  
**THE HISTORY OF KING'S COLLEGE HOSPITAL, MAUDSLEY HOSPITAL AND QUEEN MARY'S HOSPITAL SIDCUP AS LONDON'S LARGEST CENTRE FOR WORLD WAR I MILITARY CASUALTIES**

R. Bentley<sup>1</sup>

<sup>1</sup>*King's College Hospital, Oral and Maxillofacial Surgery, London, United Kingdom*

An Overview of the importance of King's College Hospital as the "Forth" and largest First World War military hospital in London, which went on to treat 75,000 troops. King's which opened as a state of the art hospital designed by Lord Lister and opened by King George V in July 1913 on it's current site was subsequently commissioned on August 4th, 1914 on the first day of the Great War as a military hospital.

At it's peak King's had over 2500 military beds in addition to the 380 civilian beds and went on to pioneer treatments such as physiotherapy, Carel- Dakin wound management, Ultraviolet radiotherapy and together with the Maudsley hospital psychiatric therapy for "Shell Shock" first described in the Lancet in February 1915.

In addition King's which now includes the Queen Mary's Hospital Sidcup was the first with it's Frognall unit set up by Sir Harold Gillies to specialize in the treatment of facial ballistic injuries and the use of endotracheal anesthesia.

King's unique position adjacent to a railway line from Folkstone and the Kent ports ensured that troop trains were able to repatriate injured soldiers from the battle fields of Flanders and Northern France directly on to a specially constructed wooden platform outside it's wards.

Over 100 years later this unique history is reflected in King's leadership of the South East London Kent and Medway (SELKaM) Major Trauma Network, the best performing Major Trauma Network in the UK and as a leading OMFS unit specialising in trauma.

## **ORAL SESSION 41: APNOEA / SLEEP**

### **A RANDOMIZED CONTROLLED TRIAL OF POSITIONAL THERAPY AND ORAL APPLIANCE THERAPY IN PATIENTS WITH POSITION DEPENDENT SLEEP APNEA**

*M. de Ruiter<sup>1</sup>, L. Benoit<sup>2</sup>, N. de Vries<sup>2</sup>, J. de Lange<sup>1</sup>*

*<sup>1</sup>Academic Medical Center, Oral and Maxillofacial Surgery, Amsterdam, Netherlands*

*<sup>2</sup>Onze Lieve Vrouwe Gasthuis, Otolaryngology, Amsterdam, Netherlands*

Obstructive sleep apnea (OSA) is associated with considerable health risks. Due to the effect of gravity of the tongue base the majority of OSA patients have an increase of obstructions in supine position; position-dependent OSA (POSA). Positional therapy (PT) reduces the supine sleeping time by vibro-tactile feedback.

This RCT assessed the effectiveness of PT compared to oral appliance therapy (OAT) in mild and moderate POSA patients after three months. Primary outcome was the AHI. Secondary outcomes were the Epworth Sleeping Scale (ESS), the Functional Outcome of Sleep Questionnaire (FOSQ). The compliance of both treatments was objectively evaluated.

A total of 99 patients underwent randomization; 70.7% were men. The mean age was 48.3. The median AHI in the SPT-group decreased from 12.7 to 6.8 and in the OAT-group from 12.9 to 6.9. No difference was seen in the median AHI in supine position, yet the median AHI in non-supine positions increased in the SPT-group from 3.4 to 4.3 and the OAT-group decreased 3.2 to 1.9 ( $P>0.005$ ). The median percentage of sleep-time in supine position decreased more in the SPT-group, 42.4 to 14.4, compared to the OAT-group, 39.9 to 38.9 ( $P>0.000$ ). Secondary outcome showed an ESS for SPT-group from 8.5 to 8.1 and for the OAT-group from 8.2 to 6.1 ( $P=0.051$ ).

The SPT showed a decrease in AHI equal to the OAT. A significant decrease in sleeping time in supine position is achieved with PT compared with the OAT, although the OAT is also effective in the AHI in non-supine positions.

NCT02045576

**ORAL SESSION 41: APNOEA / SLEEP**

**SLEEP-DISORDERED BREATHING FOLLOWING MANDIBULAR SETBACK: A SYSTEMATIC REVIEW OF THE LITERATURE**

*P.R.D.A. Bartholo<sup>1</sup>, P.J. D'albuquerque Medeiros<sup>1</sup>, J.V. Dos Santos Canellas<sup>1</sup>, F. Gamboa Ritto<sup>1</sup>, H.L. Mendes Barros<sup>1</sup>*

*<sup>1</sup>Universidade Estadual do Rio de Janeiro, Cirurgia Bucomaxilofacial, Brasil, Brazil*

**Introduction:** A mandibular setback reduces space in the pharyngeal airway, and it has been suggested that it might induce sleep-disordered breathing.

**Objectives:** An evidence-based literature review was conducted to identify the effect of mandibular setback on the respiratory function during sleep.

**Methods:** The authors performed a systematic review of pertinent literature published up to 2014. A structured search of literature was performed, with predefined criteria. A survey of the PubMed, ScienceDirect, and Cochrane database was performed. A manual search of oral and maxillofacial surgery-related journals was accomplished. Potentially relevant studies then had their full-text publication reviewed.

**Results:** A total of 1,780 publications were evaluated, through which nine papers (seven case series and two case-control studies) were selected for the final review. No evidence of sleep disorder after six months was related in 223 patients. In one study, two patients developed obstructive sleep apnea syndrome after surgery, and in another two studies, seven patients presented an increase of obstructive apneas/hypopneas events and oxygen desaturation index. Most of the patients analyzed were young and thin.

**Conclusion:** There was no evidence of postoperative sleep apnea syndrome after a mandibular setback surgery. However, one should always consider a potential reduction of the upper airway space during the treatment plan. Obese patients and those submitted to large amounts of mandibular setbacks present a higher chance to develop obstructive sleep apnea syndrome.

**ORAL SESSION 41: APNOEA / SLEEP**

**MAXILLOMANDIBULAR ADVANCEMENT (MMA) AS THE INITIAL TREATMENT OF OBSTRUCTIVE SLEEP APNEA: PRELIMINARY STUDY OF SURGICAL, CLINICAL AND RADIOLOGICAL PREDICTIVE PARAMETERS**

*A.L. Capote-Moreno<sup>1</sup>, P. Rubio-Bueno<sup>1</sup>, P. Landete<sup>2</sup>, B. Ardanza<sup>3</sup>, R. Wix<sup>4</sup>, E. Zamora<sup>2</sup>, P. Brabyn<sup>1</sup>, L. Naval-Gías<sup>1</sup>*

*<sup>1</sup>Hospital Universitario La Princesa- Madrid- Spain, Department of Oral and Maxillofacial Surgery, Madrid, Spain*

*<sup>2</sup>Hospital Universitario La Princesa- Madrid- Spain, Department of Pneumology, Madrid, Spain*

*<sup>3</sup>Hospital NISA Pardo de Aravaca- Madrid- Spain, Department of Oral and Maxillofacial Surgery, Madrid, Spain*

*<sup>4</sup>Hospital Universitario La Princesa- Madrid- Spain, Department of Neurophysiology, Madrid, Spain*

**Aim:** Obstructive sleep apnea syndrome (OSAS) is a medical disorder related to cardiovascular and metabolic diseases that make it potentially life-threatening. Continuous positive airway pressure (CPAP) therapy is the reference standard in the treatment of OSAS. However, studies suggest variable rates for CPAP compliance that range from 30 to 60%. MMA is the most effective surgical therapy for adult patients with OSAS, excluding tracheostomy. This preliminary study describes a minimum 5-year outcome of 24 adult patients with OSAS in whom MMA was carried out as an initial and unique surgical treatment.

**Material and Method:** 24 patients (20 women and 4 men) with severe OSAS were treated with MMA as an initial therapy. Clinical, polysomnographic and pharyngeal changes were analyzed and related to surgical movements in 3D scans.

**Results:** Success rate was 100%, with a follow up range of 5 to 10 years. The most frequent complications were transitory inferior alveolar nerve impairment (75%) and surgical wound dehiscence (16%). Apnea-hyponea index (AHI) improved significantly from an average of 36,3 preoperatively to 7,8 postoperatively ( $p < 0,01$ ). Total airway volume increased postoperatively an average of 86,2%. Pogonion advancement was the most predictive factor in solving OSAS ( $p < 0,01$ ).

**Conclusion:** MMA surgery is effective as an initial surgical treatment of OSAS in adults. Therefore, this procedure should be considered in every patient after comprehensive evaluation of specific surgical risk, preoperatively. Pogonion advancement should be considered as one of the main objectives in surgical planning, setting aside maxillary movement to occlusion and the facial harmony.

**ORAL SESSION 41: APNOEA / SLEEP  
NO CORRELATION BETWEEN TWO-DIMENSIONAL MEASUREMENTS AND THE THREE-  
DIMENSIONAL CONFIGURATION OF THE PHARYNGEAL UPPER AIRWAY SPACE IN CONE  
BEAM CT.**

*D. Abe-Nickler<sup>1</sup>, S. Pörtner<sup>1</sup>, S.G. Hakim<sup>1</sup>*

*<sup>1</sup>University of Luebeck, Oral and Maxillofacial Surgery, Luebeck, Germany*

The posterior airway space (PAS) plays an important role in the evaluation of insufficient upper airways. Today it still is common to use the lateral cephalometry to estimate the configuration of the PAS.

We question the correlation between two-dimensional and three-dimensional images of the PAS. Therefore we measured the PAS configuration on the lateral cephalometry and on axial images in 250 cone beam CTs (CBCT).

The pharyngeal airway space was investigated at five levels. In each level we measured the anterior-posterior dimension in reconstructed lateral cephalometric view and in axial view in corresponding cross-sectional planes.

The mean values showed wide deviation in all measurements. Regarding the main question of correlation between distances and the corresponding planes we could not find any correlation among distances, lengths or areas.

## **ORAL SESSION 41: APNOEA / SLEEP**

### **THREE-DIMENSIONAL VOLUMETRIC CHANGES IN THE UPPER AIRWAY AFTER MAXILLOMANDIBULAR ADVANCEMENT IN OBSTRUCTIVE SLEEP APNEA SYNDROME PATIENTS AND THE IMPLICATION ON QUALITY OF LIFE**

*B. Veys<sup>1</sup>, L. Potte<sup>2</sup>, J. Abeloos<sup>1</sup>, C. De Clercq<sup>1</sup>, J. De Ceulaer<sup>1</sup>, P. Lamoral<sup>1</sup>, K. Nagy<sup>1</sup>, G. Swennen<sup>1</sup>, N. Neyt<sup>1</sup>*

*<sup>1</sup>GH St John- Bruges-Ostend, Maxillo-facial Surgery- Dept of Surgery, Bruges, Belgium*

*<sup>2</sup>GH St John- Bruges-Ostend, Maxillo-facial Surgery- Dept of Surgery- Clinical Research Coordinator, Bruges, Belgium*

#### Introduction

Obstructive sleep apnea syndrome (OSAS) is an independent risk factor for cardiac, neurologic and perioperative morbidities. Surgical maxillomandibular advancement (MMA), whereby anterior displacement of the maxillomandibular complex enlarges the upper airway and its subregions, is a possible therapeutic approach.

#### Materials and methods

All OSAS patients (apnea-hypopnea index (AHI) > 5) who underwent MMA in GH St John Bruges between January 2015 and December 2015 were evaluated prospectively. Three-dimensional volumetric changes of the upper airway and its anatomic subregions before and after MMA were evaluated using cone-beam CT and validated cephalometric landmarks. These changes were correlated to changes in quality of life, using the objective AHI and the subjective Epworth Sleepiness Scale (ESS).

#### Results

In total 10 OSAS patients were operated, of which 70% were male, with an average age of 46.3 years and an average Body Mass Index (BMI) of 26.8 kg/m<sup>2</sup>. Six patients underwent bimaxillary surgery and 4 had trimaxillary surgery. The average Le Fort I advancement was 7.8mm with counterclockwise rotation. The average bilateral sagittal split osteotomy (BSSO) advancement was 9.7mm. This resulted in a significant augmentation of the volume of the oro- (p=0.007) and the hypopharynx (p=0.037), and in a nominal increase of the volume of the nasopharynx (p=0.14). The AHI decreased from 24.36 to 11.57 (p=0.043) and the ESS decreased from 15.3 to 6.1 postoperatively (p=0.012).

#### Conclusion

Maxillomandibular advancement increases the airway volume of the oro- and hypopharynx and is associated with a significant decrease in the apnea-hypopnea index and on the Epworth Sleepiness Scale.

## **ORAL SESSION 41: APNOEA / SLEEP**

### **CHANGES IN THE UPPER AIRWAY, PULMONARY FUNCTION AND QUALITY OF SLEEP AFTER ORTOGNATIC SURGERY: OUR EXPERIENCE**

*D. Villegas Toro<sup>1</sup>, B. Lago<sup>1</sup>, I. Page<sup>1</sup>, P. de Leyva<sup>1</sup>, M. Pezzi<sup>1</sup>, E. Sanchez-Jauregui<sup>1</sup>, J. Gonzalez<sup>1</sup>, J.M. Eslava<sup>1</sup>, J. Acero<sup>1</sup>*

*<sup>1</sup>Ramon y Cajal University Hospital, Oral and Maxillofacial Surgery, Madrid, Spain*

Bimaxillary maxillo-mandibular (MMA) advancement and rotation procedures have been employed in treatment of Obstructive sleep apnea (OSA) with satisfactory results. The purpose of this study was to evaluate Changes in the Upper Airway, Pulmonary function and quality of Sleep after Ortognatic surgery in obstructive sleep apnea (OSA) patients following maxillomandibular advancement surgery using CBCT, polisomnography and test de Epworth pre- and postsurgery.

#### **MATHERIALS AND METODS**

Prospective study from January 2014 to March 2016. All patients were examined at the Neumology Department according to a standard protocol. We performed MMA. Lateral cephalometric, CBCT scan, polisomnography and test de Epworth were obtained preoperatively (T1), inmetiately post surgery and 6 months postoperatively from each subject and traced used Nemotec system.

#### **RESULTS**

Eighteen consecutive OSA patients with an average preoperative apnea/hypopnea index of 46 and treated with MMA surgery were included in this study. There was an average of a 2.5-fold increase in the total volume of the upper airway space. The greatest change in a cross-sectional area occurred in the transverse axis in both the retroglossal and retropalatal spaces. The average apnea/hypopnea index was 4 postoperatively.

#### **CONCLUSION**

MMA surgery results in a significant increase in the volume and a morphologic airway in patients with OSA. The combination of these actions reduces the collapsibility of the upper airway space, hence improving or resolving the OSA.

**ORAL SESSION 41: APNOEA / SLEEP**  
**THE IMPACT OF ORTHOGNATHIC SURGERY IN THE TREATMENT OF OSAS PATIENTS**

Z. Nicolaou<sup>1</sup>

<sup>1</sup>*Cyprus Crane Maxillo Facial Center, Limassol, Cyprus*

Sleep apnea is a sleep disorder defined as a reduction or cessation of breathing during sleep of 10 seconds or more. There are three types of sleep apnea, central apnea, obstructive apnea, and a mixed apnea. Obstructive sleep apnea (OSA) is caused by the collapse of the airway during sleep.

Obstructive sleep apnea is diagnosed and evaluated by history, physical examination and eventually sleep study (polysomnography).

Whatever the cause of OSA, if left untreated, can cause serious complications. It may lead to debilitating daytime sleepiness, morning headaches, depression, automobile accidents, memory problems, sexual dysfunction and a general sense of unwellness.

Over time it gives rise to high blood pressure, heart disease, strokes, diabetes, arrhythmias and other life-threatening and life-shortening diseases.

CPAP has been the golden standard for treatment of OSAS. But with an overall success of 50%, other solutions are needed. MAD, in selected cases, can be useful.

MMA should be considered the primary surgical treatment of OSAS in patients with retropositioned jaws.

In this presentation several cases of OSA Syndrome of Orthognathic Surgery will be discussed from the Maxillofacial Surgeon's point of view.