British Society of Prosthodontics
Annual Conference 2014

bsspd

Aesthetics in Prosthodontics

14th – 15th April 2014
Apex City Quay Hotel, Dundee, Scotland

British Society of Prosthodontics | www.bsspd.org
Fixed - Removable - Implant - Maxillofacial

Welcome

I would like to welcome you to Dundee for the 2014 conference. I do hope that you will enjoy your time in the city. The last time the BSSPD was hosted in Dundee was in 1995 and I was fortunate enough to attend that conference. Much has changed in the city since then, and also much has changed in the Society itself so that it remains relevant to contemporary clinical practice. If you are attending the BSSPD for the first time I particularly hope you will not only find it to be a worthwhile experience educationally, but also that you feel very welcome here.

The theme of the conference “Aesthetics in Prosthodontics” will focus on an area that affects all of us who are involved in the provision of care either as clinicians, technicians, trainers or scientists. As patients’ expectations of what we can deliver in relation to aesthetic excellence are increasing, this will clearly result in greater demands on us in relation to the many types of restorations we provide. However, as we all know, it is not always quite so straightforward as simply complying with what is asked of us; there is a need to be mindful of the biological consequences of providing aesthetic restorations as well as having a good understanding of some of the limitations of the materials we use. Given also that there is much debate still taking place in the profession about the different approaches that are used in addressing aesthetic issues, the conference this year will offer a unique opportunity for this area to be explored in depth.

Our speakers have been chosen because of their well deserved reputations and recognised clinical expertise in this area at both national and international level. They are primarily specialist practice based. All are working to a specific brief so that, as far as possible, the whole range of fixed, removable, implant and maxillofacial prosthodontics will be covered in relation to the aesthetic issues that can arise in the provision of restorative care. I am very grateful to all of the speakers for accepting the invitation to speak at the BSSPD conference. Alongside the main presentations, there will also be programmed time for individuals to present their own work either as oral communications or posters.

The conference charity this year is “The Royal Hospital, Chelsea”. The Chelsea Pensioners are instantly recognizable with their distinctive uniforms. The hospital dates back some 300 years, and its vision “to provide veterans with the care and comradeship they need in recognition of their service to the Nation” is as relevant today as when it was conceived in the reign of Charles II. Please support this if you can, and of course some of the proceeds from the speakers’ sweepstake at the annual dinner will form part of our donations.

I do hope that not only will you leave Dundee with plenty of helpful information and fresh ideas from our distinguished group of speakers, but also that you will have had the chance to meet new colleagues as well as renewing friendships. Thank you for supporting the conference this year. I hope for all of us that it will be stimulating, friendly and above all enjoyable. If you emerge from the conference with a greater understanding of aesthetics in prosthodontics, as well as enjoying the social side of being with friends and colleagues, maybe it will be enough to inspire you to become more involved with the work of the BSSPD in the future.

Brendan J J Scott
President BSSPD 2013-2014

Contents

Conference programme

Monday 14th April

08:45	Registration and refreshments
09:30	**Welcome and Opening of Conference** Dr Brendan Scott, President BSSPD Professor Mark Hector, Dean of Dundee Dental School
	[Session 1 Chair: Dr Brendan Scott]
09:45	**Achieving favourable aesthetic and biomechanical outcomes in fixed prosthodontics – challenges and solutions** Dr Basil Mizrahi – London, UK
11:15	Coffee and trade
	[Session 2 Chair: Dr Craig Barclay]
11:45	**Achieving optimum aesthetic outcomes using removable prosthodontics – its role in contemporary clinical practice** Dr Kevin Lochhead – Edinburgh, UK
12.45	Lunch, trade and posters
	[Session 3 Chair: Professor Damien Walmsley]
14:30	**The restoration of 'Failing' Teeth with Implants in the Aesthetic Zone – The Surgical & Prosthetic Keys to Success (Part 1)** Dr. Tidu Mankoo – Windsor, UK
15:45	Tea and trade
	[Session 4 Chair: Professor Damien Walmsley]
16:15	**The restoration of 'Failing' Teeth with Implants in the Aesthetic Zone – The Surgical & Prosthetic Keys to Success (Part 2)** Dr. Tidu Mankoo – Windsor, UK
17:15	**Questions and close**
17:30	Session close
19:00	Conference Dinner on the Unicorn

If you are presenting a poster please note that this will need to be put up in the Art Gallery on the 1st floor of the hotel on the Monday morning. You are asked to stand by your posters between 1:15 and 2:15pm to answer questions from the delegates. The posters need to be removed by 5:00pm.

Tuesday 15th April

08:30	Registration and refreshments
09:15	**Annual General Meeting**
10:00	**BSSPD Gold Medal Award announcement**
	[Session 1 Chair: Professor Julian Satterthwaite]
10:05	**The challenges of creating aesthetic excellence in prosthodontics – insights from the viewpoint of a dental and clinical dental technician** Mr John Wibberley – Oldham, UK
11:00	Coffee and trade
	[Session 2 Chair: Dr Phil Smith]
11:30	**Schottlander Oral Presentations** 11:30 3D analysis of toothwear in-vivo - *Khaled Ahmed* 11:55 The bond strength of resin bonded bridge retainers to abutments of differing proportions of enamel and composite - *Kathryn Durey* 12:20 A novel optical method for recording the mandibular transverse horizontal axis - *Andrew Keeling*
12:45	Lunch
	[Session 3 Chair: Dr Phil Smith]
14:00	**Schottlander Oral Presentation** Tooth replacement for partially dentate older patients: a cost effectiveness analysis - *Gerald McKenna*
	[Session 4 Chair: Dr Brendan Scott]
14:25	**Aesthetics in the compromised patient – rehabilitation challenges in the management of trauma, oncology and developmental disorders** Dr. Peter Briggs – London, UK
15:30	**Schottlander Oral Prize Winner announcement**
15:35	**Installation of new president - Mr Peter Briggs**
15:40	Session close

Invited speakers

Basil Mizrahi

Achieving favourable aesthetic and biomechanical outcomes in fixed prosthodontics – challenges and solutions

Success of dental restorations should not only be measured by immediate outcomes such as patient comfort and appearance, but also by long-term survival and stability of the definitive restorations. Long-term success is dependent on the level of precision at which treatment is carried out. The three main areas in which this precision should be focused are precision of fit, occlusal precision, and aesthetic precision.

Some of the challenges discussed will include :

- Impression techniques for multiple teeth,
- Protocols for adhesive bonding of restorations
- Maintaining precise occlusal and special orientation co-incidence between the laboratory and the patient.

The presentation will be clinically orientated and will benefit both clinicians and technicians.

Basil Mizrahi completed his 3 year full time Prosthodontics and Implant dentistry training at Louisiana State University, USA under Dr Gerard Chiche. While specialising, he also obtained a Masters degree in Education.

For the past 14 years he has run a full time, referral based private practice specialising in Complex Rehabilitation and Aesthetic Cases and Dental Implants. He is recognised by the GDC as a Specialist in Prosthodontics and Restorative Dentistry and is an Honorary Clinical Lecturer at UCL Eastman Dental Institute. He is a Diplomate of the “American Board of Prosthodontics” and is Director of “Mizrahi Dental Teaching” where he runs hands-on and didactic courses.

Kevin Lochhead

Achieving optimum aesthetic outcomes using removable prosthodontics – its role in contemporary clinical practice

The loss of teeth can be devastating for the sufferer. In the majority of cases not only do we have to manage the missing dentition but also the supporting structures and the psychological effects that this perpetrates. Being able to

hide our prostheses can help patients regain confidence and dignity, allowing for a return to normal social interaction.

The challenge of modern prosthodontics is not only to return the patient to health and function but to do so in such a way that there is little or no evidence to the casual observer. This presentation will seek to demonstrate techniques in complete and partial denture construction, which bring together not only optimal function but also optimal aesthetics. It will in addition address diagnosis of the full arch dental implant supported situation where a removable prosthesis is the only acceptable aesthetic option.

Kevin Lochhead qualified in1987 from King's College London. A passion and love of removable Prosthodontics and implant based solutions being first instilled by Prof. Roger Watson. Working in general practice allowed investigation and research into the wide variety of tooth replacement options and techniques available. Special interest developed in providing life like and natural prostheses which return aesthetic confidence and function to the patient.

Kevin opened his practice 20 years ago in 1994 and started encouraging and accepting referrals for implant, prosthetic and occlusal cases in 1997. He gained GDC specialist status in prosthodontics in 2001. In order to further develop Prosthodontic knowledge and skills he set up an on site laboratory in 2002, which has since expanded to a 6 technologist facility servicing the needs of his multidisciplinary referral practice. The lab is fully equipped providing all forms of CAD/CAM solutions, induction cast metals, resin and ceramic technology. For the last 10 years Kevin has been practicing predominantly implant based dentistry.

Dr Tidu Mankoo

The restoration of 'Failing' Teeth with Implants in the Aesthetic Zone – The Surgical & Prosthetic Keys to Success

The aesthetic rehabilitation of failing teeth and the periodontally compromised dentition remains a challenge despite the numerous advances in the treatment of periodontitis, regenerative and dental implant therapies. This presentation will review the contemporary surgical and prosthetic concepts in management of implants in the aesthetic zone with a view to achieving optimum long term aesthetics and stability. With this in mind, novel approaches for aesthetic rehabilitation of periodontally compromised teeth in the aesthetic zone will be also be presented. The outcomes depend on the clinical management and an understanding and application of the biological factors that influence our treatment outcomes. The

Invited speakers (continued)

optimal management of the interplay between bone, soft tissues and prosthetics determines the aesthetic outcome and the long-term stability of soft tissue aesthetics. An interdisciplinary approach is the key to success.

Participants will:

- Learn the key principles for the diagnosis, treatment planning and management (both surgical & prosthetic) of failing teeth in the aesthetic zone
- Gain an understanding of the biology of the periodontal and peri-implant tissues and the application of this knowledge to clinical decision-making.
- Comprehend the behaviour of the bone & soft tissues around post-extraction sites and around dental implants
- Learn the principles of bone and soft tissue management around implants, as well as how to manage bone and soft tissue defects in post-extraction sites and peri-implant defects
- Learn to manage both delayed and immediate implants
- Be taught the keys to the management of single tooth and multiple tooth cases
- Learn the benefit of interdisciplinary case management

Dr Tidu Mankoo qualified with a BDS from the University of Bristol in 1981 and has a renowned Private & Referral Practice in Windsor, UK, treating Implant, Restorative and Aesthetic cases, particularly complex cases. He has built a reputation for exceptional dentistry and carries out both the surgical and prosthetic aspects of his cases. He is an active member of the European Academy of Esthetic Dentistry, the Association of Dental Implantology (UK), the European Association of Osseointegration (EAO), Fellow of the International College of Dentists (FICD), and a fellow of the International Congress of Oral Implantologists.

He was the President of the European Academy of Esthetic Dentistry 2009-2010 and a founder and Past President of the British Academy of Aesthetic Dentistry and serves on the Editorial Board of a number of dental journals. He is a respected teacher with numerous publications, including a chapter in the textbook ‘The Art of Treatment Planning: Dental and Medical Approaches to the Face and Smile’ by Quintessence Publishing. He is a sought-after international speaker particularly in the field of Dental Implants, Aesthetic Dentistry and management of complex cases. He lectures and gives courses regularly all over the world.

John Wibberley

The challenges of creating aesthetic excellence in prosthodontics – insights from the viewpoint of a dental and clinical dental technician

All-on-nothing to All-on-4 and beyond. There are various treatment options available today to address the aesthetic and functional needs of the patient. This presentation will discuss Cosmetic and Aesthetic principles that I apply when creating restorations. Customising of denture teeth, gingival contouring, gingival staining will be presented along with an insight into the materials used to achieve the highly aesthetic result.

The role the Clinical Dental Technician can play in the treatment planning of fixed implant restorations as part of the restorative team will be considered. Stent design will be explored, driven by the question what diagnostic information can and should be obtained from the stents we use?

The technical aspects of framework design and fabrication using CAD/CAM technology will also be evaluated.

John Wibberley started his career as one of the first full time students studying for a Certificate in Dental Technology, qualifying in 1978 from Manchester Polytechnic. John's first appointment was in the Department of Prosthodontics at Manchester Dental Hospital.

Eight months later he then moved to North Manchester General Hospital gaining more experience in a maxillofacial unit. After gaining his advanced City and Guilds in crown and bridgework John joined the RAF dental branch in 1980. Leaving the RAF in 1982, John gained valuable commercial experience in several different commercial laboratories and hospitals until eventually opening his own laboratory Portland Ceramics in August 1985, specialising in implantology and high quality restorations. In March 2001 Boots Dental Care acquired Portland Ceramics. In May 2005 he set up Waters Edge Ceramics. The Swift dental group acquired Waters Edge Ceramics in June 2013. John qualified as a Clinical Dental Technician in April 2013 and now runs his own practice.

John has travelled extensively attending courses in France, Germany, Italy and Holland and has visited the USA over forty times attending courses and conferences. He has also presented to the Association of Dental Implantology, the British Academy of Aesthetic Dentistry and Nobel Biocare World Conference in Las Vegas May 2007. In June 2005 John was awarded a Fellowship of the British Institute of Dental and Surgical Technologists.

Invited speakers (continued)

Peter Briggs

Aesthetics in the compromised patient – rehabilitation challenges in the management of trauma, oncology and developmental disorders

Learning aims:

- Understanding the challenges that significant soft and hard tissue loss creates for the Prosthodontist
- The significance and management of post-traumatic occlusal derangement
- Prosthodontic planning – what is necessary?
- Restore or extract the damaged teeth?
- Fixed or removal tooth replacement? – factors that need to be taken into account
- Bone grafting prior to implants – the associated hard and soft-tissue factors
- Team working and establishing roles
- Outcome and complications of such treatments

Peter Briggs works as a Consultant at St. George's Hospital, London and also runs a Specialist Referral Practice in North Kent. He qualified from King's College Hospital in 1983 and was appointed Consultant in 1995. He completed a Cons MSc at the Eastman in 1988 and was a Churchill Fellow in 1994. His main secondary care clinical interest is multi-disciplinary patient care. He was Clinical Director of the Maxillo-Facial Unit at St George's for 14 years.

He is committed to postgraduate training, teaching and education. He was appointed Specialist Training Committee (STC) Chair and Training Programme Director (TPD) for London Restorative Dentistry in 2012. He is also Sector lead TPD for South London for Dental Foundation and Core Development training (MDEC). Peter has been Postgraduate Dental Tutor in South West London since 2009 and appointed as the Dental Design Lead of the South London LETB in 2012.

He was elected to the British Society of Prosthodontics (BSSPD) council in 2010 and has organised the BSSPD component of the 2011 Pan Dental Society meeting in Liverpool in 2011. He sits on the organising committee of the 2016 Pan Dental Society meeting. He contributed to the 'Prosthodontics Unleashed' lecture series of past president Chris Butterworth in 2011/12 (London, Cardiff, Newcastle, Dundee, Birmingham & Manchester). He gave the first BSSPD Webinar in Nov 2012 and is President-elect of BSSPD. Peter has served terms on numerous examination panels.

Conference dinner

The conference dinner will be held on the historic HMS Unicorn on Monday 14th March at 7.00pm.

Dress Code: Lounge Suit

After dinner speaker

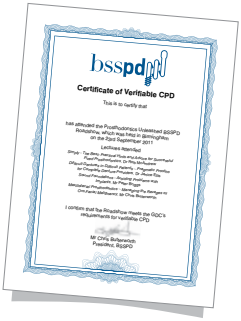
Jim Robertson (LLB DFM.NP) was born and bred in Airdrie and when asked if he has lived there all his life he replies "not yet". After education at Airdrie Academy, Strathclyde University and Glasgow University, he spent the first 15 years of his working life as a Criminal Defence Solicitor in Airdrie where he had no shortage of work, normally acting for school chums or relations. In 1989, he joined the other side and became a Procurator Fiscal. He has worked in Lanark, Hamilton, Stranraer and since 2002 as Procurator Fiscal for Kirkcaldy and Cupar.

He is married to Christine who is a Music Teacher and they have two boys; Jamie, 26 who is a Doctor healing injuries and Andrew who is 13, a schoolboy causing them. Jim is a keen golfer and has been a member of the Golf House Club at Elie for over 20 years and has been on the After-Dinner Speaking Circuit for over 10 years.

He is a sought after Burns Speaker, having spoken at a number of prestigious Burns Suppers at home and abroad. His sojourns in the past few years have taken him to Cairo and in 2009 to Cape Town where he proposed the toast to the Immortal Memory at the largest Burns Supper in the Southern Hemisphere.

CPD certificates

This meeting will provide 9 hours of verifiable CPD in total (5 hours Monday 14th April & 4 hours Tuesday 15th April). Delegates wishing to obtain verifiable CPD must sign in on both days to be awarded the hours allocated for that day.


bsspd
Certificate of Verifiable CPD

Following the conference, delegates will receive an email containing a link to the conference on-line feedback form. Once this form has been completed, the CPD certificate can be downloaded.

Schottlander oral presentation abstracts

3D analysis of toothwear in-vivo

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Aim: This study aimed to develop a novel methodology that employs 3D scanning in quantifying the progression of toothwear and then assess the applicability of the methodology *in-vivo* through monitoring toothwear progression in patients over a 12-month period.

Methods and materials: A Stainless Steel Model (SSM) was fabricated to resemble a dental arch. The dimensions of the SSM were ascertained using a Coordinate Measuring Machine. The SSM was used to identify the accuracy and precision of a contact and a non-contact 3D-scanner. The SSM was also used to identify the dimensional-accuracy and dimensional-stability of Type IV stone casts poured from 3 types of impression materials: alginates (Alg), polyethers (PE) and polyvinylsiloxanes (PVS). Thereafter, the overall 3D scanning system performance (α system) was calculated. A clinical study involving toothwear patients was also carried-out. At initial visit and after 1 year, PE impressions were taken of participants' dentition, poured and 3D-scanned. Resultant scans were 3D analysed, compared and differences detected.

Results: The contact scanner demonstrated greater accuracy and precision compared to the non-contact scanner. Alg-fabricated casts were the least accurate, while PVS was the most accurate but demonstrated greater statistical variance compared to PE. The α system was 66µm. Clinically, all study participants presented anterior toothwear >140µm in depth; however, toothwear only affected a limited surface-area.

Conclusion: In this pilot study, we were able to formulate a novel and detailed 3D scanning methodology for quantifying toothwear *in-vivo*. We have also demonstrated the clinical applicability of the methodology in monitoring toothwear progression in patients.

The Bond Strength of Resin Bonded Bridge Retainers to Abutments of Differing Proportions of Enamel and Composite

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Clinical Relevance: it is generally advised that the use of Resin Bonded Bridges (RBBs) should be restricted to cases where abutment teeth are unrestored or minimally restored. In patients with hypodontia, potential abutment teeth may be diminutive or exhibit unusual morphology. The use of composite resin to improve the shape and contour of these teeth is a well recognised technique. Although this may increase the surface area for the bonding of an RBB retainer, there is no available evidence from clinical trials or in vitro research to inform the clinician as to how this composite may affect the bond strength of the bridge.

Purpose of Study: to determine the effect that increasing the amount of composite resin, relative to enamel, on the bonding surface of an abutment, affects the bond strength of a RBB retainer.

Material and Methods: Four groups of specimens were constructed using bovine enamel and composite resin to represent bridge abutments. The composition of the bonding surface of these was: (1) 100% enamel; (2) 25% composite; (3) 50% composite; (4) 100% composite. After 7 days of ageing in distilled water at 37°C, the abutments were roughened with a diamond bur and cemented to air abraded base metal alloy beams (retainers) with a universal resin cement. The specimens were aged for a further 48hrs before tensile peel testing using a Universal Testing Machine. The load (N) at failure was recorded and statistical analysis performed. The bonding surfaces of the failed retainers were examined to identify the mode of failure.

Results: The force required to produce failure increased as the amount of composite resin on the bonding surface of the abutment increased. This difference reached statistical significant between the following groups ($p<0.05$):

- (1) 100% enamel and (3) 50% composite
- (1) 100% enamel and (4) 100% composite
- (2) 25% composite and (3) 50% composite

The mode of failure was mixed on the majority of retainers.

Conclusions: Findings suggest that RBB retainers can be cemented to abutments containing composite resin without a reduction in bond strength, provided that surface roughening is carried out and the restoration has been exposed to the oral environment for a limited amount of time.

A Novel Optical Method for Recording the Mandibular Transverse Horizontal Axis

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Recording and reproducing the mandibular transverse horizontal axis (THA) is important in many aspects of prosthodontic treatment. Despite this, it is known that techniques taught in dental school, such as the use of an earbow, are often abandoned in general practice. Reasons given include the time required to record the THA, the expense of the equipment and the perceived lack of efficacy. Typical earbow methods have been shown to be accurate to 4.7±2.9mm (mean/standard deviation). We propose and test a novel technique for determining the THA which attempts to address these issues. Specifically, we investigate the ability of our method to locate the articulator axis of mounted dental models.

Objectives: To design and assess the accuracy of a novel, non-invasive method for determining the axis of rotation of articulated dental study casts.

Method: A 3D structured light scanner was constructed using an LED pico projector and two CMOS cameras, mounted on a rigid bar. Computer software was written to calibrate the system, and to create 3D scans. The scanning area was 6x5cm, allowing simultaneous capture of six upper and six lower teeth. Dental stone casts were mounted on an average value articulator. With the upper and lower teeth positioned together, sets of 10 scans were taken from three different viewpoints. The viewpoints were 'Right' (capturing right first molars to central incisors), 'Left' (capturing left first molars to central incisors) and 'Labial' (capturing left canines to right canines). The teeth were then propped open, creating 10mm of incisal separation, and the three sets of 10 scans were repeated. From each pair of scans an axis of rotation was calculated using the mathematical principle of the instantaneous axis of rotation. A total of 900 axes were created in this way. The locations of these axes were plotted in sagittal planes located 57.5 mm left and right of the midline to represent the position of the temporomandibular joints. The accuracy of axis location was then assessed.

Results: The mean radius of error for the 900 individual axes, compared to the true axis, was 2.65mm ± 1.01mm (SD). 61.3% of the axes lay within 3mm of the true axis, and 99.2% of the axes lay within 5mm of the true axis. The orientation of the calculated axes varied by 2.11 ± 0.9° (SD). The standard deviation for the degree of rotation around the calculated axes was 0.09°.

Conclusions: The accuracy of this method is clinically acceptable, and may represent an improvement over existing earbow techniques. The acquisition time for a set of scans is a few seconds and the equipment costs less than a typical earbow. Therefore, our method may address some of the barriers to recording the THA in general practice. Further studies are required to confirm the accuracy of the virtual inter-occlusal records at the level of the dentition. Clinical studies are then indicated to determine whether the THA on a patient can be determined in a similar fashion.

Acknowledgements: This work was supported by the University of Leeds

Tooth replacement for partially dentate older patients: a cost effectiveness analysis

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Background: In many countries, the current conventional treatment offered to partially dentate older patients is provision of removable partial dentures (RPD). Whilst RPDs can function very successfully, a large proportion of patients struggle to adapt to their limitations and either discontinue wearing them or use them only occasionally. Less complex, functionally orientated treatment solutions are very applicable to partially dentate older patients. One of these is the Shortened Dental Arch (SDA) concept which aims to provide patients with a functional dentition of 10 occluding pairs of teeth or contacts without the need for a RPD.

Objective: To conduct a cost effectiveness analysis comparing two different tooth replacement strategies for partially dentate older patients namely; RPDs and functionally orientated treatment based on the SDA concept.

Methods: Partially dentate older patients completed a randomised controlled clinical trial. All patients received standardised initial care which included extensive oral hygiene instruction, non-surgical periodontal treatment, extraction of teeth with a hopeless prognosis and restoration of carious lesions. Patients were randomly allocated to two treatment groups: the RPD group and the SDA group. For the RPD group each patient was restored to complete arches with cobalt-chromium framework RPDs constructed using a standardised protocol. For the SDA group, patients were restored to a shortened arch of 10 occluding pairs of natural and replacement teeth using Resin Bonded Bridgework (RBB) constructed using a standardised protocol. All treatment was provided by a single operator.

Treatment effect was measured using impact on Oral Health related Quality of Life (OHrQOL) using the OHIP-14 questionnaire. Specifically, treatment effect was defined as the Minimally Important Clinical Difference (MID) in OHrQOL. The costs involved in providing and maintaining care were recorded for all patients including laboratory bills, use of dental materials and professional time. Maintenance requirements were documented including new and recurrent carious lesions. Caries incidence was recorded using the International Caries Detection and Assessment System (ICDAS). Mean total costs per patient were calculated and a ratio was generated which expressed comparative cost effectiveness. Patients were followed for 2 years after treatment intervention.

Results: In total, 89 patients completed the RCT (45 SDAs and 44 RPDs). The total cost of achieving the MID in OHrQOL for an average patient in the RPD group was €615.74. For the SDA group the cost of achieving the MID for an average patient was €282.17. The cost effectiveness ratio generated was therefore 2.18:1 in favour of SDA treatment. Patients in the RPD group had significantly higher maintenance requirements than those in the SDA group. These patients recorded a significantly higher incidence of new carious lesions ($p<0.001$) and recurrent carious lesions ($p<0.001$) compared to the SDA group.

Conclusion: In this study, treatment based on the SDA concept was more than twice as cost effective compared to RPDs. SDA treatment was significantly less costly to provide initially and required significantly less maintenance compared with RPDs two years after treatment intervention.

Schottlander poster presentation abstracts

Measuring clinical reasoning of UK restorative dentistry registrars in management of patients with hypodontia

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The measurement of a clinician's ability to reason and treatment plan is a complex task which requires a great deal of examiner experience and expertise in the clinical area under assessment. The challenge for educators and regulators is to develop tools for the assessment of clinical reasoning which can be used for a variety of purposes from certification of completion of basic and more specialist competencies, as well as in the re-certification of experienced practitioners. Various tools used for undergraduate and postgraduate assessment have been described in the literature.

This study investigated the validity of a structured, written, clinical, hypodontia related, case-based assessment tool to measure clinical reasoning in UK specialist trainees in restorative dentistry. A mark scheme was developed from responses of specialist and expert clinicians in the field, made up of five consultants and honorary consultants in Restorative Dentistry. Two assessors were calibrated to grade the assessments using the mark scheme.

26 UK trainees in restorative dentistry or monospecialties completed the assessment. The tool was investigated for inter-rater reliability, internal consistency. Inter-rater reliability was determined by Intraclass Correlation Coefficient of 0.901 as being excellent. To further support this marks awarded by each assessor were not found to be significantly different to each other (p=0.42). Internal consistency with Cronbach's Alpha of 0.889, was very good. The assessment did not discriminate between trainees with different backgrounds and experience of training.

The use of a clinical case-based tool to assess clinical reasoning appears to be reliable and a valid tool with good internal consistency. Further work is required to determine the number of cases and other features needed for discriminant validity between clinician experiences to be achieved.

Three dimensional imaging of the face using low-cost portable devices

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Code 002

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Aims: To assess the accuracy of three dimensional (3D) imaging of the face using low-cost, portable 3D imaging devices.

Introduction: 3D surface imaging is a valuable tool in maxillofacial prosthodontics. Various optical scanning devices have been used for treatment planning, post-operative assessment, long term monitoring of soft tissue changes and other applications. These

can achieve high accuracy and precision when scanning complex anatomical features, but incur significant costs. Furthermore, fixed devices require clinical space exclusively set up for this purpose. Recently, several low-cost handheld devices have become available on the market, but there is a lack of evidence regarding levels of accuracy that can be achieved when using these devices to image anatomical features of the face, so it is unknown whether these could be utilized in maxillofacial imaging.

Materials and methods: Two handheld digital stereophotogrammetry devices and a handheld laser scanner were tested. Validation of these devices was carried out by imaging a freeform reference object traceable to National Physical Laboratory standards, anatomical models of the ear and of the middle third of the face, and comparing the acquired data with corresponding reference CAD (computer aided design) or CT (computed tomography) data, to assess accuracy of 3D surface reproduction. The accuracy of linear measurements between anthropometric landmarks was assessed by comparing direct measurements on a human subject to corresponding measurements on the acquired data.

Results: Results showed mean overall error (distance) between the acquired data and reference data smaller than 0.5mm following surface comparisons. Linear measurements were not significantly different between the human subject and 3D acquired data at the $\alpha = 0.05$ level of significance.

Conclusion: The low-cost, portable devices used in this study could replace more expensive and less versatile equipment for clinical or laboratory use. Furthermore, they provide excellent educational tools for introduction to digital technologies.

A randomised controlled study comparing the lower anterior labio-lingual neutral zone position in edentulous subjects with and without their upper denture in-situ

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Statement of problem: The neutral zone (NZ) impression is an established clinical technique for determining the labio-lingual position of the teeth on complete dentures. Opinion is divided as to whether the neutral zone record requires the maxillary denture to remain in-situ or not. There are no published papers assessing the influence of a maxillary denture on the mandibular neutral zone.

Material and Methods: This is a randomised controlled study to which 12 subjects were recruited. Two neutral zone impressions were recorded from each participant; one with their existing maxillary denture in-situ and one without. Identical impression trays were randomly allocated to the two arms of the trial. The sequence of the impressions was also determined randomly.

The completed records were mounted in turn on the same articulator and, by maintaining the 3D spacial relationship between the articulator, impressions and camera, standardised photographs were taken. From the photographs the precise

position of the most anterior labial region of the mandibular neutral zone was measured by two independent examiners blind to the side of the trial to which the record was assigned.

Results: The mean difference, across all patients, of labio-lingual position of the mandibular neutral zone when the maxillary denture was inserted compared to when it had been removed was not statistically significant. (CI = -3.78 to 0.80; p=0.177).

Conclusion: Within the confines of this research protocol there is not enough evidence to suggest that the shift in the labio-linguial position of the anterior mandibular NZ was consistently affected by the presence of a maxillary appliance during the NZ impression procedure.

An alternative design to encounter the problem of unfavourable implants for screw-retained implant supported prostheses

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Introduction: The provision of screw-retained implant supported prostheses requires prosthetically driven implant placement so that the implants are parallel, and the screw emergence is palatal for anterior and occlusal for posterior teeth. Screw retained prostheses offer several advantages in contrast to the cement retained prostheses, such as retrievability and avoidance of problems associated with excess cement. However, it can be technique-sensitive as optimal implant position and passive fit of the prosthesis are a pre-requisite.

Case Reports: The aim of this study is to present two case reports that describe an alternative approach to encounter the problem with unfavourable implants if screw retained prostheses is desired.

In a 51-year-old female suffering from Sjogren's syndrome, six Straumann tissue level implants were placed in the maxilla for full arch fixed prostheses. The treatment plan was to provide a screw-retained fixed prosthesis for the anterior teeth and two distal cantilever screw retained prostheses for the premolars. The abutment screw for the implant in the UR3 position was emerging labially.

In the second patient, a 25-year-old female, three Straumann tissue level implants were placed in the anterior maxilla for a fixed partial prosthesis. The treatment plan was to provide a screw-retained fixed prosthesis to replace the missing teeth (UR1,2 UL1,2,3,4). The abutment screw for the implant in UR2 position was emerging labially.

The frameworks were designed in wax as screw retained prostheses, except in the UR3 and the UR2 area respectively. The wax frameworks in these areas were customised to receive individual cement-retained crowns.

The wax framework was scanned on Straumann® CARES® CAD machine using a copy-milling technique and milled in cobalt-chromium alloy (Coron®). GC Initial MC metal ceramic was applied to the framework to full contour except in the UR3 and UR2 areas, followed by application of pink coloured ceramic to mimic the soft tissues. The crowns for the UR3 and UR2 were manufactured as individual cemented metal-ceramic crowns.

The final prostheses were screwed and tightened to 35Ncm on each implant. The labial screw access holes (UR3 and UR2) were sealed and the crowns were cemented over the customised abutments using soft temporary cement.

Conclusions: This design offers an alternative approach for manufacture of a screw retained implant supported prosthesis in cases where divergent or unfavourable implants would have necessitated a cement retained prosthesis. The labially emerging screw access hole is managed without compromising the functional or aesthetic outcome and the crown can be easily removed. The prosthesis remains retrievable once the individual crown is removed and access to the abutment screws is achieved.

A national survey of Consultants, Specialists and Specialist Registrar's in Restorative Dentistry for the assessment and treatment planning of oral cancer patients

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Aims: To investigate the approach of restorative dentists towards the treatment and dental rehabilitation of oral cancer patients in the UK.

Material and methods: The survey was conducted at the Annual meeting of Association of Consultants in Restorative Dentistry (ACSRD) and Specialist Registrar in Restorative Dentistry group (SRRDG) in September 2011. Delegates were requested to fill in the questionnaire and hand it back after completion. The questionnaire involved two sections; the first section included 16 background close-ended questions, evaluating cancer service provision in their units, and the second section of the questionnaire included 5 questions based on a clinical scenario evaluating dental management of a patient undergoing pre-radiotherapy treatment.

Results: A total of 94 questionnaires were distributed, of which 65 (69.1%) were returned. Thirty (46.1%) of the respondents were consultants, 27 (41.5%) were specialist registrars and the remaining 8 (12.3%) were either specialist practitioners or trust grade dentists working in the specialty of restorative dentistry. Forty-eight (73%) of the respondents worked in NHS posts and the remaining 17 (27%) respondents worked in academic posts. A total of 50 (77%) of the respondents carried out clinical work which regularly included the dental assessment or treatment of Head and Neck (H&N) oncology patients, prior to or post radiotherapy. Among the respondents who were involved in the dental assessment of oncology patients, 32% of them did not have a protocol for review appointments in their units. Ninety one percent of respondents said that they used dental implants for rehabilitation post cancer surgery and 80% also used implants either always or sometimes in irradiated bone. Eighty one of respondents used CT guided technology in planning for dental implants. Answers in response to scenario questions highlighted that all the respondents would extract a very poorly prognostic tooth (i.e. root stumps) prior to radiotherapy, irrespective of it being at the side of planned radiotherapy field. 58% of respondents preferred to extract a non-functional, heavily restored, non carious distal maxillary molar tooth which was not in the area of radiotherapy beam and the majority (84%) chose to carry out root canal treatment (RCT) of a functional premolar tooth if considered non vital. Similarly (83%) percent of respondents preferred to carry out RCT of a mandibular premolar tooth that was in line with the radiotherapy treatment suffering with apical

periodontitis and the remaining 23% chose extractions following hyperbaric oxygen therapy.

Conclusion: This study highlights the variability in the approach of clinicians in dental and oral rehabilitation of patients undergoing radiotherapy treatment for oral cancer. The decision to extract a tooth prior to radiotherapy treatment depended mainly on risk of ORN (site and dose of radiation). Although national clinical guidelines are available in oral management of oncology patients, none are available to guide restorative clinicians in their decision making for pre radiotherapy extraction or non-extraction of tooth/teeth.

This study also highlights the increased use of dental implants for post-surgery rehabilitation and shows the different trends in which these implants are placed with increased use of CT guided technology.

A cross sectional survey to assess the evidence behind clinical decision making in implant dentistry

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Introduction: As the market for dental implants continues to grow, the number of dentists becoming involved in implantology is rising. There are various training pathways in implantology in the UK varying from short weekend courses through to a Master's Degree or as part of specialist training. The need for evidence based practice is becoming increasingly important but it is yet unknown to what affect the evidence is being implemented into daily clinical practice. The purpose of this study was to evaluate what sources of evidence are preferred by clinicians, to what extent people have received critical appraisal training and to assess the use and awareness of Cochrane.

Methods: A survey consisting of 16 questions pertaining to the use of scientific evidence in implantology was sent to 75 implant practices and 25 to hospitals across Manchester, UK. Data referring to the number of years practising, to what postgraduate training in implantology attained, what sources of information were preferred when faced with a clinical problem and whether he or she was aware of the different levels of evidence and if they used Cochrane systematic reviews were collected.

Results: A total of 58 surveys were received (response rate, 58%). The most favoured sources of evidence were previous experience and advice from trusted and expert colleagues. Clinicians with an academic qualification such as MSC or specialists were significantly more likely to use systematic reviews when faced with clinical uncertainties ($p=0.02$), whilst older clinicians relied more on their previous experience compared to their younger colleagues ($p=0.032$). Those with Master's degrees (79.2%) or specialist training (100%) had received training in critical appraisal, had a greater understanding of evidence-based practice and were significantly more likely to use Cochrane reviews than those without degrees (31.8%) ($p=0.00$). All respondents report that they find clinical guidelines useful.

Conclusions: The use of Cochrane systematic reviews seems to be lower amongst general dentists when compared to those with an academic or specialist background. In addition, they are less likely to possess the necessary skills to critically appraise current evidence and implement this into daily practice. The introduction of clinical

guidelines and protocols may be more useful in bringing about changes to clinical practice that are evidence based.

Zygomatic Implants in Complex Cases with an analysis of conventional vs. the remote anchorage concept

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This poster presents the findings of a retrospective study analysing the outcome of zygomatic implants used in the oral and facial rehabilitation of complex NHS priority cases by a single Maxillofacial Prosthodontist in Merseyside. 113 zygomatic implants were placed in 43 consecutively treated patients from October 2005 to July 2013.

The aim was to present findings on the case mix, remote anchorage concept, survival and restoration of conventional and oncology zygomatic implants. Data was collected from medical records and the Liverpool Oral Rehabilitation Database. The study was approved as an NHS service evaluation.

Thirty-one head and neck oncology patients, 5 cleft palate patients, 5 patients with severe maxillary atrophy, and 2 others were treated. 29 were female and 14 male, aged between 36 and 92 years at the time of implant placement. Ten patients were smokers and 11 were ex-smokers. Two patients were treated with chemotherapy and 15 patients with a mixture of pre and postoperative radiotherapy to the jaws. All patients underwent placement of implants under general anaesthesia.

Zygomatic implants alone were placed in 32 patients (mean: 2.6 implants, range: 1–4 implants). The remaining eleven patients had 32 additional conventional dental implants placed in the anterior maxilla (mean no of conventional implants: 2.9, range: 1-4). 67 implants (59.3%) were conventionally anchored and 46 (40.7%) used the remote anchorage concept. 9 patients had primary placement of 26 zygomatic implants. In four patients, zygomatic implants were used to retain a nasal prosthesis, the rest were restored with fixed bridges, bar retained overdentures and obturators.

The zygomatic implant survival rate was 92% overall and 88.2% for the oncology cohort (follow up 2 – 58 months). Seven patients died with their implants surviving at the time of death (six with their implants restored). Nine zygomatic implants failed in 4 oncology patients.

PEEK: The new maxillofacial implant

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Craniofacial defects resulting from trauma or surgical intervention can have significant aesthetic and functional implications for patients. They can also present considerable challenges for surgeons to reconstruct.

Poly Ether Ether Ketone (PEEK) is a polymer that can be used to produce computer-designed, patient specific implants.

PEEK polymers were originally used in multiple industries as they exhibit good strength, stiffness and toughness, as well as displaying good resistance to corrosion and high temperature stability. These characteristics, combined with their excellent biocompatibility led to their use as medical implants.

PEEK is now widely recognised as a highly reliable implant material used for reconstruction in spinal and orthopaedic trauma. The use of PEEK in the craniofacial field is increasing but is less well documented.

This report describes several cases in which temporal fossa, zygomatic and mandibular defects were reconstructed using computer-designed patient specific PEEK implants. These cases demonstrate how PEEK can be used to reconstruct a wide range of defects and detail the important treatment planning stages required in order to design a successful PEEK implant. It stresses the important role of CT imaging in this process and how clear communication is required between clinicians and specialised overseas technicians. Both cases demonstrate how such implants can be used to achieve good aesthetic results with short postoperative recovery time.

Overdentures: alternative materials to maximise the aesthetic outcome in severe tooth wear cases

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Severe pathological toothwear presents a multitude of patient and clinical related challenges. Treatment modalities focus on restoring the aesthetic and functional components of the dentition; this is often an arduous and complicated process for both the patient and clinician alike. Overdentures can provide a conservative, predictable and highly pleasing aesthetic result for a patient with a minimum of invasive care. Resin composite and acrylic prosthetic teeth allied to cobalt chromium framework are both viable options to restore aesthetics. The merits of these materials are illustrated through two clinical cases.

Aim: To discuss the approaches to maximising the aesthetic outcome of overdentures in the management of severe toothwear cases.

Background: The aetiology of severe tooth surface loss is multifactorial with attrition, erosive and abrasive components. Impaired aesthetics, reduced function, devitilisation, reduced intermaxillary space, dentoalveolar compensation and limited remaining tooth structure are challenging presenting features in such cases. Strategies to restore the dentition may include; fixed prosthodontics, surgical crown lengthening, endodontics, extractions, conventional dentures and overdentures. Overdentures have been shown to be a reproducible and conservative method to facilitate positive aesthetic outcomes in severe tooth wear cases.

Discussion: Two severe anterior toothwear cases are used to compare and contrast the use of resin composite and acrylic resin with cobalt chromium frameworks. The physical properties, technical considerations and aesthetic outcome of each material are discussed.

Conclusion: Overdentures are a viable method to greatly increase the quality of life of individuals with severe anterior toothwear. Resin composite and acrylic prosthetic

set ups on a cobalt chromium framework have positive aesthetic outcomes but vary in their physical and aesthetic qualities.

In vitro Evaluation of Fluorapatite Coatings against Peri-Implantitis

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Objectives: Bacterial adhesion to dental implants remains the essential initial step in the pathogenesis of peri-implantitis, an infection commonly associated with implant failure. Although hydroxyapatite is commonly used as a coating for dental implants it does not possess antimicrobial properties, while its relatively low strength and stability have stimulated interest in other bioactive materials. One such material is fluorapatite (FA), which appears more stable and induces bone growth. The aim of this study was to explore the antibacterial effectiveness of FA coatings against bacteria implicated in peri-implantitis, towards dental implant applications.

Methods: FA crystal growth on stainless steel (SS) substrates was achieved using the hydrothermal method. Ordered and disordered FA coatings were produced on the under and upper surfaces of the SS discs, respectively. The subsequent coatings were characterized using scanning electron microscopy (SEM), energy dispersive spectroscopy (EDS), non-contact stylus profilometry and x-ray diffraction (XRD). The antibacterial activity of the ordered and disordered FA coatings against S. mutans and P. gingivalis was assessed in vitro using the colony forming units (CFUs) method and confocal microscopy.

Results: The results showed that the hydrothermal method was able to produce FA coatings with well aligned and self-assembled crystals into an ordered enamel prism-like structure, and disordered FA coatings that were arranged randomly. The disordered FA coatings presented significantly higher surface roughness, area and fluoride content in comparison to the ordered one. XRD confirmed the crystallinity of the FA crystals. In terms of their antimicrobial performance, the disordered FA coatings significantly reduced the adhesion and growth of both examined bacterial strains, in comparison to the ordered FA and the SS.

Conclusions: These results show promising signs for FA produced using the hydrothermal method to be used as a dental implant coating due to significant antibacterial activity against bacteria strongly implicated in peri-implantitis.

Shade Selection in Fixed Prosthodontics

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The inconsistencies surrounding shade selection in fixed prosthodontics and how this may impact on the success of treatment, has been well documented. This audit has been conducted with the aim, of gathering an understanding of how variable shade selection can be between experienced staff and the inexperienced undergraduate, in an attempt to develop an improved undergraduate teaching strategy for shade selection.

Currently, an experienced member of the technical staff who will construct the restoration will make shade selections after careful discussion with the patient. This is a great resource which is well utilised however, it is one which will be unlikely to be available to the undergraduates following graduation. It is therefore important that the undergraduate develop skills in shade taking at this stage as errors can be frustrating and expensive later.

This audit involves three elements; firstly, to compare shades recorded by a sample of undergraduate students to experienced technicians using the Vita Linear Shade Guide 3D. Secondly, to produce a questionnaire for completion by the undergraduates on their experience of shade selection, including how confident they are at this process. Finally, after collating the data, a teaching strategy can be devised to address any issues raised and the audit can be repeated to assess the impact changes have made.

Preliminary results of this study would suggest that there is indeed variation between shade selection of the experienced and inexperienced, with a lack of confidence in shade selection and communication to the technician.

In conclusion, it is important that undergraduates gain the skills and knowledge which allow them to communicate with their patients and laboratory optimising treatment outcomes.

Minding the Gap … Longterm

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Background: Hypodontia patients often require inter-disciplinary planning, notably from orthodontists and restorative dentists to obtain an optimal aesthetic and functional outcome. Implant replacement of congenitally missing lateral incisors is often the treatment of choice but may not be suitable in all cases. Provision of adhesive bridgework as an alterative option can be problematic.

Aim: To describe techniques utilised by Glasgow Dental Hospital's hypodontia team, highlighting advantages and disadvantages.

Methods: Patients with missing lateral incisor teeth on completion of orthodontic treatment were provided with adhesive bridgework and orthodontic retainers following collaboration with dental laboratory staff. To optimise restorative and orthodontic outcomes a number of approaches were utilised:

- Bridges incorporating fixed retainers
- Cantilever adhesive bridges (retained on canine teeth) with a pontic "spur" engaging an adhesive band on central incisor teeth

The performance of these approaches was then observed.

Findings - Novel techniques

- Initial attempts to provide bridgework that incorporated fixed retainers made use of palatal grooves to facilitate placement of a bonded stainless steel wire. This approach then evolved to include precision attachments on pontics as an alterative means for wire placement.

- Adhesive bridges with the pontic "spur" attempted to reduce orthodontic relapse through stabilisation of the labial position of the pontic. An adhesive metal band on the central incisor teeth was necessary to prevent caries development.

Findings - Clinical outcomes

- Bridgework with palatal grooves proved suboptimal due to composite bonding issues.
- Those with precision attachments performed well but placement could be challenging from a clinical perspective.
- Designs with the pontic "spur" gave a satisfactory outcome in terms of orthdodontic retention but compromised aesthetics due to metal shine through at interproximal contact points. There was also a need for sufficient occluso-gingival height.

Discussion: In cases involving pre-restorative orthodontics, hypodontia patient's failure can be classified as orthodontic or restorative in origin. Their orthodontic relapse was characterised by space opening between central incisors, mesial tilting and mesio-labial rotation of canines. Any canine rotational relapse appeared magnified at the mesial aspect of the bridge pontic that sometimes necessitated retreatment.

Traditional methods to overcome relapse in hypodontia patients have shortcomings. Clear Overlay Retainers do not routinely provide sufficient control for this specific case type. Hawley appliances have the advantage of being adjustable, which can facilitate control of the labial position of bridge pontics. Use of fixed-fixed conventional bridges is unfavourable due to metal shine through, increased failure rate and risk of caries. Adhesive cantilever designs with large interproximal butt joints against central incisor teeth can be difficult to clean, unaesthetic and require sufficient occluso-gingival height.

Novel techniques adopted in this case series appear to go some way to overcoming the problems related to provision of adhesive bridgework in hypodontia patients.

Conclusion: Early indications suggest the techniques described here may positively combine adhesive bridgework and fixed orthodontic retention in hypodontia cases. Further case selection and completion with follow up will determine whether they have the potential for adoption into clinical practice.

Restoration of a Traumatised Permanent Central Incisor

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Background: A 16 year-old patient was referred to the Restorative Department of the Glasgow Dental Hospital due to difficulty negotiating the root canal of tooth 11. The patient's presenting complaint was of decoronation of the right maxillary central incisor due to trauma on a trampoline as a child. During this time many restorations had been attempted but subsequently failed.

Methods: Tooth 11 was deemed to be border-line restorable due to the limited amount of sound supra-gingival tooth structure present. Given the patient's age, the tooth's position in the aesthetic zone, ginigival contour and smile line it was felt preservation of the remaining tooth structure was of key importance.

Endodontic retreatment of 11 was completed over two visits while the patient wore a removable prosthesis. To avoid preparing the little remaining dentine a fibre post was cemented and the crown built from direct composite resin. A putty index made from an intra-oral composite mock up was used to layer the definitive composite build up in dentine and enamel shades. Opaque and blue tints were incorporated into the incisal third to mimic anatomical features of the contra-lateral incisor.

Conclusion: This case demonstrates the successful use of layering composite to recreate anatomical form of a broken down central incisor in an aesthetically demanding case.

This minimally invasive, medium term restoration has achieved excellent aesthetics and function, maximising dental hard and soft tissue until gingival maturity when alternative restorations may be considered.

An audit assessing the Prevalence of clinical complications during the treatment of head & neck cancer patients treated with Implant supported prostheses

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Introduction: Implant supported prostheses are becoming ever popular in oral rehabilitation of head and neck cancer cases. The clinical success and post treatment complications of implant retained prostheses on head and neck cancer patients is well documented. However there is a lack of documentation looking at the complications involved during the treatment of these patients.

Objectives: To identify complications and their prevalence occurring during treatment of head and neck cancer patients treated with implant supported prostheses, and where possible to implement changes to reduce them.

Methods: Retrospective review of all head and neck cancer patients who had implant supported prostheses treated under Mr. Bateman over a 1 year period.

Results: 42 patients were included in this audit. In total 222 implants were placed, with a failure rate of 2.3%. 27 patients had fixed reconstruction, 12 patients had removable reconstruction and 3 patients had fixed and removable reconstruction. Clinical complications occurred during the treatment of these patients. In all there were 42 complications that occurred in the 42 patients. Complications were grouped into complications related to the patient (affecting 26.2% of patients), laboratory (affecting 14.3% of patients), clinician (affecting 4.8% of patients), equipment (affecting 4.8% of patients) and implants (affecting 8.6% of implants). Some of the consequences of these complications included 11 cases where clinical work was repeated (26.2% of patients), 8 implants were explanted and 3 occasions where support from implant representatives was required.

Conclusion: Even with the resources available to treat these patients complications during treatment can occur. In reducing the complications (where possible) this can reduce the consequences that come with them.

Oral rehabilitation following maxillectomy and rhinectomy using fixed prosthodontics and digital scanning: A case report

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Introduction: A 45 year old female was referred to the restorative department at Glasgow Dental Hospital following treatment for a maxillary malignancy necessitating complete rhinectomy and maxillectomy, with the loss of the maxillary dentition. The patient presented with ileac crest reconstruction of the maxillary alveolus and scapular graft to reconstruct the palate. The patient was dentate in the mandible.

Methods: Following specialist restorative assessment, implant placement was undertaken by OMFS colleagues. Six regular platform titanium implants were placed for intra-oral rehabilitation. A further seven were placed extra-orally to support a nasal prosthesis. Limited opening and mouth breathing made conventional impression making impossible. An intra-oral digital scan of the implant fixtures was carried out in a commercial laboratory. A verification jig was constructed to confirm dimensional accuracy. Subsequently, a metal-based, implant-retained prosthesis with acrylic teeth was constructed to replace the maxillary incisors and canines. The intra-oral implant position and angulation was more labial than ideal for prosthodontic aesthetics. The surgical limitations encountered by the OMFS team, however, offered no alternative. The obliteration of normal anatomy challenged conventional aesthetic goals. Good communication with the patient was essential to provide an acceptable, aesthetic result.

Results: Successful oral rehabilitation has been provided by a fixed implant-retained restoration in the anterior maxilla. The fixed prosthesis restored some function and improved oro-facial aesthetics in a compromised clinical situation.

Conclusion: Aesthetic success in oral rehabilitation of patients who have undergone head and neck cancer surgery is as important as for any other patient. The challenges and barriers to providing this are significant and must be communicated to the patient before embarking upon extensive, demanding or invasive treatment. Principles of aesthetics must be borne in mind, but adapted, in compromised cases.

Validation of a novel technique for characterising the interface geometry of non-metallic crowns

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Objectives: Improved fracture strength and fatigue resistance of the ceramic-crown complex requires effective stress distribution through this compound system. Optimising the nature of the interface; in terms of its adhesion to the substrates, its physical properties and the internal geometry is key. Current techniques used for characterising the geometry of the tooth-crown interface are characterised by being destructive, lack accuracy and have poor inter-specimen reproducibility and repeatability.

The authors have developed a novel technique to overcome all of these limitations by using a combination of micro-CT scanning and 3-D computational modelling of the crown-tooth complex.

The aim of this investigation was (1) to test the accuracy, repeatability and reproducibility of a new interface measurement technique that uses micro-CT imaging and computational analysis and; (2) validate the virtual model with a solid physical replica.

Methods: An all-ceramic crown preparation was prepared on a typodont maxillary first premolar in accordance with the manufacturer's guidelines (Ivoclar-Vivadent AG). 15 dies were duplicated from the master and divided into 5 equal sets. Lithium-disilicate glass ceramic crowns (IPS e.max®; Ivoclar Vivadent AG) were fabricated for each die using 3 different techniques: (i) Manually-applied wax spacer and pressed-crown; (ii) 3D-printed wax pattern (Solidscape D76PLUS, Solidscape Inc.) and pressed-crown; (iii) digital scan of the model and machined-crown (CEREC-inLab® v3.6 Sirona AG). The fitting surface of the crowns was unaltered and the crowns were cemented with a resin-based cement (Variolink II; Ivoclar Vivadent AG) mixed with barium sulphate to improve the contrast ratio. The cementation technique was standardised using a universal testing machine (Lloyd LRX®, Lloyd Materials Testing Inc). The samples were micro-CT scanned (Skyscan 1172®, Bruker-Micro CT), a 3D digital model was constructed (MIMICS 14.1, Materialise Co., Ltd) and the digital model was segmented into its component parts; the ceramic crown, resin cement and tooth. A technique was developed to accurately measure the interface dimensions in multiple planes with a resolution of 1µm for all specimens in a reproducible manner.

The validation of the data obtained was based on the fabrication of a 3-D physical model. These models were accurately measured at key points with a laser micrometer to a resolution of (1micron). Correlation of measurements at these points between the virtual and physical models was indicative of the accuracy of the interface measurements taken on the virtual model.

Results: The measuring data sets were analysed by one-way ANOVA ($p \leq 0.05$) has confirmed a significant difference in the interface thickness among the three groups. There was a perfect correlation between the dimensions of the physical and virtual models for each specimen.

Conclusion: This technique enables high accuracy and intra- and inter-specimen measuring reproducibility and repeatability with effective 3D comparison of the interface geometry at any point within the interface structure. This data enables researchers to characterise the interface geometry of the crown-tooth complex for optimum stress distribution.

Dental assessment of head and neck oncology patients: an audit

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Objectives: To determine if head and neck oncology patients are given a dental assessment as part of their care pre and post-treatment, and offered appropriate restorative input as per guidelines.

Standard: Every head and neck oncology patient should be given a dental assessment before treatment. Subsequently, post-treatment, every patient should have the opportunity for dental rehabilitation and access to a consultant restorative

dentist. (Sign Guidelines on the Diagnosis and management of head and neck cancer and the British Association of Head and Neck Oncologists.)

100% compliance with these standards is expected.

Method: Records from the Regional Oral and Maxillofacial surgery department at the Southern General Hospital were examined. One hundred recently diagnosed oncology patient records were assessed.

The following criteria was recorded: Diagnosis/staging; site; date of first multi-disciplinary team (MDT) meeting; whether an orthopantogram (OPT) was available; whether the patient was dentate on presentation; whether there was evidence of a dental appointment; and any other evidence of a dental assessment.

Results

- 47.8% of dentate patients had a pre-operative dental assessment.
- 29.2% of patients had a post-operative rehabilitation appointment /pending referral or ongoing hygienist appointments.
- 8.6% of patients had both a pre-op and post-op dental assessment.
- 41.9% of patients had no evidence of a dental assessment at any stage.

Conclusions: The desired standards are not being reached.

It can be suggested that an appropriately trained dental practitioner should undertake a pre-operative dental assessment and a restorative consultant should be present at MDT meetings, with more detailed records kept. Post-treatment, it is suggested that at review appointments, a second referral to a restorative consultant dentist is made for dental rehabilitation, to ensure timely assessment.

A Pilot Study to Assess the Use of Mouthguards by players of contact sports in the Glasgow Area and to promote the use of a Smart Phone App which may be of Benefit in a Dental Emergency

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Aim: This pilot study was conducted to assess if mouthguards are routinely worn when playing contact sports in the Glasgow area and to assess the design of an online questionnaire as a means of assessing mouthguard use and experience of a sports-related dental injury. Another aim was to raise awareness of a Smart Phone App providing guidance on initial management of a dental injury.

Methods: An online questionnaire was emailed to a variety of types of contact sports clubs in the Glasgow area. The survey was sent with a covering explanatory email. Permission was granted from the author of the Dental Trauma App to promote its use.

Results: 67 people completed the pilot online survey. Contact sports played included rugby (22), hockey (20), shinty (17), football (4), basketball (6), cricket(1), and American football (1). On average players trained or played 3 times per week. Fifty six (84%) people owned a mouthguard and 11 (16%) did not. 26 (46%) of mouthguards owned were purchased in a sports shop and 30 (54%) were made by a dentist.

32 (48%) respondents admitted to not wearing a mouthguard when training and 20 (30%) do not wear one during a match. Twenty four (31%) people had experienced a dental injury whilst playing sports, with 13 (54%) of those requiring dental treatment as a result. In addition, 39 (50%) people had observed a dental injury with 15 (19%) having never seen a dental injury result from their sporting activity.

54% of respondents knew that when a tooth has been knocked out it can be reimplanted. When asked if they knew how to manage specific dental emergencies, 'No' was the most popular answer given in relation to avulsion (45%), luxation (49%) and crown fracture (58%).

69% of respondents felt a Smart Phone App explaining how to immediately manage a dental emergency would be beneficial.

Conclusion: Results from this pilot study indicate that although the majority of sports players owned a mouthguard they did not always wear them. Players are less likely to wear one when training. Of those who wore a mouthguard almost half used one purchased in a sports shop, which according to Newsome et al 2001 are considered to provide less protection than a custom made one provided by a dentist. Almost one third of players had experienced a dental injury themselves while half had observed an injury. Respondents knowledge of how to manage a dental emergency was poor. The majority of players felt a Smart Phone App would be beneficial in a dental emergency. Some flaws in the design of the questionnaire were highlighted by this pilot study and modification will be required prior to extending the survey to sports clubs throughout Scotland.

Denture Cleanliness: a clinical audit in a secondary care setting

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Aims: An audit evaluating patient denture cleanliness and clinical record keeping was undertaken within a secondary care setting, which builds upon the work conducted in general dental practice (Mylonas et al, BSSPD 2013).

The aims of this audit were to evaluate the effect of direct clinical intervention on denture hygiene, as well as assessing current patients' attitudes and knowledge on the topic itself. This was to be achieved by evaluating the quality of clinical record keeping for patients seen on the Prosthetics Department (n=60), obtaining a baseline record of denture cleanliness for a number of patients (n=60), evaluating the differences in denture hygiene between denture types, and developing new guidelines for use at the Birmingham Dental Hospital.

Methods: A prospective analysis of patient attitude and knowledge of denture hygiene was conducted, and baseline record of denture hygiene measured for patients in a secondary care Prosthetics Department using a previously developed Denture Cleanliness Index (DCI, Mylonas et al, BSSPD 2013).

A retrospective analysis of denture hygiene instruction (DHI) record keeping was undertaken (n=60).

Analyses of record keeping and patients' denture hygiene were conducted at 1-month recall, to assess the effectiveness of given clinical intervention.

Results: 60 patients were seen at baseline, 26 were male, and 34 were female, with a mean age of 63.1 years and ranging from 18 to 84 years old. 63% (n=38) of patient clinical records had evidence of DHI which improved to 100% at 1-month.

Questionnaire results indicated that the vast majority of patients (90%, n=54) were provided with information on how to look after their existing set of dentures by their current or previous dentist, however 88% of patients (n=53) at baseline had DCI scores ≥3; this dropped to 6.3% (n=3) at review.

Improvements in denture cleanliness were noted; 11.7% (n=7) had DCI ≤2 at baseline compared with 93.8% (n=45) at 1-month review. Additionally, complete dentures scored worse overall (82%, n=50 with DCI≥3) compared to partial dentures (77%, n=34 with DCI≥3), however both denture types demonstrated improvement at recall.

Conclusions: A new patient information leaflet and clinical guidelines on denture hygiene have been written and implemented. The results of this audit suggest that this may be a relatively straightforward method to achieve a short term improvement in denture cleanliness.

Patients appeared to have good knowledge and express enthusiasm to embrace improvements in denture hygiene, although this cannot be quantified by a simple DCI score.

The development and implementation of a DCI score is helpful in allowing patients to improve denture hygiene and its wider use is supported.

Future research will need to be conducted to evaluate denture hygiene compliance on a medium and long term basis.

Retrospective evaluation of the use of a custom oral Radiation Positioning Stent in reduction of radiation dosage to the opposing jaw in Head & Neck cancer patients treated with radiotherapy

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Aims: To evaluate the use of a custom oral Radiation Positioning Stent (RPS) in reducing radiation dosage to the opposing jaw in Head and Neck Oncology patients treated with primary or adjuvant Radiotherapy.

Materials and Methods: Fifty five radiotherapy treatment plans were compared to determine if the Radiation Positioning Stent (RPS) was a factor in reducing radiation dose to the opposing jaw, when compared with a similar cohort of patients, matched in terms of disease, without the RPS. Each jaw would either be recorded as 'same jaw' in relation to the location of the tumour and the other would be recorded as the 'opposing jaw'. Radiation dosages at similar points in the same/opposing jaws were measured in the two cohorts of patients using the radiotherapy planning system software.

Results: It was found that there was a significant reduction in the radiation dosage in the opposing jaw in patient given the RPS, when compared to opposing jaw of patients without the RPS. ($p<0.05$)

Conclusions: The use of a Radiation Positioning Stent was a factor in reducing the radiation dosage to the opposing jaw in patients with Head and Neck cancer treated with Radiotherapy. Reduction in radiation dosage can significantly improve the oral and dental rehabilitation prognosis in that jaw. This information can also assist in appropriate pre-radiotherapy dental assessment and planning.

How well do clinicians communicate with laboratory staff? An audit to determine the clarity of partial denture designs

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Teamwork is an important component in the delivery of clinical care, especially when dentists and dental care professionals work together to construct dentures. The aim of this audit was to determine if prescription forms completed by the clinicians gave the technicians sufficient information to construct partial dentures without needing further clarification. A sample of 100 laboratory forms were examined where partial dentures had been prescribed by dental students, training grade staff and career grade staff. A panel of six individuals composed of two clinicians, two experienced dental technicians and two technicians in training, independently assessed the prescription forms. The percentage of forms that each assessor judged did not need further clarification were calculated. The majority of designs appeared clear to interpret with the assessors judging that between 68-84.5% of them had sufficient information for the dentures to be constructed. There was generally broad agreement between the two clinicians and the two experienced technicians but more variation between the two technicians in training as to whether the designs were clear. Students at the beginning of the course, who had been very closely supervised, had the highest compliance with the six assessors judging that between 83.5-100% of designs did not need further clarification. In contrast training grade staff had the lowest compliance levels, with the assessors judging only 50.5-78.5% of the designs did not need further clarification. The more experienced dental students and career grade staff appeared to lie between the two other groups and were broadly similar. The variation between assessors suggested that information perceived to be clear by experienced technicians may not be so readily interpreted by technicians in training. The results suggest that although a majority of partial denture prescriptions could be interpreted as being clear, there is a need to improve communication between dental team members.

The prosthetic rehabilitation of a patient with cleft lip and palate: provisional and definitive restoration

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The dental management of patients with cleft lip and palate (CLP) can pose quite a challenge. Teeth may commonly be missing, malformed or malpositioned, and underlying bone support is also often compromised. The presence of fistulae, mid-face retrognathia and hypomaturation of the maxilla can further complicate treatment. It is important to not only be able to deal with the aesthetic and functional demands, but also address the psychosocial effects of these deformities.

Cleft lip and palate defects arise in about 1.7 per 1000 live births, with some ethnic and geographic variation. Following the CSAG report, these patients are usually treated in specialist secondary care centres with a multidisciplinary approach to their management. However, general dental practitioners also play a crucial role in the maintenance of these patients' dental reconstructions.

Although advances in surgical and orthodontic management of CLP patients in the UK have revolutionised the management of these patients, many challenges still exist. In this particular case, the patient had undergone primary lip and soft palate repair in the developing world, but had never had formal closure of the hard palate defect, resulting in the presence of a large palatal fistula.

The aim of this poster case presentation is to describe a unique method of obturating a large palatal fistula; initially with a removable maxillary obturator prosthesis, followed by definitive management with alveolar distraction, anterior maxillary bone grafting from iliac crest harvest and subsequent implant supported overdenture reconstruction. This case demonstrates the challenges and possible solutions in the dental rehabilitation of patients with CLP.

Kois Analyzer for optimal aesthetics

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The facebow is widely used to record and transfer the horizontal axis of an individual patient to an articulator. The introduction of a simplified technique to optimise aesthetics using a Kois Analyzer has advantages in cases where vertical dimensions are not changed.

Dr John Kois found the average axis-incisal distance to be 1000mm and from this, the Kois Analyzer was developed.

Traditionally, we record the incisal canine line parallel to the eyes. With the Kois Analyzer, the dental midline plays a more critical role in its relation to the facial midline. The incisal-canine line is made perpendicular to the dental midline with the plane of the eyes not considered.

In complex cases where excursions and horizontal axis are major factors in the treatment planning, the arbitrary facebow should be used. However, in cases with high aesthetic demand and an accepted occlusal scheme the Kois can be effectively used. It is an innovative tool which is quick and simple to use chair side with transferable components allowing the dental technicians to mount models on to commonly available articulators.

Often dental technicians have to construct crowns or veneers with the illusion of reality. For the technician to exercise their artistic talents in this process they must have models orientated on the same horizontal plane as when they are placed in the patient's mouth. The use of the Kois Analyzer is therefore an aid to dentist and technicians to accurately capture the midline and occlusal plane.

Aim: To describe cases where the aesthetics has been optimised with the use of the Kois Analyzer.

Dentinogenesis Imperfecta: two different approaches to management between mother and daughter- Functional, aesthethic and social considerations

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Dentinogenesis Imperfecta is an autosomal dominant genetic condition characterised by abnormal dentine structure affecting either the primary or both the primary and secondary dentitions.

The teeth appear amber, brown/blue or opalescent brown while radiographically the crowns may appear bulbous, pulp chambers are often small or obliterated and the roots are often narrow with small or obliterated root canals.

The defects in mineralisation often lead to wear of the enamel and dentine which can cause early tooth loss.

Literature provides information on how patients should be managed especially in the primary and mixed dentition. The main aims are to preserve the dentition for as long as possible, reduce wear especially on posterior teeth and to achieve reasonable aesthetics. At the stage of adulthood, many adults are restored with removable prostheses as wear is often to gingival level.

This poster describes the dental management of a family with Dentinogensis Imperfecta – a woman and her two daughters who are now young adults.

The mother has undergone implant surgery for implant retained bridges. The older daughter has opted for conventional overdentures while the younger daughter is now at a stage where she is considering both options.

The aim of this poster is to highlight the aesthetic, functional and social issues when managing patients with Dentinogenesis Imperfecta.

An audit of post dam prescription in Dundee Dental Hospital and School

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Background: Within each stage of denture construction, there are details which can be overlooked by the prescribing clinician. This audit looked at the prescription of the post dam for full and, where applicable, partial upper dentures. By ensuring the clinician takes responsibility for post dam prescription, retention of the final prostheses should be improved.

Aims and objectives:

- To determine the current percentage of clinicians at Dundee Dental Hospital prescribing for post dams during the construction of partial and full upper dentures.
- To determine the commonly asked for post dam depths.

- To determine if any differences exist regarding post dam prescription in relation to the type of denture being constructed.
- To implement change, where required, so as to increase compliance with current guidelines.

Method: Data collection was carried out retrospectively using data collection sheets. The 100 most recent laboratory cards from completed cases were examined. Data collected included information about the prescribing clinician, type of prosthesis constructed, whether a post dam been prescribed for and, if so, had the required depth been noted.

Results: The locally agreed standard that 100% of dentures should have a post dam prescribed for by the treating clinician, where appropriate, was not achieved (52%). The locally agreed standard that 100% of cases should have the required depth of post dam noted was not met (90.4%). It was also noted that few partial upper dentures meeting the inclusion criteria had prescription of a post dam made (21.1%). The intervention will involve dissemination of the audit results and information from the first data collection cycle to staff and clinical dentistry students via email. A second audit cycle will be carried out.

Confronting the Grey Areas

The British Society of Prosthodontics 2015 Annual Conference

Friday 27th & Saturday 28th March 2015

British Library, Conference Centre, St Pancras, London

Confirmed speakers: Prof Daniel Edelhoff, Ken Hemmings, Phil Taylor, Prof Paul Tipton, Prof Dominic O'Sullivan, Kevin Lewis, Richard Porter, Jimmy Makdissi, Prof Trevor Burke and Shakeel Shahdad

The British Society of Prosthodontics will hold its 2015 conference in London under the Presidency of Peter Briggs. The scientific programme will take place at the conference centre in the British Library. It will focus on the controversial areas of clinical prosthodontics. Peter has put together a dynamic and well known group of speakers to tackle the Grey Areas of Prosthodontics.

The main conference hotel is the Pullman, St Pancras which is next door to the British library. There is accommodation for all budgets in this area of London. The conference meal will take place on Friday 27th March 2015 at the Pullman.

- The society will debate the implications of a phase-down of dental amalgam with the help of Phil Taylor and Trevor Burke.
- Prof Daniel Edelhoff, from Germany, will outline the Grey areas of CAD CAM and ceramic technology for clinical dentistry.
- Richard Porter will tackle the diagnosis and best management of cracked vital and non-vital teeth.
- Dominic O'Sullivan will present his views on when patients are ready to receive implant treatment for teeth lost from periodontal disease.
- Ken Hemmings will outline the grey areas of decision-making between adhesive and conventional prosthodontic options to manage compromised and worn dentitions.
- Paul Tipton will update the society on his views on the important grey areas of occlusion
- Jimmy Makdissi and Shakeel Shahdad will discuss what imaging and planning should be used in the 21st century for prosthodontic reconstruction.
- Kevin Lewis will outline the dento-legal grey areas of prosthodontic clinical practice and the challenges of some of the newer prosthodontic techniques.

There will also be a robust scientific programme to include poster sessions, prize presentations and parallel educational sessions including treatment planning sessions.

We look forward to seeing you all in 2015.

Notes

Notes

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