

IMPT 27th Biennial Scientific Congress

10th – 11th September 2015 HMS Belfast London, UK

THE INSTITUTE OF MAXILLOFACIAL PROSTHETISTS AND TECHNOLOGISTS

27th SCIENTIFIC BIENNIAL CONGRESS LONDON – UK 10th - 11th SEPTEMBER 2015

Welcome to the 27th Scientific Congress held on-board HMS Belfast in the heart of central London. The event begins at 09:00 on Thursday 10th September 2015 with the induction of our new President, Mr Kavin Andi BDS MBBS PGCert Med Ed FHEA FDSRCSEng FRCSEd FRCS (OMFS), a Consultant Oral and Maxillofacial Surgeon at St Georges University Hospitals NHS Foundation Trust. Mr Andi shall then deliver his presidential lecture.

The Scientific programme continues during the day with a series of interesting and stimulating short free papers on Thursday 10th and Friday 11th September. The BAOMS Keynote Lecture will be delivered by Mr Niall Kirkpatrick BDS MBBS MD FRCS FRCS (Plast), Consultant Plastic Surgeon. Mr Kirkpatrick leads the multidisciplinary Craniofacial Unit at Chelsea and Westminster Hospital NHS Foundation Trust.

The plenary will also include an exhibition of scientific posters and be complimented by commercial exhibitors specifically selected for the event.

A broad range of topics have been selected that will be of interest within maxillofacial prosthetics and technology.

The organising committee are keen to showcase innovative and new work; to educate through presentations by established and respected professionals, while offering a platform for trainee Maxillofacial Prosthetists the opportunity to present research studies to educate and inform. We are delighted that Free Paper Session Five is entirely compromised of STP Trainees.

The Congress venue is perhaps the most unique in its history; being one of the most iconic locations within the UK. The HMS Belfast is a ship with an incredible history which we hope you will have time to learn more about during your time onboard.

The reunion dinner is being held at the Horniman at Hays which is situated riverside to the HMS Belfast. The banquet and awards ceremony shall feature on a transformed HMS Belfast to that which has hosted the congress lectures

CPD points will apply to the Congress; these will be awarded after the sessions have been completed. You will need to sign the register of attendance at the Registration desk to receive the final awarded certificate.

IMPT Chairman's Welcome



Dear Delegates,

May I extend a warm welcome to all delegates to the 27th IMPT biennial scientific conference, held this year at the unique location of HMS Belfast in the heart of London. You will note the conference timetable has been compressed into two days in order to meet the challenges presented when hosting a conference in a major capital city.

I would like to thank all those attending this year's meeting, in particular those who are contributing lectures, demonstrations and poster displays. Without these there would be no conference. Similarly, I would like to add particular thanks to the conference organising committee.

Please do not forget to take time during breaks to attend the trade stands and displays. These companies are directly supporting our conference.

Finally I would like to introduce our new president Mr. Kavin Andi and thank our outgoing president Mr. Adrian Farrow for all his efforts on our behalf these past two years.

I sincerely hope you all enjoy this year's conference.

Barry Edwards MSc MIMPT

IMPT Chairman 2015

Message from Organising Committee

To assist all the presenters, all delegates are respectfully reminded that mobile phones and radio pagers should be set on silent running or switched off in lecture theatre.

No audio or visual recording is permitted at any time within the lecture theatre.

Due to a full lecture programme, all persons lecturing must be aware of their allocated lecture time. Those who exceed their allocation will have their lecture terminated by the session chair.

Thank you

2015 Congress Organising Committee

Ms Naimesha Patel MSc MIMPT Mr Adrian Kearns DPS MIMPT Ms Heidi Silk BSc (Hons) MIMPT Mr James Dimond DPS MIMPT Mr Edward Malton DPS MIMPT Mr Richard Eggleton FIMPT Mr Hitesh Koria DPS MIMPT

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IMPT Congress Awards

The Wim de Ruiter Delft Plate

Awarded for significant **research contribution**. Mr Wim de Ruiter from Ridderkirk near Rotterdam provided a maxillofacial prosthetic service for the Rotterdam area and donated this award in 1985.

The Mount Vernon Award

Awarded for **outstanding clinical or technical practice**. Designed and fabricated by Chief Maxillofacial Prosthetist Mr John Hayward at Mount Vernon Hospital, this award was first presented at the 1981 IMPT Congress held at Brunel University, London.

The Presidents Award

Awarded for the **best poster display**. This award was inaugurated in 1983 at the IMPT Congress; held at the Royal College of Surgeons, London.

The Kidd Award

Awarded for **innovation**. This award was donated by Mr Norman Kidd, who began making subperiosteal implants in 1956 and upon his retirement, instigated the Kidd Award plaque in 1997.

The Ian MacLeod Alumno Award

Awarded to the most **outstanding contribution from a student or junior/associate** IMPT member. This award has been dedicated by the IMPT in honour of lan MacLeod; a member of the IMPT who had a positive influence on many young MfP's.

Technovent Award for the best first time lecturer

Awarded to the best first time lecture delivered at congress

Materialise Award for the best Journal article

This award goes to the individual with the best journal article chosen from the Journal of Maxillofacial Prosthetics and Technology

The IMPT Travel Fellowship

£1,000 is awarded to the successful applicant to provide the means for study and research. This award is assessed and awarded by the Fellows of the IMPT. It must be applied for prior to the IMPT Congress by contacting the Chairman.

The Brian Conroy Award

Awarded for outstanding services to maxillofacial prosthetics. Donated by Mr Brian Conroy MBE FIMPT (Hon) in 1969, the award was commissioned- "For those who have given significant service for advancement in technology, prosthetics, surgery and other activities that relate to maxillofacial prosthetics and technology".

2015 Congress Awards Assessors Dr Trevor Coward PhD MPhil FIMPT FETC

Mr Fraser Walker MSc FIMPT Mr Stefan Edmondson BSc (Hons) DPS MIMPT

IMPT Congress – Lecture Programme

Registration - Wednesday 9th September – Guys Hospital, Floor 18, Tower Wing 15:30 – 17:00

Thursday 10th September – HMS Belfast – 08:15 – 09:00

Thursday 10th September

09:00	Congress Opens			
	 Chairman's Welcome Formal Handover of P Inauguration of new IN 	residential Office /IPT President, Mr Kavin Andi		
09:15	New Presidents Lecture	Pixels, Polygons and Printers. Why we will need the clinical technologists of tomorrow		
10:15	Coffee Break			

Free Paper	Session One:	Chair	Barry Edwards, East Grinstead, UK
10:45	Lucy DiSilvio	Growing boo	dy parts - Hype or hope?
11:15	Mike Fenlon	Obturation a	nd its alternatives
11:45	Niall Kirkpatrick	Facing the w BAOMS Lec	vorld ture
12:45	QUESTIONS		
12:55	Lunch		

Free Paper Session Two:		Chair	Adrian Kearns, Guildford, UK
14:00	Jason Watson & Chris Maryan	Higher Specialist Scientific Training (HSST) in Reconstructive Science	
14:15	Jason Watson	Equivalence	e: The Road to Registration
14:30	Kerry Tinkler	The Acader Academy, E Developme	ny of Healthcare Science; The Role of the equivalence Assessment and Future nts
14:50	QUESTIONS		
15:00	Coffee Break		

Free Paper Session Three:		Chair	James Dimond, Coventry, UK
15:30	Ffion Lorraine O'Malley	Summary of research und Manufactured	key findings and results of PhD lertaken on Maxillofacial Additive d (AM) Surgical Guides
15:45	Andrew Richmond	Hemimandib utilising the L	ulectomy and Distraction Osteogenesis Jnique Herford Distractor; 2 case series
15:55	Taran Malhotra	Successful m segmental m microvascula critical review	nandibular reconstruction following andibulectomy using bone grafts, Ir free flaps and reconstruction plates: a V of literature
16:05	Muhanad Hatamleh	Biocompatibi cranioplasty f protocols	lity and surface characteristics of titanium implants following different finishing
16:25	Joern Brom	The Vistafix 3	3 system – a series of case studies
16:40	Lauri Wauters	Revolutionizi Custom Impla	ng Jaw Angle Surgery with 3D Planning and ant Design
17:00	QUESTIONS		

Close Day One

Friday 11th September

Free Paper Session Four:		Chair	Hitesh Koria, Birmingham, UK
09:00	Rehema Semididu	Ocular Prosthetics in Tanzania	
09:15	Emma Worrell	Hollow prostl	netic eyes
09:30	Neeraj Chandraker	Ocular and o unconventior	rbital defect prosthetic management – an nal approach
09:45	Robin Richards	Challenging	cases
10:30	Mahmoud Ellarousi Elbashti	The role of d prosthetic co	igital technology in overseas maxillofacial llaboration
10:45	QUESTIONS		
10:55	Coffee Break		

Poster presenters are asked to be next to their posters for panel assessment

Free Paper Session Five:		Chair	Jason Watson, Nottingham, UK
11:30	Sian Hayward	Combined orbital rehabilitation	
11:40	Oliver Burley	To examine to delivering ac	he use of radiotherapy mouth bite devices in curate oncology treatment
11:50	Sabah Zaulifqar	The effective laser vs pres	management of resistant or recurrent keloid scars: sure therapies.
12:00	Catherine Turner	Comparing the techniques	nree orthognathic model surgery planning
12:10	Jessica Jones	Comparing the surgical orthom	ne accuracy of digital and analogue manufactured ognathic wafers.
12:20	Kelly Morris	Development radiotherapy	t of a phantom head for use in intensity modulated treatment dose verification
12:30	Amy Davey	Paediatric cra custom-made	anial fracture treated with a e helmet
12:40	QUESTIONS		
12:50	Lunch		

Optional Break out Room session for interested units to discuss hosting STP trainees, or opportunity to question persons involved in training.

Free Paper Session Six:		Chair	Ian Collins, Worcester, UK
14:15	Hitesh Koria	The use of C orthognathic	BCT and Dolphin 3D to virtually plan an surgical procedure.
14:35	Pauline Paul	Who nose? . rhinectomy p	A parallel case study of two post-operative atients.
14:55	Malene Grip	Congenital M	licropthalmia from an Ocularist`s perspective
15:05	Daniella Bellini	Silicone colo	ur effect with addition of Raylon Fibres
15:15	Philippe Federspil	Surgery and rehabilitation	implant-retained craniofacial prosthetic in the setting of uncertain curability or palliation
15:30	QUESTIONS		
15:40	Close of Business – Coffee Break		
15:55	IMPT Business Meeting (All Members Welcome)		

16:30 Close of Meeting



IMPT Reunion Dinner – Horniman at Hays Unit 26 Hays Galleria – 18:45 – Casual Dress

IMPT Banquet and Award Ceremony – HMS Belfast

18:30 – 11:30 Formal Dress

Coaches leave Motel One at 18:00





Congress Hotel - Motel One – London Tower Hill

24 - 26 Minories, EC3N 1BQ - Tel: 0207 481 64 20



Abstracts for Lecture Presentations

Free Paper Session One

Growing body parts – Hype or hope?

Professor Lucy Di Silvio, King's College London

With the global ageing population, the demand to replace, repair and regenerate tissues is increasing.

Tissue engineering (TE) allows the repair or replacement of damaged tissues with living parts. Many approaches use stem cells to induce the regeneration of new tissues for the treatment of degenerative diseases and congenital defects. Stem cells have the capacity to differentiate into multiple lineages by responding to biological stimulating factors and mechanical cues. Success of cell-based therapies is highly dependent on the ability of the transplanted cells to be delivered and retained at the site where they are required. Such an integrated system requires an understanding of the basic biology of tissue regeneration in its broadest sense and the development of effective strategies and tools to initiate and control the regenerative process. TE approach has the potential to impact and improve the quality of life of many patients.

This presentation will address current status in engineering functional tissues.

Obturation and its alternatives

Professor Mike Fenlon, King's College London

BAOMS Lecture: Facing the world

Niall Kirkpatrick, Consultant Plastic Surgeon, Chelsea and Westminster Hospital

Free Paper Session Two

Higher Specialist Scientific Training (HSST) in Reconstructive Science

Jason Watson, Consultant Maxillofacial Prosthetist, IMPT Education Officer Christopher Maryan, Reconstructive Science Education Consultant, Stockport, UK

In conjunction with the Modernising Scientific Careers program, the IMPT and senior members of the profession have developed the 2 stages of Scientist training. The first level curricula, completed in early 2013, is a 3 year fixed term Scientist Training Programme (STP) which has run since late 2013. The first graduates from the STP in Reconstructive Science are due in summer 2016. The second level curricula development, the Higher Specialist Scientific Training (HSST) in Reconstructive Science, was completed in early 2015; The HSST programme aims to build on STP, adding complexity to the technical and clinical skills, breadth and depth to the knowledge base, and to further develop innovation and evidence based practice. The 5 year programme is based around a Doctorate in Clinical Science; a component of this has been described as the NHS 'MBA', learning in management, finance and leadership. The goal is to produce the leaders of the future, the experts in their field of Clinical Science, the Consultant Reconstructive Scientist. The programme ideology is underpinned by the Good Scientific Practice guide.

The road to registration

Jason Watson, Consultant Maxillofacial Prosthetist, IMPT Education Officer

There will be no 'Grandfathering' for Maxillofacial Prosthetists to the Health Care Professions Council (HCPC) register of Clinical Scientists. Applicants will have to show Equivalence to the current training route at STP level to get registration but the mapping document is based on good scientific and clinical practice. Providing a portfolio of evidence based on this mapping document, experience and research undertaken over their career. Equivalence requires *"a professional and informed judgment based on a review of the evidence provided*". Equivalence is seen as being applicable at all levels and stages of the MSC Career Framework (STP & HSST). The roll out for Reconstructive Science is set to begin in June 2015 with the appointment and training of assessors. This presentation will provide insight and offer debate on the implications for the profession.

The Academy of Healthcare Science; The role of the academy, equivalence assessment and future developments

Dr Kerry Tinkler, Registrar and Director of Standards, Academy of Healthcare Science

Free Paper Session Three

Summary of key findings and results of PhD research undertaken on maxillofacial Additive Manufactured (AM) surgical guides.

Ffion O'Malley, Surgical & Prosthetic Design, PDR, Cardiff Metropolitan University, Cardiff

Over the last three years my PhD research focus has been on the area of Maxillofacial AM Surgical Guides. A mix of qualitative and quantitative research has been undertaken to develop new knowledge about how guides are used, the cleanliness, and surface roughness characteristics of the materials and the accuracy of procedures.

The presentation will cover key results from the above topics, summarising and highlighting specific advantages & limitations from the planning, designing, fabrication and use of maxillofacial surgical guides. Discussion will also highlight how the work has challenged some common assumptions; conclude the clinical implications of this and need for further research.

Hemimandibulectomy and distraction osteogenesis utilising the unique Herford Distractor; 2 case series

Andrew Richmond, Nottingham University Hospital, Nottingham

Hemimandibulectomy is a debilitating surgical procedure functionally and aesthetically. Depending on the aetiology of the tumor and subsequent radiotherapy the usual reconstruction options are early primary free tissue transfer from the fibula or scapula. In these 2 cases the tumor was a locally aggressive Ameloblastoma, a benign tumor usually of the mandible. No radiotherapy was given post op. Distraction options are plentiful but the Herford Distractor from KLS Martin was chosen for its unique transport characteristics. This distractor is relatively new and has only been used in very small numbers in Europe. Both cases were planned using 3D models and virtual computer planning preoperatively (NUH and KLS). Both cases showed the unique perspective that undertaking the surgical distraction on a 3D model gives the Surgeon and Reconstructive Scientist. The planning process, outcomes and subsequent review of the cases is discussed with recommendations for future planning and surgical guide manufacture.

Successful mandibular reconstruction following segmental mandibulectomy using bone grafts, microvascular free flaps and reconstruction plates: a critical review of literature

Taran Malhotra, Lead Maxillofacial Prosthetist, Maxillofacial Prosthetics Laboratory, Aintree University Hospital, Liverpool, UK

The Aim of this study was to critically appraise existing literature on successful mandibular reconstructions in adults who underwent reconstruction with vascularised and non-vascularised bone grafts/free flaps. The main challenge of reconstruction is the ability to select and enhance existing reconstructive surgical techniques to produce the best functional and aesthetic outcome that is distinct for the patient.

The method entailed searching 4 electronic databases to obtain papers for a preliminary evaluation. The studies were then scored for quality using and 22-item criteria and classified under the oxford centre for EBM. A total number of 3255 papers were obtained from searching four selected databases. Following a preliminary review, a total of 31 papers met the inclusion and exclusion criteria for this review.

This review has established the need for more randomised controlled trials to improve evidence within oral, maxillofacial and microvascular surgery in terms of mandibular reconstruction. Lower level evidence for example, case reports, can produce hypotheses which can further result in more controlled studies of higher evidence.

Biocompatibility and surface characteristics of cranioplasty titanium implants following different finishing protocols

Muhanad M. Hatamleh, MIMPT, BSc, MPhil, MSc, Dip, PhD Oral and Maxillofacial Department, King's College Hospital, London, SE9 5RS

To investigate the effect of finishing protocols on surface morphology, hardness and biocompatibility of cranioplasty titanium. Seventy square titanium specimens (ASTM F68) were divided into seven groups of different surface treatments (n=10) including mechanical polishing, sandblasting, chemical treatment, and/or electro-chemical treatment. Mass loss %; 3D u-Roughness; Vickers u-Hardness (VHN), and osteoblast cell attachment and proliferation (after 3 days) were determined for each specimen. Data was analysed using one way ANOVA and Dunnett T3 *post-hoc* tests, and *t*-test (P<0.05). Results showed that mass loss was in the range of 1.70-5.60 % (P<0.05). Sq micro-roughness values were in the range of 2.8-16.7um (p<0.05). VHN values were 170.9-442.2. All surface treatments produced equally biocompatible surfaces with increased cell attachments after 3 days (P<0.05). In conclusion, all finishing protocols exhibited surfaces that statistically significantly different in topography and hardness at micro level, but were equally biocompatible and satisfied cell culture tests.

The Vistafix 3 system – a series of case studies

Joern Brom, Brom Epithetik, Heidleberg, Germany

This presentation compares the advantages and disadvantages of the latest Cochlear Vistafix 3 implant system on a varied range of case studies. It will explore the treatment plans to which these implants are best suited and shows best practices in case of limitations.

Revolutionising jaw angle surgery with 3D planning and custom implant design

Dr. Lauri Wauters MD MSc, Laarbeeklaan 101, 1090 Jette, Belgium

A Belgian girl suffered from hemifacial microsomia, a birth defect usually affecting the development of one half of the face and the second most common birth deformity in the craniofacial area. Professor Mommaerts from the European Face Centre was involved since the early stages of her treatment. After a series of corrective surgeries, a complex jaw angle reconstruction was planned with Materialise's PROPLAN CMF and 3-matic software.

Free Paper Session Four

Ocular prosthetics in Tanzania

Rehema Semididu, Principal Facial/Ocular Prosthetist, Dar Es Salaam, Tanzania

A short presentation describing the difficulties and challenges providing an ocular prosthetics service at the Comprehensive Community Bases Rehabilitation in Tanzania Hospital, specialist eye services.

From its conception to now providing over five hundred custom made indwelling eye prosthesis per year to the people of Tanzania.

Hollow prosthetic eyes

Dr Emma Worrell, Queen Victoria Hospital, East Grinstead, West Sussex

Following the loss of an eye, ocular prosthetic rehabilitation has proved difficult for some patients. This lecture describes the aetiology, methods, materials and innovative techniques used in the long-term management of these anophthalmic patients. Fabrication of hollow ocular prostheses is described, followed by a presentation of a small case series (n=9) with their quantitative and qualitative results.

Ocular and orbital defect prosthetic management – an unconventional approach

Dr Neeraj Kumar Chandraker MDS (Prosthodontics) AIMPT, Associate Professor, Government Dental College, Raipur, Chhattisgarh, India

Several ocular and orbital disorders require surgical intervention that may result in ocular defects. An ocular prosthesis is given to uplift the patient psychologically and improve the confidence. Such prosthesis can be custom made or a stock shell. To improve the comfort and matching of the prosthesis with that of the adjacent natural eye a custom made ocular prosthesis is preferred. A successfully rehabilitated anophthalmic socket must hold and support a prosthetic device that mimics the contralateral globe. Static symmetry of the palpebral apertures, canthal angles, and superior sulci are basic objectives. Different techniques are available to fabricate a custom ocular prosthesis. In clinical practice, rarely we encounter an ideal socket. And restoration of such defect with conventional custom prosthesis is challenge. This presentation discusses the significance of rather unconventional approach such as cosmetic correction with use of optical lenses, modified ocular prosthesis and newer technology to manage such ocular defect.

Challenging cases

Robin Richards, Cavendish Imaging, London

Some of the clinical problems, that we get involved with, are more difficult than normal for a variety of reasons. I will be discussing the issues and showing some of the possible solutions that we use in an attempt to provide a better outcome for the patient. These include anatomical models to help plan surgical procedures, various cutting guides to implement planned resections and implant designs that assist in accurate implant placement.

The role of digital technology in overseas maxillofacial prosthetics collaboration

Mahmoud Ellarousi Elbashti, Department of Maxillofacial Prosthetics, Tokyo Medical and Dental University, Tokyo, Japan.

This lecture presents a method of overseas collaboration to provide maxillofacial prosthetic rehabilitation for maxillofacial defected patients of developing countries. In this lecture the overseas collaboration between Libya and Japan will be reported as an example. Digital data will be obtained from digital photography and computer tomography of the patient's maxillofacial region. These data will be sent to maxillofacial prosthetic specialised centre in developed countries by internet and the prosthesis will be constructed using three dimensional visualisation, designing and printing tools. The silicone prosthesis will be conventionally fabricated by using the printed mould. The definitive prosthesis will be extrinsically coloured and then shipped to the patient. This concept of the overseas collaboration has a potential to address the patient's aesthetic and psychosocial concerns.

Free Paper Session Five

Combined orbital rehabilitation

Sian Hayward, Queen Victoria Hospital, East Grinstead, West Sussex

This case study describes the prosthetic rehabilitation of a very challenging patient. The traumatic enucleation of both eyes from a dog attack left this patient not only blind but markedly disfigured. Multiple surgical procedures, including an osteo-odonto-keratoprosthesis (OOKP) in his left eye are described. The OOKP restored some vision and a referral from the Face Clinic led to his prosthetic rehabilitation. The whole multidisciplinary approach to this patient's care is discussed in this paper.

To examine the use of radiotherapy mouth bite devices in delivering accurate oncology treatment

Oliver Burley, Maxillofacial Laboratory, Leicester Royal Infirmary, Leicester

The purpose of treating cancer with radiation is to kill cancer cells using high energy radiation rays. An issue with radiotherapy treatment is during its intervention it damages normal cells. Therefore the treatment must be carefully calculated and planned to lessen its detrimental side effects.

After conducting thorough research of the current literature, a paucity of knowledge surrounding radiotherapy mouth bite devices has become apparent. The questions being; are they essential in oral cancer treatment and are the devices playing a successful role in removing healthy tissue outside the radiation zone and retaining cancerous tissue within? Computerised tomography (CT) scans are essential in the planning stages of delivering effective radiotherapy. By undertaking a pilot study, a measuring system has been devised using cephalometric landmarks to analyse CT scan data. This system has been used to determine whether the planned target area is being treated accurately throughout the course of treatment.

The effective management of resistant or recurrent keloid scars: laser vs pressure therapies

Sabah Zaulifqar, Prosthetics Department, Burns and Plastics, Whiston Hospital, Prescot, Merseyside

There are no set guidelines and no definitive pathway for the most effective management of keloid scars due to the varied range of treatments available and the varied presentation of the condition in terms of aetiology, distribution, size and thickness. The aim of the research study is to evaluate the effect of early laser intervention after surgical excision in comparison to conventional pressure therapy, to reduce incidence of recurrence and allow improved management and patient experience. Although it is an approved method of treatment, laser treatment of keloid scars is not routine within the NHS. This study could support the placement of laser treatment as a routine method for successful management within the NHS. The presentation will be of the scope of the research project, methods of treatment (shave excision, laser and pressure therapy) and the results seen thus far.

Comparing three orthognathic Model Surgery Planning techniques

Catherine Turner, St. Leonards on sea, East Sussex

Does the orthognathic surgery outcome accurately reflect the pre-surgical orthognathic model planning? Analysis of the variations between three model surgery planning techniques (MSP) and the ability of them to reflect the prescribed movements desired in surgery.

Description of current MSc project, including aims, objectives and methods.

The Aims of the investigation are to compare the three main MSP techniques, evaluating the accuracy of predicted movements compared to actual movements made at a skeletal level. With the purpose of identifying potential areas of error in the MSP process in order to attempt to address these for further cases. A 3D skull set into a specific purpose made jig will be used to test wafers from each MSP technique to indicate differences between the model surgery and the desired surgical outcome.

Comparing the accuracy of digital and analogue manufactured surgical orthognathic Wafers.

Jessica Jones, Nottingham University Hospitals Trust, Nottingham

Model surgery for orthognathic planning requires a significant amount of laboratory time and is subject to inaccuracies due to properties of the materials used, such as the expansion of plaster, and the inaccurate transfer of the Frankfort plane. Digital 3D model surgery and printing surgical wafers is available to use and eliminates these potential inaccuracies with the incorporation of 3D dental models and 3D CT/CBCT data. Few studies have been published on the accuracy of digitally planned orthognathic surgery planning, and fewer still on the accuracy of the resulting wafer compared to traditional model surgery and acrylic surgical wafers. The preliminary study was to compare the accuracy of both analogue manufactured wafers and digitally manufacture wafers.

Development of a phantom head for use in intensity modulated radiotherapy treatment dose verification

Kelly Morris, Maxillofacial Laboratory, Morriston Hospital, Swansea.

Head and neck cancers are commonly treated with a combination of surgical resection and postoperative radiotherapy. High density implant materials such as titanium, present challenges when determining dose distributions for intensity modulated radiotherapy treatment (IMRT).

The effect of titanium implants on a radiation beam required for radiotherapy treatment has been widely investigated, reporting two distinct outcomes due to electron backscatter:

- 1. Enhanced dose upstream of the implant
- 2. Decreased dose downstream from the implant

Dose variations of up to 23.1% resulted from alterations due to backscatter electrons.

Research suggests a need for an anatomically correct phantom head consisting of multiple densities which accurately mimics natural tissue and incorporates commonly used titanium implantable devices for IMRT dose verification.

I propose to develop a heterogeneous anthropomorphic phantom head with removable titanium craniofacial devices using maxillofacial materials and additive manufacturing (AM) techniques for improved dosage prediction for IMRT in patients with craniofacial reconstruction.

Paediatric cranial fracture treated with a custom-made helmet

Amy Davey, Bristol, UK

A 9 month old female presented in clinic with an undiagnosed cranial fracture from ventouse intervention at birth. Magnetic resonance imaging confirmed diagnosis and cranial surgery was carried out, after haematoma developed at 6 months of age.

The typical dressings did not provide sufficient pressure to contain cerebral fluid and the fracture did not heal. A custom-made helmet was prescribed to act as a pressure dressing.

A direct impression was taken under general anaesthetic, after a lumbar puncture to reduce the volume and pressure of cerebrospinal fluid (CSF). A vacuum-formed thermoplastic helmet was manufactured using a model from this impression. After a second lumbar puncture under general anaesthetic, the helmet was fitted. The helmet was worn continuously, removed only for cleaning, for several months to prevent CSF build-up and to aid healing.

Free Paper Session Six

The use of CBCT and Dolphin 3D to virtually plan an orthognathic surgical procedure.

Hitesh Koria, Principal Maxillofacial Prosthetist, Queen Elizabeth Hospital, Birmingham, UK

To correct maxillofacial deformities, a combination of orthodontic treatment and orthognathic surgery is needed. Accurate surgical planning and transfer of the data and measurements are very important in achieving a successful surgical outcome with appropriate skeletal improvement. Prediction software packages are also beneficial in treatment planning and achieving improved outcomes, but before using any software its reliability and reproducibility must be assessed.

The aim is to present an integrated 3-dimensional (3D) virtual approach towards cone-beam computed tomography (CBCT) and Dolphin 3D (Chatsworth, CA, USA) for treatment planning of Orthognathic surgery at the Queen Elizabeth Hospital, Birmingham.

The potential benefits and actual limits of a 3D virtual approach for the treatment of patient with a maxillofacial deformity are discussed from our experience using 3D virtual treatment planning.

"Who Nose" A parallel case study of two post-operative rhinectomy patients

Pauline Paul, Maxillofacial Laboratory, Southern General Hospital, Glasgow

The improvement in surgical nasal reconstruction techniques has provided a viable option to that of silicone prostheses. In the West of Scotland Regional Maxillofacial Unit this is becoming a more popular choice of patient rehabilitation.

In contrast, patients who want no further major surgery require nasal prostheses. Purpose specific oncology and zygomatic implants have provided additional methods to prostheses retention.

I will present examples of both and highlight the advantages and difficulties associated with each technique.

Congenital micropthalmia from an ocularist`s perspective

Malene Grip – Anna Malene Grip MSc, Anaplastologist/Ocularist, Oslo University Hospital, Ullevål

In my Masters Degree in Maxillofacial Prosthetic Rehabilitation, I wrote a literature review of both Acquired and Congenital contracted eye sockets. I will present the findings concerning Congenital Micropthalmia. I will also present my personal experience in treating patients with Micropthalmia.

Method: I used PubMed, Science Direct and Ovid Medline to find relevant articles. On the subject Micropthalmia I found 12 research articles and 3 reviews.

Results: The use of orbital tissue expander gave infections in 38% of the cases. The use of solid implants with conformer therapy had complications such as retractions in 50 % of the cases.

Conclusion: There seem to be more complications when surgery is used to the Microphthalmic eye socket. The use of solid conformers are regarded a safe method with few complications, but not sufficient in the severe cases.

Silicone colour effect with addition of raylon fibres

Dr Daniella Bellini MSc (Merit), PhD Student at KCL, Academic Centre of Reconstructive Science, Kings College London Dental Institute, 20th Floor, Guy's Tower Wing, London, SE1 9RT

Objectives: to assess the accuracy of measuring skin colour with a new colour formulation system (E-Skin®) compared to the clinical standard (CM-2600d®) and assess the effect on colour matching silicone to skin by addition of rayon fibres.

Materials and method: Caucasian (16), Asian (6) and African (8) subjects were scanned with the CM-2600d® and E-Skin® to acquire 112 coloured silicone samples (56 with flock, 56 without). Mean Δ E values of the colour formulas acquired with the two systems were calculated. Visual assessment of the accuracy of colour matching silicone to the subjects' skins was carried out.

Results: When comparing the two systems' skin readings, a mean overall ΔE of 3.45 indicated both statistical and clinical significance. No significant effect of ethnicity on the mean ΔE 's recorded between the two systems was observed. When comparing systems readings of silicone samples, a mean overall ΔE of 5.59 also indicated statistical and clinical significance. Ethnicity and addition of flock had no significant effect on observed differences.

Conclusion: statistically and clinically significant differences were observed between the two colour formulating systems when scanning human skin and silicone swatches. Ethnicity or presence of flock did not influence the result.

Surgery and implant-retained craniofacial prosthetic rehabilitation in the setting of uncertain curability or palliation

Philippe Federspil, University Hospital Heidelberg, Oto-Rhino-Laryngology, Heidelberg, Germany

Background: In advanced or recurrent cancer of the head and neck, a curative resection is not always possible with sufficient probability, or even impossible. However, these patients are suffering significantly from the local tumour spread.

Material and Methods: During the last 8 years, a large tumour resection in conjunction with an implant-retained craniofacial prosthesis was performed in palliative intention for 5 patients and in a situation with uncertain curability for 8 patients.

Results: Out of 8 patients with questionable curability, 5 are currently with no evidence of disease. The patients' satisfaction was predominantly very high.

Conclusion: Even in therapeutically difficult situations, it may be reasonable to perform extensive tumour surgery and to provide implant-retained craniofacial prostheses. In situations with questionable curability, a portion of patients may be brought into cure with a relatively aggressive treatment protocol. In the palliative situation, the expected benefit for the patient has to outweigh the drawbacks and risks of the therapy by far. These treatment options have to be compared against palliative chemotherapy with the patient in his psychosocial situation.

Abstracts for posters

A mono-block radiotherapy prosthesis for the treatment of mandibular lesions: A case report

Mahmoud Ellarousi Elbashti, Department of Maxillofacial Prosthetics, Tokyo Medical and Dental University, Tokyo, Japan

This case report describes a method in which a mandibular mould was fabricated to deliver radiotherapy. A 90 year old female patient diagnosed with squamous cell carcinoma of the right mandibular alveolar mucosa. The treatment plan was decided by the radiation oncologist and discussed with the maxillofacial prosthodontist to use small radioactive gold seeds carried by an acrylic resin mould. When designing a radiotherapy mould prosthesis for an edentulous mandible patient, it is important to consider the translucency, retention and stability of the prosthesis to ensure maximum therapeutic radiation delivered to the desired lesion location. Therefore, a clear acrylic resin mono-clock mould was designed to provide visible access to the lesion to determine the most affective position of the seeds and to provide stability and retention by undercut engagement. The fabrication and benefits of using a retentive, stable and comfortable mandibular radiotherapy mould are described.

Integration of low-cost digital technologies in maxillofacial rehabilitation training and research

Andreas Artopoulos¹, Trevor J. Coward². ¹Clinical Research Fellow in Maxillofacial Prosthetic Rehabilitation & Clinical Teacher in Removable Prosthodontics.² Reader/Consultant in Maxillofacial Prosthetic Rehabilitation

KCL, Academic Centre of Reconstructive Science, Kings College London Dental Institute, 20th Floor, Guy's Tower Wing, London

Aim: to reduce costs of training and research.

Materials and methods: 4 students expressed interest in research involving digital technologies, through summer fellowships. Their budget was up to £1,000 each, and the aim was to produce clinically relevant outcomes. The projects carried out were:

- a. 3D printing of nose models.
- b. 3D printing of mandibular condyle models.
- c. 3D laser scanning of edentulous casts.
- d. 3D surface imaging of the face.

Results: the projects were completed within the budgets. Results produced were of clinical significance, and demonstrated that low-cost devices could find laboratory or research applications. The students acquired valuable experience.

Conclusions: as digital technologies mature associated costs diminish. However, low-cost devices are not often considered for scientific applications on the assumption of poor performance. The findings of this study provided evidence against this. The students demonstrated a good understanding and would feel confident integrating digital technologies in their workflow.

Silicone wafers at the Royal Surrey County Hospital - a 3 year review

Adrian Kearns, Consultant Maxillofacial Prosthetist, Department of Maxillofacial Prosthetics, Royal Surrey County Hospital, Guildford, Surrey, UK

The accuracy of laboratory made orthognathic wafers is essential for transferring pre-operative prescribed movements to theatre. Polymethyl Methacrylate (PMMA) wafers are most commonly used. The Royal Surrey County Hospital NHS Foundation Trust uses silicone in over 110 cases each year. This communication highlights how the wafer design has improved to provide increased self-retention and improved intra-oral visualisation for the surgeon.

Post burns therapy for the treatment of hypertrophic scarring

Sian Hayward, Queen Victoria Hospital, East Grinstead, West Sussex

This poster describes the treatment of a patient with severe hypertrophic scarring as a result of third degree burns, following an industrial accident. After several skin grafts to his upper body, head and neck, the patient presented with extensive hypertrophic scarring that was both disfiguring and movement limiting. The fabrication of the post burn splint and subsequent follow up is discussed.

A custom-made nasal septum perforation splint

Bueiad HS, Artopoulos A; Coward TJ, Hopkins C Academic Centre of Reconstructive Science, Dental Institute, King's College London

Nasal septum perforations (NSP) may be repaired prosthetically or surgically. NSP may occur due to trauma, inflammatory disease, inhalant irritation or septal surgery. *Materials and methods:*

The fabrication of a long-term, comfortable and economical custom-made poly-methyl methacrylate NSP splint is described for a 66 year old female who presented with a NSP and difficulty breathing with persistent dry mouth. A computerised tomography (CT) scan was conducted to reconstruct a 3D model of the patient's NSP. Stereo-lithography based 3D printing was used to create a model from which a customised splint using orthodontic wire and magnets was obtained. This procedure was carried out at Guy's & St. Thomas's NHS Foundation Trust (King's College London).

Discussion & Conclusion: This technique provided a solution in fabricating a well-fitting custom made septal splint. The patient acknowledged that the custom made splint provided a comfortable fit and symptomatic relief (e.g., improved breathing).

Keywords: Nasal septum perforation, nasal septum obturator, septal button, computer tomography, stereo-lithography model technique.

Management of the remnant with auricular prostheses

Philippe A. Federspil¹ and Jörn Brom²

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Background: Traditionally, the remnant is excised, when a patient is fitted with an auricular prosthesis in order to create a plane area. Depending on the patient's age, it has to be taken into consideration, whether surgical construction of the pinna will be kept as an option for the patient. Moreover, psychological factors play an important role.

Material and methods: case study.

Results: Management of the remnant was individually discussed in an multidisciplinary approach with the patient.

Conclusion: Sometimes, it may be very helpful for the patient to keep the remnant, even if the fitting of the auricular prosthesis is more difficult. On the other hand, it may be wise to take off far dystopic remnants, in order to improve camouflage.

The use of High Consistency Rubber (HCR) silicones in the maxillofacial laboratory

Steven Hollisey-Mclean, Maxillofacial Laboratory, Morriston Hospital, Swansea

HCR silicones are commonly used in the creation of prosthetic limbs due to their high tear strength and handling qualities. These highly filled silicones exhibit tear strengths far beyond most liquid silicone rubber (LSR) silicones that are used in the Maxillofacial laboratory.

Recent availability of small roll mills that are needed to process these silicones along with the development of lower duromiter silicones that are easier to homogenise have allowed these useful materials to be used within the laboratory.

We illustrate the various applications of this versatile material within the laboratory, including finger, facial and nipple prosthetics as well as septal buttons and teaching models.

Additive Manufacture for Design-Led Efficient Patient Treatment – ADEPT

Heather Goodrum, Maxillofacial Unit, Morriston Hospital, Swansea, SA6 6NL

Patient Specific Implants (PSI) fabricated prior to a surgical operation typically offer improved predictability, better aesthetic contours and a higher degree of design precision. These benefits are derived from being able to plan and produce devices in a more controlled, less time pressured environment. Advances in technologies have made it possible to go from medical imaging data directly to an implant without having to undertake lab-based production. Computer Aided Design

& Additive Manufacture (CAD/AM) offers the ability to fabricate implants with improved function possibly due to improved design and that fit anatomy more accurately than lab-produced alternatives. However, these methods can also be inefficient, expensive and potentially dangerous if used outside a robust design process.

This poster will describe research undertaken as part of the Innovate UK & EPSRC-funded ADEPT project to improve the efficacy and remove barriers to more widespread adoption of CAD/AM techniques.

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The organising committee encourage delegates to visit the exhibits during coffee and lunch breaks to discover the latest in commercial innovations to enhance our practise.

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