AMSTERDAM, THE NETHERLANDS

ICP & EPA JOINT MEETING

18th Biennial Meeting
36th Year of the ICP
www.icp-org.com

43rd Annual Meeting
of the EPA
www.epadental.org

2019 PROGRAM

Science and Art in Prosthetic Dentistry

SEPTEMBER 4–7, 2019 | BEURS VAN BERLAGE

CONFERENCE TOPICS

Science & Art in Advanced Prosthodontics, Esthetic Dentistry/Digital Technology, Multidisciplinary/ Maxillofacial, Graduate Student Case Presentations, Implant Prosthodontics, Fixed & Removable/ Occlusion/Temporomandibular Disorders, Advanced Biomaterials, Management/ Complications, Special Needs/Geriatrics, Biology in Prosthodontics

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36th Year & 18th Biennial Meeting of the

International College of Prosthodontists

Joint Meeting with the 43rd Annual Conference of the

European Prosthodontic Association

Amsterdam, The Netherlands

September 4-7, 2019

International College of Prosthodontists
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Table of Contents

Welcome Letter from the ICP Presidents

Greetings to all ICP & EPA members!

Now that we, starting from 1st January 2018, take over the Co-Presidency of ICP from Mario Bresciano and Brian Fitzpatrick, it is a good occasion to look back on their successful Presidency and to look forward to the coming period.

Mario Bresciano and Brian Fitzpatrick, heading their team of Officers and Counselors, did a lot of work behind the scenes and out of direct sight of the ICP membership. What stands out most are the implementation of new grants and prizes for young researchers and members of ICP interested in doing research, together with professionalized procedures to apply for these grants. Another big issue was the update of standard operating procedures for the ICP board, which intensified the professionalization of the organization. Speaking of professionalization, we take a moment to reflect on the retirement of Eben Yancy, who as director of RES, was responsible for many years as the professional back-up of ICP. Although we have full trust in his committed successor Res Seminars, the ICP will miss his wisdom and engagement. Eben is owed ICP's gratitude for all the work he has done for the College.

Most visible in the past two years was, of course, our bi-annual meeting in Santiago, Chili. It was the first occasion that the ICP held a conference in South America. The Scientific Program Committee, headed by Dr. Dean Morton on behalf of the ICP, and Dr. Eugenio Neito Grez on behalf of our local partner Sociedad de Protesis y Rehabilitacion Oral de Chile (SPROCh) – composed a program that addressed mainly two topics: one was the role and use of digital technologies in prosthodontics, the other was focusing on providing simple and minimal invasive treatment interventions to improve patients' oral health-related quality of life. These two topics suggest covering two ends of the prosthodontic spectrum, but were brought under the conference theme of "Less is More" in a very natural way as belonging together. Besides an interesting scientific program, the organizers provided us with excellent social outings and activities.

Usually, the even years show a quieter international scientific presence of ICP, but in 2018, ICP will participate in a combined scientific conference in conjunction with the Italian Academy of Prosthetic Dentistry (AIOP). ICP accepted an invitation of AIOP to participate in a two-day congress on Occlusion, Treatment Planning and Full-Arch on Implants in Riccione, Italy from April 13th to 15th, 2018. Another important activity, in which ICP is involved, is the Young Prosthodontic Educators workshop that will be held in Karlsruhe, Germany in October 2018. This initiative of the Chief Editor of the International Journal of Prosthodontics Dr. George Zarb, who chairs this workshop together with the director of the Dental Academy for Continuing Professional Development in Karlsruhe, Dr. Winfred Walther, is supported in part by the ICP, as proof of its engagement in not only research but also in educational matters. Through the Education Grants program, the ICP provides a portion of the financial support required for this unique workshop, which allows talented young prosthodontic educators to work together with a faculty of renowned senior prosthodontic scholars from all over the globe.

In 2018 your team comprising the Co-Presidents, Scientific Program Chairs, related Committees and RES, have been working diligently to continue to place the essential pieces together as we head toward the 18th International ICP Biennial Meeting, to be held together with the European Prosthodontic Association (EPA) in September 2019 in Amsterdam, the Netherlands.

Yours Sincerely,
Dr. Nico Creugers and Dr. Nicola Ursula Zitzmann
Co-Presidents of the ICP

Dr. Nico Creugers
Radboud University Medical Center
Oral Function &Prosthetic Dentistry
Nijmegen, Gelderland
Netherlands

Dr. Nicola Ursula Zitzmann
University of Basel Department
Of Reconstructive Dentistry
Basel Switzerland

Welcome Letter from the EPA President

Dear Colleagues:

It is a great pleasure for us, the European Prosthodontic Association, to welcome all of you. Thank you for taking a time off your busy schedules and come to our small piece of land in Europe, famous for the battle against the sea

We are very proud that the ICP has given us the opportunity of hosting the first joint meeting with the ICP. The challenge is big and we have worked very hard for delivering up to your expectations.

Hosting this meeting means very much for us, it is a great opportunity to have an event of this magnitude in our country, with all the presentations and knowledge from mainstream clinicians and researchers, and above all, the possibility to share with fellow colleagues from around the globe, which I believe have more things in common than separating us.

We feel privileged to have you here and being the world center of Prosthodontics for these three days. I´m sure you will a wonderful time in the Netherlands.

Hope you enjoy your stay in the Netherlands, it is a perfect time of the year, Enjoy the canals and the Art and everything Amsterdam has to offer you.

Have a great time in our country. Colleagues, welcome to Amsterdam!

Sincerely,

Khee Hian Phoa TANDARTS-MFP
(NVGPT) Restauratief Tandarts
(NVVRT)
President
European Prosthodontic Association

Welcome Letter from the Scientific Program Chairs

Dear Colleagues:

We are very honored to have been given the privilege by the ICP and EPA to collaborate on this great event. We are grateful to the ICP co-Presidents Zitzmann and Creugers, to the EPA president Phoa and to all the members of the Scientific Program Committee for their strong support in bringing this exciting and important biennial event together.

The ICP and the EPA are prestigious international organizations with a long history of bringing together prosthodontic professionals to improve their knowledge and to build fellowship with colleagues around the world.

We recognize that many problems encountered by prosthodontists are common throughout the world and that solutions are sometimes hidden in the vast volume of information available. Our renowned presenters will deliver a synthesis of critical contemporary information consistent with the theme of the meeting, the Science and Art in Prosthetic Dentistry.

We appreciate the interest and the richness of international perspective that you will bring to this global event, and we are confident that you will share our passion for our patients, our profession and our specialty.

Colleagues, we warmly welcome you to our conference, with the best wishes that we all increase our knowledge and friendship.

Sincerely,

Kazuyoshi Baba, DDS, PhD
Chair and Professor
Department of Prosthodontics
Showa University
Tokyo, Japan

David Chvartszaid, DDS, MSC (PROSTHO), MSC (PERIO), FRCD©
University of Toronto
Graduate Program Director, Prosthodontics
Assistant Professor, Faculty of Dentistry
Toronto, ON Canada

Khee Hian PHOA TANDARTS-MFP (NVGPT)
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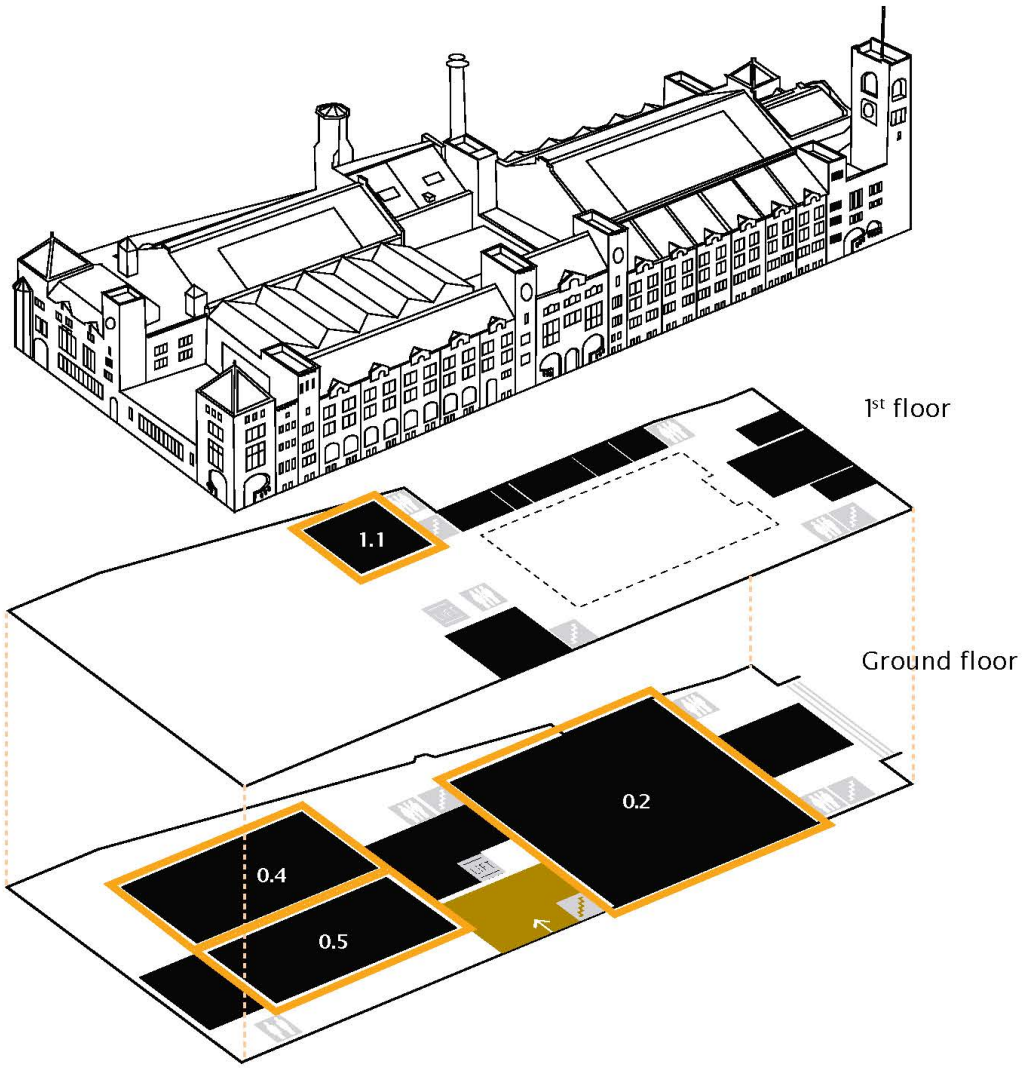
Beurs van Berlage Map



0.2= Grote zaal
Poster Session & Exhibits

0.4= Effectenbeurszaal
Concurrent Session A

0.5= Graanbeurszaal
Concurrent Session B

1.1= Administratiezaal
Concurrent Session C

Elective Events

Elective events are optional and are offered at an additional fee. Subject to availability.

Thursday, September 5th

Daily Spouse/Guest Tour: Amsterdam Taste Tour (10:00 – 12:30)

Amsterdam Taste To Join us for a "Taste of Amsterdam" . The guide accompanies you through a maze of Amsterdam's many food stalls. We explain how local delicacies are made and advise on items that you might enjoy. We visit some secret eateries that are off the map so that you get to experience the sounds and smell of Amsterdam's best dining experiences.

10:00- Pick up at the Beurs van Berlage (meet in lobby)
Registration Required – see registration desk
Fee: $60.00 USD per person

Friday, September 6th

Daily Spouse/Guest Tour: Amsterdam Walking Tour (including the Rijksmuseum) (09:00 – 13:00)

A walking tour through the city center of Amsterdam. A stop will be made at the national museum of Amsterdam, "the Rijksmuseum." This museum is world famous and here the largest collection of paintings by the Dutch old masters can be admired. Work from Frans Hals, Jan Steen and Rembrandt (the Night Watch painting) are assembled here. For the first time, the entire collection is on display at All the Rembrandts of the Rijksmuseum.

09:00- Pick up at the Beurs van Berlage (meet in lobby)
Registration Required – see registration desk
Fee: $65.00 USD per person

Presidential Reception & Banquet (19:30 – 22:30)

Delegates and guests are invited to attend this gala event for the recognition of participating countries and their representatives, presentation of awards and installation of new officers. Entertainment, light appetizers, dinner, and wine are included in this banquet event.

Registration Required – see registration desk
Fee: $150.00 USD per person (prior to Aug. 31, 2019)
Late Fee: $175.00 USD (after Aug. 31, 2019)

Saturday, September 7th

Networking Social Outing (16:00 – 18:00)

Join your colleagues for a post conference outing – Canal Tour & Cocktail Reception

The history of Amsterdam is intimately connected with water. Its 165 canals were created over the centuries to stimulate trade and transport and reclaim land to expand the city. They continue define the city's landscape and in 2010 Amsterdam's canal ring was recognized as a UNESCO world heritage site. Besides providing a stunning backdrop to the city's historical centre, floating down Amsterdam's canals is one of the most memorable ways to discover the city's sights and attractions. Whether you're a first-time or frequent visitor, everything in Amsterdam seems a bit more magical when viewed from a boat.

Registration Required – see registration desk
Fee: $125.00 USD per person

If you are interested in attending an event, please see the registration desk to check availability.
One voucher ticket will be provided per person.
Voucher tickets will be collected at the start of each event.

Session Moderators

Thursday, September 5th

Science and Art in Prosthetic Dentistry Room Location: Effectenbeurszaal	Nico Creugers, Nicola Zitzmann & Khee Hian Phoa (09:00-12:00)
Session A: **Advanced Biomaterials**	Markus Blatz & Marco Ferrari (13:30-15:30)
Esthetic Dentistry/Digital Technology Room Location: Effectenbeurszaal	Kazuyoshi Baba & Phophi Kamposiora (16:15-17:45)
Session B: **Multidisciplinary/Maxillofacial I**	Suresh Nayar & Dale Howes (13:30-15:30)
Multidisciplinary/Maxillofacial II Room Location: Graanbeurszaal	Marcio Grossi & Hana Hubalkova (16:15-17:45)
Session C: **ICP/EPA Graduate Student Case Presentations** Room Location: Administratiezaal	Peter Owen & Argirios Pissiotis (13:30-17:55)

Friday, September 6th

Session A: **Esthetic Dentistry/Digital Technology**	Daniel Wismejier & Wael Att (9:00-12:30)
Denture Session Sponsored by P&G	David Barlett & David Felton (14:30-15:30)
Geriatrics/RPDs Room Location: Effectenbeurszaal	David Chvartszaid & Sun-Jong Kim (15:30-17:00)
Session B: **Implant Prosthodontics I**	Carlos Parra & Guillermo Pradies (9:00-12:30)
Implant Prosthodontics II Room Location: Graanbeurszaal	Ami Smidt & Timo Narhi (14:30-17:00)
Session C: **Biology / Materials / Presentation by Award Recipients**	Mutlu Özcan & Xinquan Jiang (9:00-12:30)
Occlusion / Nutrition / Others Room Location: Administratiezaal	Limor Avivi-Arber & George Papavasiliou (14:30-17:00)

Saturday, September 7th

Science and Art in Prosthetic Dentistry Room Location: Effectenbeurszaal	Jung-Suk Han & Rafael Martinez de Fuentes (9:00-12:15)

Program Schedule Overview

Tuesday, September 3rd

09:00 - 17:00	**ICP Board Meeting** *(Councilors Only)*

Wednesday, September 4th

09:00 - 17:00	**ICP Board Meeting** *(Councilors Only)* **Room: Veilingzaal**
09:00 - 17:00	**EPA Board & Committee Meetings** **Room: Administratiezaal**
13:00 – 17:00	**Registration Check-In** **Foyer**
17:00 - 18:30	**Welcome Reception** **Room: Grote Zaal**
18:30 - 20:00	**YPE Reunion (Invitation only- Past YPE Delegates)** **Room: Keurzaal**

Thursday, September 5th

(09:00 - 12:00)	**Science and Art in Prosthetic Dentistry** **Room: Effectenbeurszaal** Moderators: Nico Creugers, Nicola Zitzmann & Khee Hian Phoa		
09:00	****Hugo de Bruyn:** *Oxford Lecture – The Future Is Now: The Coming 20 Years*		
10:00 - 10:45	**AM Break / Exhibit Review**		
10:45	****Sreenivas Koka:** *Prosthodontic Therapy for a Super-Aging Population*		
11:15	****Daniel Edelhoff:** *CAD/CAM-Polymers as Innovative Pre-Treatment Option for Complex Rehabilitations*		
11:45	*Discussion*		
12:00 - 13:30	**Conference Luncheon**		
(13:30 - 15:30)	**Advanced Biomaterials** **Room: Effectenbeurszaal** Moderators: Markus Blatz & Marco Ferrari	**Multidisciplinary/ Maxillofacial I** **Room: Graanbeurszaal** Moderators: Suresh Nayar & Dale Howes	**ICP/ EPA Graduate Student Case Presentations** **Room: Administratiezaal** Moderators: Peter Owen & Argirios Pissiotis
13:30	***Markus Blatz:** *CAD/CAM Ceramics Update*	***Richard van Merkesteyn:** *Medication Related Osteonecrosis of the Jaws (MRONJ)*	**Einat Varon-Shahar:** *An Alternative Treatment in a Case of Severe Bone Loss in the Esthetic Zone*
13:40			
13:50	***Bart Van Meerbeek:** *Current Approaches for Adhesive Luting of CAD-CAM Restorations*	***Thomas Salinas:** *Maxillofacial Reconstruction: Contemporary Approach and Application*	
14:00			**Alana Evans:** *Rohner Technique for Reconstruction of Complete Maxillectomy*

14:10	***Matthias Kern:** *Resin-Bonded Fixed Dental Protheses Made from Zirconia Ceramic – A Minimally Invasive Alternative to Single Tooth Implants*	***Dale Howes:** *Osseointegration and Malignancies*	
14:30	**Gonca Deste:** *Analysis of Effects of Different Sintering Procedures on Bi-Axial Flexural Strength in Monoblock Zirconia Systems*	**Richelle Chuka:** *Advanced Jaw Reconstruction in Head and Neck Tumors: A Review of the Data and Protocol*	**Zeqian Xu:** *Multi-Disciplinary Therapy Combined with Soft and Hard-Tissue Augmentation for Implant Restoration in Esthetic Zone*
14:40	**Panagiotis Symeonidis:** *Impact of Common Beverages and Aging on Color Stability and Translucency of Highly Translucent Zirconia*	**Apostolos Bounatsos:** *Comprehensive Treatment and Rehabilitation of Patients with Vascular Malformations: 3 Clinical Reports*	
14:50	**Deniz Yilmaz:** *Effect of Home Bleaching on the Surface Roughness of CAD-CAM Materials with Different Surface Treatments*	**Leonardo Ciocca:** *Digital Prosthetic Solutions for Mandibular Reconstruction After Cancer Surgery: Preliminary Results of Ongoing Research*	
15:00	**Bahar Tekli:** *Assessment for Flexural Strength and Surface Hardness of CAD/CAM Polymers (PMMA/PEEK) and Heat-Cured PMMA*	**Leslie Laing:** *Possibly the Long-Awaited, Minimally - Invasive, Oral Decay-Arresting Treatment for Sjögren's Syndrome Patients*	**Yasmin Osman Latib:** *Treacher Collins Syndrome: A Case Presentation*
15:10	**Yan Wang:** Curing Modes Affect the Degree of Conversion and Mechanical Parameters of Dual-Cured Luting Agents	**Derk Jan Jager:** *Implants in Sjögren's Syndrome Patients in the Premolar and Molar Region: A Multicenter Prospective Study*	
15:20	**Nilgun Gulbahce:** *Comparison of Color Change on Composites After Immersion of Beverages with CIEDE2000 and CIELAB Formulas*	**Kirsi Sipilä:** *Association of Pain-Related Disability with Psychosocial Factors in TMD Patients, Based on DC/TMD Criteria*	
15:30 - 16:15	**PM Break / Exhibit Review**		
(16:15-17:45)	**Esthetic Dentistry/Digital Technology** **Room: Effectenbeurszaal** Moderators: Kazuyoshi Baba & Phophi Kamposiora	**Multidisciplinary/ Maxillofacial II** **Room: Graanbeurszaal** Moderators: Marcio Grossi & Hana Hubalkova	**ICP/ EPA Graduate Student Case Presentations** **Room: Administratiezaal** Moderators: Peter Owen & Argirios Pissiotis
16:15	***David Gratton:** *Digital Dentistry: Just Because We Can, Should We?*	***Robert Carmichael:** *A Multidisciplinary Approach to Habilitation of Children, Adolescents and Young Adults with Congenital Absence of Teeth*	**Abdulmajeed Okshah:** *Management of Obstructive Sleep Apnea an Overview and Case Report*

16:35	***Jongyub Kim:** *Analog to Digi-log, Digital in Implant Dentistry*	***Harry Reintsema:** *Science and Art in Maxillofacial Prosthetics. How to Derive Functional Rehabilitation?*	
16:45			**Variza Daya Roopa:** *The Fabrication and Feasibility of Digital Complete Dentures*
16:55	**Vygandas Rutkunas:** *In-Vivo and In-Vitro Accuracy of Full-Arch Digital Implant Impressions*	***Sandy van Teeseling:** *Interdisciplinary Management of Complex Dental Cases - the Orthodontic Perspective*	
17:05	**Phillippe Mojon:** *Accuracy of Optical Impressions in Three Different Clinical Situations*		
17:15	**Julius Dirse:** *Accuracy of an Intraoral Scanner in Tooth Color Determination. Clinical Evaluation*	**Sunit Kumar Jurel:** *Functional Evaluation of Maxillectomy Patients Undergoing Prosthetic Rehabilitation*	**Rolf Meijer:** *Case Presentation: Treatment of a 64 Year Old Patient with a Severe Deep Bite Using a Combination of Restorative Dentistry During Orthodontics. What if Orthognathic Surgery is Not an Option?*
17:25	**Valentin Vervack:** *A Full-Digital Workflow for Nanoceramic Endocrowns: A 1-Year Prospective Study*	**Noland Naidoo:** *Mandibular Ameloblastomas: A comparison of Rehabilitation Techniques and their Functional Outcomes*	
17:35	**Aiste Gintaute:** *Clinical Aspects of Digital Technologies in an Inter Disciplinary Multiple-Implant Case*	**Ting Jiao:** *Design and Fabrication of Maxillofacial Obturators by Digital Technology Based on Integrating Multi-Source Data*	**Stefano Granata:** *Digital Oriented Treatment: New Protocols in Digital Workflow*
17:45	**Session Adjourns**		**Session Adjourns 17:55**
17:45 - 19:45	**Poster Session & Exhibit Reception**		

Friday, September 6th

(09:00 - 12:30)	**Esthetic Dentistry/Digital Technology** **Room: Effectenbeurszaal** Moderators: Daniel Wismejier & Wael Att	**Implant Prosthodontics I** **Room: Graanbeurszaal** Moderators: Carlos Parra & Guillermo Pradies	**Biology / Materials / Presentation by Award Recipients** **Room: Administratiezaal** Moderators: Mutlu Özcan & Xinquan Jiang
09:00	***Daniel Wismeijer:** *The Rendered Reality of Digital Dentistry. A Fake Reality?*	***David Chvartszaid:** *Are Strong Forces Detrimental to Osseointegration?*	***Xinquan Jiang:** *New Strategies for the Restoration of Oral-Maxillofacial Morphology and Function*

09:20	***Wael Att:** *Three-Dimensional Engineering in Dentofacial Rehabilitation*	***Terry Walton:** *Has the Evolution of the Implant-Abutment Interface Improved Long-Term Clinical Outcomes*	***Hiroshi Egusa:** *Emerging Approaches for Regenerative Prosthodontics*
09:40	***Brian Millar:** *Teaching Prosthodontics Internationally*	***In-Sung Yeo:** *Three-Dimensional Evaluation of Bone–Implant Interface in Endosseous Dental Implants*	**Jacqueline Lopez Gross:** *Bringing CLARITY to Astroglial Morphological Plasticity: Endodontics Vs. Extraction Effects*
09:50			**Shalinie King:** *A Diet High in Fat and Fructose Negatively Affects Osseointegration and Bone Metabolism in Rats*
10:00	**Ernesto Borgia:** *Is Direct Composite Resin the Most Efficient Material for Partial Restorations in Posterior Teeth?*	**Jaafar Abduo:** *Accuracy of Static Computer-Assisted Implant Placement: A Simulated Laboratory Study Comparing Fully-Guided and Semi-Guided Protocol*	**Nadja Rohr:** C*ment Gap – How Roughness and Cement Material Affect Biofilm Formation and Fibroblast Behavior*
10:10	**Carline van den Breemer:** *Clinical Evaluation of Partial Glass-Ceramic Posterior Restorations Luted Using Photo-Polymerized Resin Composite and IDS*	**Aris-Petros D. Tripodakis:** *Five-Year Volumetric Evaluation of Periodontally Compromised Sites Restored by Immediate Implant Restorations*	**Yunsong Liu:** *Fabrication and Application of a 3D-printed Poly(e-caprolactone) Cage Scaffold for Bone Regeneration*
10:20	**Emine Nisa Özdil:** *Clinic Outcomes of Zirconia Crowns and Fixed Dental Prostheses with Different Marginal Preparation Designs*	**Marco Peichl:** *Oral Health-Related Quality of Life in Patients Treated with "All-on-four" or Removable Implant Retained Restorations*	**Danielle Layton:** *On Methodology: How to Build a Search Strategy*
10:30 - 11:15	**AM Break / Exhibit Review**		
11:15	***Bassam Hassan:** *Integration of Functional Occlusion Using Virtual Articulation in CAD-CAM Full Mouth Prosthetic Rehabilitation*	**Francesco Pera:** *Esthetic and Biomechanical Requirements in Full-Arch Immediate Loading Rehabilitations*	**Teppei Ito:** *Influence of Matrix Transparency on Indirect Resin Composite Performance for Indirect Matrix Technique*
11:25		**Paolo Pera:** *Full-Arch Management with Minimum Number of Immediately Loaded Implants: 10-Year Follow-Up*	**Zhengyi Zhang:** *The Effects of MDP Micellar Solutions on Extrafibrillar Collgen Demineralization and Dentin Bond Performance*
11:35	***Marco Gresnigt:** *Partial Ceramic in Compromized Situations*	**Asher Zabrovsky:** *Esthetic Upgrade of an Existing Implant-Supported Single Crown in the Esthetic Zone*	**Ayben Bayrak:** *Evaluation of Marginal Fit of Different Preparation Designs Using Micro-Computed Tomography*
11:45		**Justinas Pletkus:** *Complete Digital Workflow and Immediate Functional Loading of Implant-Supported Monolithic Glass Ceramic Crowns*	**Sebnem Yilmaz:** *Is Color Masking Possible with the Combination of Polymeric Hybrid Material and Resin Cement Shade?*

11:55	**Sven Rinke:** *Retrospective Evaluation of Extended Heat-Pressed Ceramic Veneers After a Mean Observational Period of 10 Years*	**Francesco Bassi:** *Implant Rehabilitations and Geriatric Age: Considerations from Literature*	**EPA Prostho Contest Winner (1st Place): Simone Gismondi**
12:05	**Alon Preiskel:** *The Good, the Bad and the Ugly of Corporate Dentistry*	**Norina Forna:** *Digital Implant Planning and Guided Implant Surgery: A Clinical Case*	**EPA Prostho Contest Winner (2nd Place): Fausto Sommovigo**
12:15	***Nadim Baba:** *ACP Digital Dentistry Curriculum*		**ICP Education Grant Recipient's presentation: Mahmoud Elbashti**
12:25			
12:30 - 14:30	**Conference Luncheon & Exhibit Review**		
13:15 - 14:30	**ICP Business Meeting - Room: Effectenbeurszaal**		
13:15 - 14:30	**EPA Business Meeting- Room: Graanbeurszaal**		
(14:30 - 15:30)	**Denture Session sponsored by P&G** **Room: Effectenbeurszaal** Moderators: David Felton & David Bartlett	**Implant Prosthodontics II** **Room: Graanbeurszaal** Moderators: Ami Smidt & Timo Narhi	**Occlusion / Nutrition / Others** **Room: Administratiezaal** Moderators: Limor Avivi-Arber & George Papavasiliou
14:30	***Nadim Baba:** *Denture Adhesives: Where Can they be Beneficial for the Complete Denture Patients?*	***Ami Smidt:** *Aspects and Conditions in Treatment with a Single Implant Supported Crown Restoration in the Anterior Maxillary Area*	***Frank Lobbezoo:** *A Bite of Bruxism: Shifting Paradigms*
14:50		***Alberto Fonzar:** *Science and Art in the Prosthetic Rehabilitation of Patients Affected by Severe Periodontal Disease: A Critical Analysis*	***Limor Avivi-Arber:** *How the Brain Controls Everything: From Bone Remodeling, through Chewing Efficiency to Cognition*
15:00	***David Felton:** *Denture Adhesives - Prosthodontic Failure, or Acceptable Therapy?*		
15:10		***Izchak Barzilay:** *Implant Problem Solving and Trouble Shooting Over the Past 30 Years*	**Eldad Sharon:** *Centric Relation – Call for Reassessment of the Clinical Utility*
15:20			**Federico Amoroso:** *Bionic TM Robotic Articulator Over the Limit of Fully Adjustable Articulators*
(15:30-17:00)	**Geriatrics/RPDs** **Room: Effectenbeurszaal** Moderators: David Chvartszaid & Sun-Jong Kim	**Implant Prosthodontics II (Cont.)** **Room: Graanbeurszaal** Moderators: Ami Smidt & Timo Narhi	**Occlusion / Nutrition / Others (Cont.)** **Room: Administratiezaal** Moderators: Limor Avivi-Arber & George Papavasiliou
15:30	***Leonardo Marchini:** *The Science and Art of Patient Satisfaction*	***Egon Euwe:** *The Biologic Prosthetic Interface in Modern Esthetic Implantology: Revealing the Hidden Secrets of the Transgingival Part of the Implant*	**Ramtin Sadid Zadeh:** *Chairside CAD/CAM Technology for Rehabilitation of Worn Dentition*

15:40			**Ting Jiang:** *Research on FGP Recording on 3D Printed Diagnostic prosthesis for Functional Occlusal Morphology of Prosthesis*
15:50	***Sayaka Tada:** *Dilemma of Developing Dentistry in The Super Ageing Population: How can the burden of prosthodontic treatments be handled?*	**Jin-Hong Park:** *Splinted vs Non-Splinted Implant Attachments on Maxillary Four-Implant Overdentures: A Randomized Controlled Trial*	**Tomoya Gonda:** *Influence of Wearing Distal Extension Removable Partial Dental Prostheses on Occlusal Force to Anterior Teeth*
16:00		**Francesco Bagnasco:** *Evaluation of Internal and External Hexagon Connections in Immediately Loaded Full-arch Rehabilitations: A Split-Mouth Trial*	**Srđan Poštić:** *Compression Strains and Displacements of Particularly Designed Copings on Remaining Teeth for Overdenture Support*
16:10	***Yasuhiko Kawai:** *How Can We Implement the Result of the Clinical Trial in the Prosthodontics Practice?*	**Paola Ceruti:** *Single Implant Supported Mandibular Overdenture: 6 Years of Functional, Radiographic and Prosthetic Data*	**Hui Chen:** *Progressive Oral Rehabilitation and its Influence in Neurocognitive Activity*
16:20		**Manabu Kanazawa:** *The Patient General Satisfaction and Oral Health-Related Quality of Life of Single Implant Overdentures*	**Pooran Chand:** *A Computerized Tomographic Evaluation of MAD at Two Different Jaw Relation in OSA Patients*
16:30	***Anita Visser:** *Implant Dentistry in Frail Elderly: Blessing or Burden?*	**Avish Jagathpal:** *Comparison of Excess Cement at Implant Crowns Using Three Extraoral Cementation Techniques*	**Balendra Pratap Singh:** *Randomized Controlled Trial to Assess the Nutritional Status After Complete Denture and With/Without Food Supplements*
16:40		**Maria Menini:** *Peri-Implant Disease: Clinical Evidence and Future Perspectives*	**Francesca Giulia Serra:** *Nutritional Status and Life Quality in Mandibular Mini-Implants Retained Overdentures Wearers: A Pilot Study*
16:50		**Toshiki Nojiri:** *Therapeutic Effects of Surgical Debridement with Titanium Brushes and Autogenous Bone Graft on Severe Peri-Implantitis*	**Rijkje Bresser:** *Indirect Restorations with Deep Margin Elevation in the Posterior Region: A Long Term Evaluation*
17:00	**Session Adjourns**		
19:30 - 22:30	**Presidential Reception & Banquet** *(Elective-Pre registration required)* **Room: Grote Zaal**		

Saturday, September 7th

07:00 - 08:30	**ICP Board Meeting** *(Councilors only)* **Room: Veilingzaal**
(09:00 - 12:15)	**Science and Art in Prosthetic Dentistry** **Room: Effectenbeurszaal** Moderators: Jung-Suk Han & Rafael Martinez de Fuentes
09:00	****Lawrence Brecht:** *Facial Reconstruction to Facial Transplantation: Success Through a Team Approach*
09:30	****Carlo Poggio:** *Current and Future Trends in Prosthodontics*
10:00 - 10:45	**AM Break / Exhibit Review**

10:45	****Joke Duyck:** *On the Search for Better Oral Health (Care) for Frail Older Persons*
11:15	****Chris Wyatt:** *Dental Treatment Planning for Older Adults: Issues, Process, & Success*
11:45	*Discussion*
12:00	**Conference Announcements**
12:15	**Meeting Adjourns**
16:00 - 18:00	**Networking Social Outing** *(Elective- registration required)* **Canal Tour & Reception**

KEY

**: Keynote Speaker

* : Invited Speaker

Taking photos and/or videos of the presentations is strictly prohibited.
Kindly be sure to silence your cell phones and devices during the presentations.

Views expressed by the presenters at the ICP & EPA Meeting are solely their own and do not necessarily reflect the positions or policies of the ICP or EPA. The ICP & EPA reserves the right to cancel or modify its program as circumstances might dictate.

List of Poster Presentations

Listed by Presenting Author – Alphabetical (Last Name, First Name)

Last Name	First Name	Submitted Title
Abu-Awwad	Motasum	*When to do Cuspal Coverage for Posterior Vital Teeth and Endodontically Treated Teeth?*
Abuzar	Menaka	*Removable Prosthodontic Prescriptions: How do Students Compare with Clinicians?*
Agop-Forna	Doriana	*Laser-Assisted Minimal Invasive Therapy in Dentistry*
Agop-Forna	Doriana	*Study Regarding Classic Versus Erbium Laser-Assisted Frenectomy in the Proprosthetic Stage*
Ahn	Minzin	*Dynamic Functional Impression Technique Using Tissue Conditioner for Mandibular Removable Partial Denture: A Case Report*
Al Ameri	Muna	*Investigating the Affect of Eliminating the Silanation Stage by Inclusion Within Resin-Cements When Adhering Ceramics*
Almazrooei	Banan	*The Oral Health Status of Attendees and Residents in UAE Care Homes*
Alsaggaf	Arwa	*Effect of Denture Wear on Residual Ridge in Edentulous Patients: Case Control Study*
Al-Sahan	Maha	*Developing a Metatheory of How People Manage Tooth Loss*
Alshikh	Ayesha	*Effectiveness of Spray Disinfectants on Dental Impressions*
Altıntaş	Sebile	*Prosthetic Rehabilitation of a Bruxist Patient with Severe Dental Wear*
Amichia-Alloh	Yomin Cécile	*Innovation in the Design of the Palatal Plate of Immediate Obturator Prostheses*
Arıkan	Hale	*Immediate Provisionalization of an Implant Placed in Fresh Socket for the Replacement of Maxillary Incisor*
Auskalnis	Liudas	*Effect of Intraoral Scanner, Printer and Digital Analog System on Accuracy of 3D Printed Models*
Avukat	Esra Nur	*Cytotoxic Evaluation of Zirconium Oxide Nanoparticles Additive to Acrylic Base Material*
Avukat	Esra Nur	*Influence of Different Argon Plasma Irradiation Time on Shear Bond Strength of Y-TZP Zirconia Resin Interface*
Aygun Cimentepe	Elif	*Digitally Fabricated Glass-Ceramic Versus Nanoceramic Veneers: A Split-Mouth Study*
Bagis	Bora	*Effect of Non-Thermal Plasma on the Bond Strength of Glass Ceramics with Resin Cements*
Basso	Matteo	*Evaluation of the Accuracy and Precision of 5 Intraoral Digital Scanners: An In-Vivo 3dimensional Analysis*
Batak	Burcu	*Effect of Home Bleaching Treatment on the Translucency of Novel CAD-CAM Ceramic Materials*
Bei	Maria	*The Use of the Copy Denture Technique to Fabricate a Treatment Denture. A Case Report*
Bellia	Elisabetta	*Immediate Loading of Mandibular Overdentures Retained by Two Mini-Implants: 3 Years Follow Up Results*
Berze	Ildikó	*Prosthetic Classification of Missing Teeth Providing Possible Treatment Options*
Bhandari	Sudhir	*Factors Affecting Mouth Opening in Head and Neck Cancer Patients: Preliminary Data in 322 Patients*
Bhandari	Sudhir	*Retaining Interim Obturator in Completely Edentulous Patients with Bilateral Maxillectomy*
Biagioni	Annalisa	*Learning Curve of an Intraoral Digital Scanner on Sound Teeth*
Bianchi	Alessandro	*17-Year Follow-Up of 26 Implant-Retained Removable Partial Dentures*
Biçer	Mehmet	*Analysis of Marjinal Discrepancy of Metal-Ceramic Crowns with Laser Sintering Method*
Bicheru	Madalina	*Dry Mouth Syndrome and Oral Health in Nursing Home Residents with Complete Dentures*
Bocca	Norma	*Differences Between a Traditional and an Innovative Method of Impression to Restore a Maxillofacial Defect*

Last Name	First Name	Submitted Title
Bortolini	Sergio	*Toronto "Snap": A New Technique in Fixed Implant Prosthodontics*
Bujak	Bartosz	*Evaluation of Using a Single Implant as a Support Element for the Lower*
Burduroglu	Defne	*In-Vitro Comparison of Mechanical and Physical Properties of Various Provisional Restoration Materials*
Cai	Xinjie	*A Thermosensitive Chitosan-Based Hydrogel for Sealing and Lubricating Purposes in Dental Implant System*
Cal	Ebru	*Comparison of Adhesive Bonding Effectiveness of Resin-Cements and Flowable-Composites in Luting Glass-Ceramics to Dentine*
Carrabba	Michele	*Cement Opacity and Color as Influencing Factors on the Final Shade of Ceramic Restorations*
Celebic	Asja	*Mini-Implants Supported Kennedy Class I Removable Partial Dentures - A 3-Year Follow-Up Outcomes*
Chalazoniti	Aspasia	*Telescopic Removable Restoration in The Maxilla – A Case Report*
Charvát	Jindřich	*Implant and Root - Supported Overdentures and Fuction of Mechanoreceptors*
Chatziparaskeva	Maria	*LLLI Effect on Biological Behavior of Implant Abutment Materials*
Chen	Ji-Hua	*Properties of Urethane-Based Adhesives with Different Concentration of Acetone*
Cheng	Hui	*Apoptotic and Autophagic Effects of Dental Alloys Manufactured by Different Methods Based on 3D OMM*
Chu	Rosemary	*Complications with Refurbishing of Implant-Supported Fixed Dental Prostheses: A Case Report*
Chu	Cheng An	*An Alternative Direct-Indirect Method to Fabricate Multiple Casting Post-And-Cores in Severely Worn Dentition*
Chuka	Richelle	*Predictive Factors of Outer Cortex Loss in Advanced Jaw Reconstruction*
Çiçekci	Gökhan	*Rehabilitation of Maxillary Defect with Implant Supported Screw Retained Hybrid Prosthesis – A Case Report*
Claudio Contreras	Lisseth Patricia	*Surface Gas-Phase Fluorination for Bonding Monolithic Zirconia Restorations *Winner of the Ivoclar Vivadent / ICP Research Fellowship in Dental Restorative Materials*
Cross	Laura	*Tooth Auto-Transplantion: An Alternative Option for Anterior Single Tooth Replacement*
Damlaj	Ousama	*Diagnosis and Early Management of a High Smile Line Partially Edentulous Patient: A Case Report*
D'Arienzo	Luigi Federico	*Learning Curve of an Intraoral Digital Scanner on Natural Abutments*
Daya Roopa	Variza	*Rehabilitation of an Unusual Presentation of Ossifying Fibroma with Complications*
Delucchi	Francesca	*Implant-Prosthetic Rehabilitation Using Zygomatic Implants and a Carbon Fiber Framework*
Deng	Hongyan	*Curative Effect Observation of Occlusal Reconstruction with Increasing Occlusal Vertical Dimension*
Dholam	Kanchan	*Retrospective Case Series of Rehabilitation of Facial Defects with Patch Prosthesis*
Dian	Arturo	*Evaluation of the Accuracy of 4 Intraoral Digital Scanners When Used by Untrained Dentist*
Dirse	Julius	*Repositioning Accuracy of Implant Prosthetic Components Used for Digital and Conventional Workflow*
Dutt	Pranjali	*Knowledge and Practice About Oral Hygiene by Tribal Women of Uttar Pradesh - A Community Based Study*
Elbashti	Mahmoud	*Feasibility of Intraoral Scanners in Digitizing Maxillectomy Defects: An in Vivo Study*
Elovaara	Anton	*Effect of Bonding and Post Length to the Dislodgement Characteristics of Fiber Reinforced Composite Post*
Fasoula	Maria	*Translucency of Monolithic Zirconia After Aging. A Systematic Review*
Faydali	Özge	*The Effect of Denture Cleaners on the Color Parameters of Artificial Denture Teeth*

Last Name	First Name	Submitted Title
Ferrari Cagidiaco	Edoardo	*RCT on Lithium Disilicate Partial Crowns Using a Novel Prosthodontic Functional Index for Teeth (FIT)*
Forna	Norina	*Digital Implant Planning and Guided Implant Surgery: A Clinical Case*
Frugone Zambra	Raul	*Finding Occlusal Plane Orientation Based on Skulls Morphology, Occlusometry and VD-Meter*
Fukazawa	Shota	*Accuracy and Reproducibility of Abutment Position in Intraoral and Extraoral Scanning*
Gallo	Giulia	*A Randomized Controlled Trial of Two Lithium Disilicate Partial Crowns: 3-Year Results*
Gao	Jing	*Minimally Invasive Tooth Preparation with Customized 3D Printed Guide in Digital Ceramic Veneer Restoration*
Garg	Deepti	*Correlation Between the Steepness of the Articular Eminence and Occurrence of Anterior Disc Displacement*
Gassino	Gianfranco	*Effects of an Intraoral Stent on Side Effects of Radiation Therapy*
Gedrimiene	Agne	*In Vitro Study on Digital Splint Effect to the Accuracy of Digital Dental Implant Impression*
Grossi	Marcio	*Bruxism Assessment Questionnaire: A New Validated Questionnaire for Bruxism Diagnosis*
Habibzadeh	Sareh	*Does Selection of Post and Core Material Influencet the Fracture Strength of Endodontically Treated Teeth?*
Han	Tianxiao	*RNA-Seq Analysis of Rbmmscs on Tio2 Nanotube Arrays*
Hasanzade	Fidan	*Evaluating the Color Stability of Various Denture Liners: Comparison of CIE and CIEDE 2000 Formulas*
Hasanzade	Fidan	*Functional and Esthetic Rehabilitation of a Young Patient with Amelogenesis Imperfecta*
Hatta	Kodai	*Occlusal Force Predict Decline in Cognitive Function in 3-Year*
Hatta	Minori	*Effect of Priming Agents on Shear Bond Strength of IPN Fibre-Reinforced-Composite*
Hayashi	Shoji	*Long-Term Performance of Electroforming Telescopic Double Crown Removable Prostheses*
Hong	Seoung-Jin	*Combining Conventional Impressions and Intraoral Scans for the Management of Flabby Tissue*
Huang	Cui	*High-Performance Therapeutic Resveratrol-Doped Adhesive for Adhesive-Dentin Interfaces*
Huang	Po-Ju	*Evaluation the Strain Distribution Between Milled, 3D Printing and Conventional Denture Base*
Huang	Bo	*Repeated Fractures of the Fixed Implant-Supported Metal-Acrylic Prostheses: A Case Report*
Ikawa	Tomoko	*Reproducibility of Scanned 4 Silicone Impressions Via a Laboratory Scanner*
Imre	Marina	*Digital Aesthetic Preview for Edentulous Patients. A Case Report*
Isik-Ozkol	Gul Bahar	*Implant-Supported Overdenture Treatment Complications*
Isik-Ozkol	Gul Bahar	*The Oral Health-Related Quality of Life in Patients Treated with Implant Prostheses*
Iwaki	Maiko	*Complications of Immediate Loading of Two-Implant Mandibular Overdentures: 5-Year Prospective Study*
Jang	Gaejun	*Speech Improvement Using Palatal Lift Prosthesis in Myopathy Patients*
Kaffaf	Berk	*Knowledge of Removable Partial Denture Design Among Dentists, Dental Technicians and Students in Turkey*
Kane	Brittany	*A Stem Cell-Laden Photocrosslinkable Adhesive Hydrogel for Treatment of Peri-Implantitis*
Kane	Brittany	*Tunable Nanolayered Titanium Dental Implants Coatings for Enhanced Osseointegration*
Kaptanoglu	Asena	*Partial Laminate Veneers in Broken Teeth - Case Series*
Karsila	Ville	*Clinical Evaluation of Short-Fiber Reinforced Composite Resin Restorations and Glass-Ceramic Endocrowns in Endodontically Treated Molars*
Katheng	Awutsadaporn	*Effect of Stereolithography Post-Curing in Different Conditions on the Fitting Accuracy of Photopolymer 3D Resins*

Last Name	First Name	Submitted Title
Kaya	Umut	*Full-Digital Protocol for the Design-Fabrication of Monolithic Feldspathic Ceramic Endocrowns Luted Semi-Erupting Permanent First Molars*
Khan	Sadika	*Are Systematic Reviews the Panacea for Evidence Based Dentistry?*
Kim	Soyeun	*Mandibular All-On-4 Implant Restoration Considering Maintenance*
Kim	Sun Jong	*Posterior Maxillary Osteonecrosis of Jaw Related Dental Implants: A Retrospective Study*
Kim	Ye-Ji	*Complete Denture Rehabilitation of Edentulous Patients Using Suction Denture: A Clinical Report*
Kim	Jinwan	*Clinical Evaluation of Lithium Disilicate Pressed Zirconia and Monolithic Zirconia in Posterior Implant-Supported Prostheses*
Kim	Jinseon	*Accuracy of Implant Impression Techniques: Comparison Between Conventional and Digital Method*
Koga	Sayuri	*Impact of Oral Hygiene Instruction on Maxillofacial Prosthetic Patients*
Koishi	Yukiko	*Elucidation of Pathophysiology with Longitudinal Study of Subchondral Cyst Utilizing MRI in TMD Patients*
Kokkoni	Magdalini	*Resin Bonded Bridges as a Treatment of Choice: Clinical Behavior and Updated Considerations*
Koli	Dheeraj Kumar	*Masticatory Efficiency and Bite Force Changes in Complete Denture with or Without Soft Liner*
Kovacic	Ines	*Marginal Bone Loss in Short Mini-Dental Implants as Complete Mandibular Overdenture Retainers: 1-Year Cohort Study*
Kreulen	Cees	*Microleakage with the Elevated Margin Technique of Full Ceramic Crowns*
Kuoppala	Ritva	*Impact of Pain-Related Disability on Treatment Outcome in TMD Patients*
Kusumoto	Yuriko	*Effects of Types of Implant Prostheses on Oral Health-Related Quality of Life in Edentulous Patients*
Kwon	Kung-Rock	*Cementless Fixation (CL.F) System: A Novel Type of Dental Implant Prosthesis*
Lalama	Martin	*3D Accuracy Analysis Between Heat-Pressed and CAD-CAM Polyetheretherketone (PEEK) Post and Core Restorations*
Lan	Yi-Hao	*Design of Substructure and Suprastructure for Excessive Vertical Restoration Space: A Case Report*
Lee	Jae-Hyun	*Implant-Assisted Removable Prosthesis Design for a Patient with Recurrent Ameloblastoma: A Clinical Report*
Lee	Jong Hyuk	*Shear Bond Strength Between CAD/CAM Denture Base and Artificial Teeth Using Resin Cement*
Lee	Jeong-Yol	*Treatment Outcomes of Mandibular ISRPD in Kennedy Class I Patients: A Systematic Review and Meta-Analysis*
Lee	Hyeonjong	*A Digitally Optimized Occlusion Concept on Implant Prostheses*
Lee	Younghoo	*Complete Denture Fabrication Using Non-Dental CAD Software with Customized Resin Blocks*
Liang	Shanshan	*Digital-Conventional Methods for Oral Rehabilitation of Defective and Severely Worn Dentition: A Case Report*
Lin	Hui-Yi	*Swing-Lock Removable Partial Denture in Mandible with Few Remaining Teeth: A Case Report*
Linardou	Maria	*Approaching the Partially Edentulous Mandible Through Guided Implant Placement and Immediate Loading*
Loster	Jolanta	*Evaluation of the Effectiveness of Teaching TMD Examination Using the RDC/TMD Axis I*
Luchetti	Cesar	*Screwed Framework with Abutments for Cemented Prosthesis in Complex Implant Cases*
Ma	Sunyoung	*Are Digital Impressions as Accurate as Traditional Dental Impressions?*
Ma	Sunyoung	*Reliability of RFA in Assessing Implant Stability: A Retrospective Analysis*
Makihara	Eri	*Evaluation of the Compliance of Two Types of Oral Appliances for Five Patients with OSA*
Masumi	Shin-Ichi	*A Case of Lower Removable Partial Denture with Stud, Intracoronal and Extracoronal Dental Magnetic Attachment*

Last Name	First Name	Submitted Title
Mckenna	Katy	*Abutment Screw Loosening in Angulated Implants at Varying Degrees: An in Vitro Study*
Medic	Vesna	*Aesthetic Management of Patients with Congenital Anomalies–Case Report*
Meng	Dan	*A Case of Implant Restoration in Aesthetic Area of Anterior Teeth*
Michael	Michael	*Comparison of Different Methods for Rehabilitation of Maxillary Defects*
Milic Lemic	Aleksandra	*The Impact of New Dentures on Salivary Stress Markers Values in Complete Dentures Wearers*
Mishra	Niraj	*A Study to Evaluate the Efficacy of Cerrobend Shielding Stents in Preventing Adverse Radiotherapeutic Effects*
Miura	Shoko	*Evaluation of Abutment Tooth Color, Cement Color, and Different Thickness of Computer-Aided Design/Computer-Aided Manufacturing Blocks*
Miyoshi	Keita	*Effects of Different Types of Intraoral Scanners and Scanning Ranges on Digital Impression Precision*
Molinero Mourelle	Pedro	*Fit and Microleakage of Implant-Supported Abutments*
Montaldo	Enrico	*Retrospective Analysis of Implant Prosthetic Rehabilitations Over a Period Of 25 Years*
Mori	Daizaburo	*Proposal for Fabrication of Models Next Generation Material*
Morita	Miyako	*Comparison of Mandibular Movements Between CAD and Conventional Articulator*
Motevasselian	Fariba	*A Review on Monolithic Translucent Zirconia*
Mothopi-Peri	Matshediso	*Is There a Place for the Removable Partial Dentures in the Post Implant Era?*
Motta	Chiara	*Fibronectin Adsorption and Osteoblastic Response of a Rough Titanium Surface Compared to Machined Titanium*
Murat	Sema	*Fabrication of Obturator Prosthesis by Using Digital Technology*
Nagaoka	Kento	*Mechanical Properties and Microstructure of Novel Lithium Disilicate Glass Ceramic Block for CAD/CAM*
Nakai	Nobuyuki	*Oral Health-Related Qol of Non-Metal Clasp Dentures and SDA with Unilateral Mandibular Distal-Extension Edentulism*
Nakazato	Yukari	*Inhibitory Effects of Vibratory Stimulus Via an Occlusal Splint on Sleep Bruxism*
Narimatsu	Ikue	*Epithelial and Connective Tissue Sealing Around Titanium Implants with Various Typical Surface Finishes*
Naveau	Adrien	*3D-Printing Offers New Impression Procedures to Overcome Severely Limited Mouth Opening: About Two Cases*
Nethononda	Portia Tshimangadzo	*Design and Fabrication of a Facial Prosthesis with Immediate Loading Following Rhinectomy*
Nikitina	Evija	*Reduced Bone Mineral Density Association with Radiographic Signs of Degenerative Joint Disease in the TMJ*
Nishiyama	Hirotaka	*Fabrication of Removable Partial Dentures by Fully Digitalized Workflow: A Case Report*
Niu	Lin	*Corrosion Behavior of Passive Films on Vitallium Casting Alloy in Simulated Oral Environment with Fluoride*
Nowak	Magdalena	*Change in the Concentration of Volatile Sulfur Compounds in Patients Using Removable Dentures*
Ogawa	Toru	*Electromyographic Analysis of Masseter Motor Unit Activity Using Multi-Channel Surface Array-Electrodes with Modified Spike-Triggered Averaging*
Ogino	Yoichiro	*Clinical Assessment of Maxillary Sinus Floor Augmentation Using Carbonate Apatite: A 30-Month Follow-Up Study*
Okazaki	Yohei	*Antibacterial Dental Adhesive Containing Cetylpyridinium Chloride Montmorillonite*
Omondi	Ben	*Combined Prosthodontic and Surgical Management of Patients with Amelogenesis Imperfecta: Case Series of Three Patients*
Ordueri Kilavuz	Tugce Merve	*Maxillary Molar Intrusion by Using Mini Implants for Prosthetic Rehabilitation: Case Report*
Ortensi	Luca	*A Fully Digital Workflow Changes the Approach to Dentistry: A Case Study*

Last Name	First Name	Submitted Title
Osman Latib	Yasmin	*A Preliminary Study on the Accuracy and Cost of a Digital Workflow for Metal-Based Frameworks*
Ou	Shiu Fong	*Managing Angulated Implants in Atrophic Fully Edentulous Maxilla with Implant Supported Overdenture*
Owen	C Peter	*Cross Contamination During Denture Fabrication*
Özmen	Mehmet Fatih	*Multidicipliner Management of Missing Maxillary Lateral Incisors in Patient with Oblique Occlusal Plane: Case Study*
Özmen	Mehmet Fatih	*Peri-Implant Soft Tissue Healing with Using Provisional Restorations After Flapless Postextraction Socket Implant Placement*
Pantea	Mihaela	*Comparative Study on Dimensions of 3D Printed Dental Models Obtained After Intraoral and Extraoral Scanning*
Papavasiliou	George	*Exploring Different Modules for the Restoration of the Edentulous Maxilla*
Park	Taemin	*Retrospective Clinical Evaluation of Implant-Assisted Removable Partial Dentures Combined with Implant Surveyed Prostheses*
Parra	Carlos	*Digital Smile Design in the Interdisciplinary Management of an Attrition Patient, 4y Follow-Up*
Pei	Dandan	*Does Probiotic Lactobacillus Have Therapeutic Effect on Peri-Implant Diseases: A Systematic Review and Meta-Analysis?*
Pei	Dandan	*Effect of Nano-Hydroxyapatite Containing Desensitizing Toothpastes on the Bonding Performance of Two Self-Etch Adhesive Systems*
Pesson	Delon Muller	*Fixed Prosthodontics in Cote D'ivoire, West Africa: Knowledge and Practices of CAD/CAM*
Phang	Zi Ying	*Hybrid Digital–Analog Workflow in Fabricating Orbital Prosthesis: A Case Report*
Pozidi	Georgia	*In-Vitro Investigation of the Surface Topography of Zirconia Implant Abutments After Different Polishing Protocols*
Qafmolla	Alketa	*The Biological Principles of the Teeth Preparation for Fixed Restoration (Experimental – Clinical Study)*
Qianju	Wu	*Study on the Clinical Effect of Difference Between Digital and Traditional Impression for Fixed Restoration*
Radovic	Katarina	*The Cellular Response of Denture –Bearing Tissues on Mechanical Stress in Diabetic Conditions*
Rahmat	Maria	*Three-Dimensional Accuracy of Implant Analogs in Three-Dimensional Printed Resin Models*
Rani	Padmini	*Biomechanics of Immediately Loaded Implants Based on All-On-Four Concept-in Vitro Study*
Regazzoni	Alberto	*Laser Surfice Texturing to Guide Implant Roughness: A Preliminary Survey on Osteoblast Adhesion*
Rizonaki	Maria	*Comparative Analysis of Internal and Marginal Fit of Lithium-Disilicate CAD-CAM Crowns with Different Finish Lines*
Roulet	Jean-Francois	*Strength of a Zirconium Oxide Ceramic Produced with an Alternative Production Process*
Sa	Yue	*Multidisciplinary Approach for Functional and Esthetic Implant Supported Reconstruction in the Aesthetic Area*
Sahin	Dilara	*Three Patients Treated with Different Hybrid Prosthesis: Case Series*
Şahinbaş	Abdurrahman	*The Flexural Strength, Surface Hardness and Surface Roughness of 3D Printed Denture Base Material*
Salazar Marocho	Susana Maria	*Er,Cr: YSGG Laser Through Y-TZP Ceramic for Debonding Purposes: Pulse Rate Effect at Low Power Settings* **Winner of the Ivoclar Vivadent / ICP Research Fellowship in Dental Restorative Materials*
Santana	Roberto	*Effects of Two System Post on Failure Patterns on Endodontically Treated Mandibular Premolars*
Sarafianou	Aspasia	*Occlusal Rehabilitation of Class Ii Adult Patients Using a Prosthodontics-Centered Multidisciplinary Approach: A Clinical Report*
Sato	Naoko	*Fibular Reconstruction of Mandibule with Virtual Surgical Planning*

Last Name	First Name	Submitted Title
Sayin	Bahar	*Follow-Up After 6 Months of Definitive Single Implant-Supported Crowns Impressioned by Using Hind's Technique*
Seckin	Özge	*Comparison of PEKK (Poly-Ether-Ether-Kethone) and Zirconia Based Different Ceramic Veneer Systems on the Fracture Resistance*
Shakibpour	Mani	*Aesthetic Considerations of Anterior Fixed Restorations*
Shanker	Rama	*Evaluation of Clinical Outcome in Early Loaded Implants with Different Implant System*
Shigemoto	Shuji	*New Concept of Rotation Axis for Analyzing Mandibular Movements*
Shinya	Akikazu	*Effect of Cavity Depth on Bond Strength of Different Types of Bulk Fill Composites*
Shoji	Takumi	*Physical Properties of New Hybrid Resin Block for CAD/CAM*
Slaidina	Anda	*The Impact of General Bone Mineral Density on the Edentulous Mandible*
Sohmat	Phibadahun	*An Evaluation of the Efficacy of Two Prosthesis in Palatopharyngeal Incompetency Patients*
Sone	Mineyo	*Aesthetic Evaluation of Peri-Implant Soft Tissue - The Influence Exerted by the Observer's Clinical Experience*
Song	Young-Gyun	*Study on Physical Properties and Effect on Osseointegration by Surface Treatment of Zirconia*
Sozen Yanik	Irem	*Tooth - Supported Overdentures Retained with Root Canal Anchors: Case Series*
Su	Ting-Shu	*Properties of Novel Dental Zirconia Materials: A Pilot Study*
Sun	Jian	*Translucency and Micro-Shear Bond Strength of Novel Dental Zirconia Materials: A Pilot Study*
Symeonidis	Panagiotis	*Investigation of Micro-Structural and Nano-Mechanical Properties of Monolithic Zirconia Ceramics Before and After In-Vitro Aging*
Takaoka	Ryota	*Prosthodontic Recovery of a Patient with Severe Central Incisors Root Resorption Associated with Impacted Canines*
Tan	Ken	*Teleconsultation in Determination of Tooth Restorability*
Tan	Zhi Hui Janice	*3-D Positional and Mating Accuracy of Intraoral and Laboratory Implant Scan Bodies*
Tancu	Ana Maria Cristina	*Correlations Between General Health Status and Materials Used for the Subtotal Edentulous Patient Treatment*
Tangül	Mustafa Burak	*Two Different Retention Systems for a Bar Retained Overdenture*
TAS	Nevin	*Shear Bond Strength of Resin Cement to Zirconia Ceramic After Aluminum Oxide Sandblasting*
Tealdo	Matteo	*One Stage Technique Vs Two Stage Technique for Placement of Extra-Short Implants: A Multicenter Study*
Tezvergil-Mutluay	Arzu	*Mechanical Performance of CAD/CAM Restorative Materials After Erosive Challenge*
Tonogai	James	*Long-Term Outcomes for a Patient with Fixed Implant-Supported Prostheses Over a 27-Year Period: Case Report*
Toska	Melania	*Clinical Dilemmas in Restoring Teeth in the Anterior Esthetic Region: Case Report and Literature Review*
Tsai	Fu-Chuan	*Comparison of Accuracy of Complete Dentures Fabricated with CAD/CAM Technology*
Turkoglu	Pinar	*Using DSD and Prosthetically Guided All-On-4 Surgery for the Esthetic and Functional Rehabilitation of Edentulous Maxilla*
Turkoglu	Pinar	*Effect of Implant Abutment and Cement Color on the Final Color of Monolithic Zirconia Crowns*
Uluc	Irem Gokce	*Maintenance of One-Piece Full-Arch Hybrid Prostheses: Short Term Clinical Follow-Up*

Last Name	First Name	Submitted Title
Van Der Linde	Schalk	*A Novel Surgical Guide for Large Mandibular Dentoalveolar Defects: An Appropriatech Method*
Vardanyan	Anna	*Biomechanical Comparison of Inclination and Length of Implants in All-On-Four Concept by Finite Element Method*
Vardar Kosun	Nalan	*Preparing the Emergence Profile and Gingival Contour in Implant Supported Crowns: A Case Report*
Varon- Shahar	Einat	*A Murine Peri-Implantitis Model: Characterization and Comparison to Periodontitis*
Vasilaki	Dimitra	*Prosthetic Options and Considerations for the Missing Tooth in the Anterior Esthetic Region*
Vavrickova	Lenka	*Digital Versus Conventional Impression in Fixed Prosthodontics: The Patients´ View*
Vervack	Valentin	*A Full-Digital Workflow for Nanoceramic Endocrowns: A 1-Year Prospective Study*
Wang	Lili	*Severe Periodontitis-Induced Dentition Loss All-On-4 Immediate Implant Restoration Short-Term Efficacy Observation*
Wang	Wan-Ting	*The Effect on Bond Strength of New Type Tissue Conditioner With Addition of PMMA Resin*
Wang	Jie	*Enhanced Osseointegration and Biocompatibility of Mg-Al-LDH Nanosheet Patterned Pore-Sealed PEO Bilayer Coating on Magnesium*
Wang	Ying-Hui	*Aesthetic Restoration of Maxillary Incisor with Implant: A Case Report*
Wang	Yuhua	*Digital Four - Dimensional Virtual Prediction and Realization Technology in Aesthetic Restoration of Anterior Teeth*
Wang	Yake	*Color Stability of Dual-Cured Resin Cements Containing with or Without Alternative Photoinitiators*
Watanabe	Takafumi	*Evaluation of Treatment Effects of Oral Appliance at Different Mandibular Positions for Patients with OSA*
Wen	Jin	*IGSF10: An Old/New Factor Benchmarked to BMP2 and Implications in Bone Regeneration*
Wheeler	Julie	*Evaluation of the Effects of Polishing Systems on Surface Roughness and Morphology of Composite Resin*
Wieczorek	Aneta	*Influence of Oral Hygiene on Fungal Growth in Patients – Users of Removable Dentures*
Wiśniewska	Kamila	*Lymphatic Response to Trauma-Induced Inflammation After Vital Teeth Preparation for Fixed Prosthesis*
Wiśniewska	Kamila	*The Effect of the Er: YAG Laser Decontamination Process on the Surface of Two Titanium Alloys*
Wong	Jin Lin	*Sectional Maxillary Complete Denture in a Patient with Microstomia: A Clinical Report*
Wu	Lin	*Effect of Collimated and Focused Low-Intensity Pulsed Ultrasound Stimulation on Bone Repair*
Wu	Yuqiong	*Fabricate a Removable Partial Denture for a Microstomia Patient by Using Digital Intraoral Impression: A Clinical Case Report*
Xhajanka	Edit	*The Correlation Between Cervical and Body Damages From Using of the Mobile Phone*
Xin	Xianzhen	*Delivery Vehicle of Muscle-Derived Irisin Based on Silk/Calcium Silicate/Sodium Alginate Composite Scaffold for Bone Regeneration*
Xiong	Yaoyang	*Optical and Mechanical Properties of Novel Zirconia*
Xu	Chun	*The Application of Individualized Abutment-Crown Integrated Provisional Restoration in Optimizing the Peri-Implant Soft Tissue Contour*
Xu	Lianyi	*Histological Change of Ossification/Osseointegration Within the Center Of BMP-2 Enhanced Tissue-Engineered Bone on Rabbit Models*
Xu	Yichen	*The Peel Bond Strength Between 3D-Printing Custom Tray Materials and Elastomeric Impression/Adhesive Systems*
Yang	Hongye	*Resveratrol Pretreatment Improves Dentin Bonding Durability*
Yi	Yuseung	*The Effect of Cyclic Loading on CAD-CAM Abutment in Morse Taper Internal Type Implant*

Last Name	First Name	Submitted Title
Yi	Lu	*Comparison of Crown Fitness and User-Friendliness Between Tooth Preparation with Electric and Air-Turbine Handpieces*
Yoon	Sena	*Tissue Surface Adaptation of 3D-Printed Complete Denture Base: In-Vivo Studies*
Yu	Hao	*Effects of Staining Beverages on the Effectiveness of In-Office Tooth Bleaching: A Randomized Controlled Trail*
Yu	Chun-Hua	*Comparison of Three Conservative Treatments for Myofascial Pain with Limited Mouth Opening: A Retrospective Study.*
Zeng	Jianyu	*Influence of Two Planting Methods on Stress Distribution Within Insufficient Available Bone Width*
Zeng	Deliang	*Enhanced Osseointegration Around Biofunctional Polyetheretherketone Fabricated by Electron Bean Evaportion*
Zenziper	Eran	*Therapeutic Approaches, the Treatment and Follow-Up of Heavy Bruxers with Full Mouth Rehabilitations*
Zhai	Ying	*Comparison of Supporting-Area of Complete Dentures in Patients with Different Degrees of Bone Resorption*
Zhang	Shaoping	*Conservative Management of Discolored Anterior Teeth: A Case Report*
Zhou	Yi	*Keratinized Mucosa Augmentation Before Implant Placement? - An Experimental Study in Canine Model*
Zhu	Ziyuan	*Digitally Designed and Three-Dimensional Printed Die for Fixed Denture Fabrication*
Živković	Rade	*An Anthopometric Study of Craniofacial Measurements and Their Correlation with Vertical Dimension of Occlusion*

Keynote & Invited Speakers

Keynote Speakers

Lawrence Brecht
Institute of Reconstructive Plastic Surgery
New York University-Langone Medical Center
Jonathan & Maxine Ferencz Advanced Education Program in Prosthodontics
New York, NY USA

Lawrence E. Brecht, DDS, is the Director of Maxillofacial Prosthetics in at New York University College of Dentistry in the Jonathan & Maxine Ferencz Advanced Education Program in Prosthodontics. He has a joint appointment at the Department of Otolaryngology-Head & Neck Surgery of NYU Langone Health. Prior to its dissolution, he was the Director of Craniofacial Prosthetics at the Institute of Reconstructive Plastic Surgery, Hansjörg Wyss Department of Plastic Surgery at NYU Langone for 25 years. In addition, he is the Director of Maxillofacial Prosethetics at Lenox Hill Hospital of the Northwell Health System and is a Visiting Professor at MD Anderson Cancer Center in Houston, Texas. Dr. Brecht received his DDS from New York University and completed a residency at Boston's Brigham & Women's Hospital and a Fellowship at Harvard School of Dental Medicine. He then earned his Certificates in both Prosthodontics, as well as Maxillofacial Prosthetics from the New York Veterans Administration Hospital. In addition to memberships in many prosthodontic organizations, he is a past-president of the Greater New York Academy of Prosthodontics as well as a past-president of the American Academy of Maxillofacial Prosthetics. Currently, he serves as the President of the Maxillofacial Foundation. He is a frequent contributor to the plastic and maxillofacial prosthetics literature and serves as a reviewer for several prosthodontic and surgical journals. He is one of the developers of nasoalveolar molding (NAM) for early cleft management and the "Jaw-in-a-Day" (JIAD) concept for reconstruction of the mandible and maxilla. Dr. Brecht serves on the Medical Advisory Board of NextGenFace, a charitable organization that supports children with craniofacial conditions and their families. He also maintains a practice limited to prosthodontics and maxillofacial prosthetics in New York City.

ABSTRACT:
Facial Reconstruction to Facial Transplantation: Success Through A Team Approach
The art and science of reconstruction of the mandible and maxilla has rapidly progressed due to the advent of virtual surgery. The development of computer-aided, three-dimensional planning along with computer-fabricated surgical splints and cutting jigs now allow for a prosthetically-driven, occlusally-based rehabilitation in combination with unprecedented precision in surgical reconstruction of form and function. The culmination of technology employed in an active multidisciplinary team setting has resulted in the ability to deliver an implant-supported prosthetic rehabilitation for the mandibular or maxillary resection patient during a single reconstructive surgical episode. This presentation reviews the evolution of the collaborative effort of our team of an oral and maxillofacial surgeon, a microvascular plastic surgeon and a maxillofacial prosthodontist in optimizing the outcomes in our mandibular resection patients.

Hugo de Bruyn
Professor
Periodontology & Oral Implantology
Ghent University
Groningen, The Netherlands

Hugo De Bruyn graduated in Leuven Belgium, got his PhD from Groningen University The Netherlands and was research fellow at the Lund University (Malmo Sweden). He had a referral clinic in Brussels combined with an associate professorship in Malmo and later visiting professorship. He is currently part-time professor Periodontology and Oral Impantology at Ghent University and chairman of the Specialist programme. Currently he chairs the dental school at Radboud Medical Center in Nijmegen The Netherlands and is professor Periodontology. He published over 200 peer-reviewed papers and has given over 500 international lectures in the field of periodontology and implant dentistry.

ABSTRACT:
The Future is Now: The Coming 20 Years
The future for implant dentistry looks very bright when we consider the enormous improvements in treatment indication, implant survival and very positive patient-centered outcome. On the other hand, biological issues coined as periimplantitis have darkened the implant sky. Furthermore, one recognizes that advanced technological developments in terms of pre-surgical diagnosis, treatment planning and implementation of surgery and prosthetics may impose an enormous burdon on clinicians and patients. This lecture will open a philosophical window and look upon the future of implant dentistry the coming decades. Some focus will be on digital dentistry both in surgery as well as prosthetics and expected future developments in biomaterials, implant designs and how industry may cope with globalization. The affordability and the impact of societal choices will also be raised. This lecture will give food for thoughts and discussion and result in more personal questions than answers.

Joke Duyck
Professor, Dept. of Oral Health Sciences
KU Leuven
Flanders, Belgium

Joke Duyck is Full professor at the department of Oral Health Sciences at KU Leuven. She graduated as a dentist in 1995 and acquired her specialist degree in Prosthodontics and PhD in Medical Sciences in 2000 (KU Leuven, University of Oslo). She studied peri-implant bone mechanobiology, but now focuses her research on gerodontology and policy supporting research aiming to optimise oral health for care-dependent persons. Joke Duyck is vice-president of the Prosthodontic Research group of the IADR, and associate editor of the International Journal of Oral & Maxillofacial Implants and the International Journal of Prosthodontics. Her clinical activities are situated in the field of prosthodontics, maxillofacial prosthodontics and gerodontology.

ABSTRACT:
On the Search for Better Oral Health (Care) for Frail Older Persons.
Improving oral health and oral health care for frail older persons is highly desirable if we want to assure good oral and general health, function, and quality of life for care-dependent older persons. In order to achieve this, there are different issues that need to be addressed. The relevance of the impact of oral health on a person's general condition is often underestimated or ignored. This urges the need to include oral health in the overall assessment that defines what kind of health care and other care is required for an individual care-dependent older person. The latter could be facilitated by including oral health in the interRAI suite of instruments, designed to assess an older person's health and need for care. The interRAI suite of instruments supports those involved in care planning to consider major issues triggered by the assessment and consequently to consider possible prevention and treatment options. It also helps the assessor to evaluate whether a referral for further evaluation is needed. In her lecture, Joke Duyck will first introduce the research aiming to validate and optimise the oral health part of the interRAI assessment tool. Secondly, she will elaborate on the initiatives that are embedded in the Flemish health care policy aiming to improve oral health care in care organisations for frail older persons.

Daniel Edelhoff
Director and Chair
Department of Prosthetic Dentistry University Hospital
LMU Ludwig-Maximilians-University
Munich, Germany

Daniel Edelhoff C.D.T., Dr. Med. Dent., Ph.D. Director and Chair Department of Prosthetic Dentistry, University Hospital, LMU Munich, Germany. Daniel Edelhoff granted his Certified Dental Technician degree from the Dental technician school in Düsseldorf, Germany. He graduated from Dental School in 1991 and earned his Doctor of Medical Dentistry degree 1994 and his Ph.D. in June 2003 from the University of Aachen, Germany. He is currently Director and Chair at the Department of Prosthetic Dentistry at the University Hospital, LMU in Munich. Daniel Edelhoff is board certified Specialist in Dental Prosthetics and member of the advisory board of the German Society Dental Prosthetics and Biomaterial Sciences (DGPro), Associate Member of the American Academy of Esthetic Dentistry (AAED) and International College of Dentists (ICD). He was Scientific Chairman of the 8th World Congress of the International Federation of Esthetic Dentistry (IFED) 2013 in Munich. Daniel Edelhoff received in 2010 the award "Best Lecture" by the Association of Dental Technology (ADT), and in 2011/2012/2013 three awards "Best Teacher" by the dental students of the Ludwig-Maximilians-University and the Bavarian Association of Dentists. 2014 he became Active Member of the European Academy of Esthetic Dentistry (EAED) as well as Section Editor of the multidisciplinary international research journal Clinical Oral Investigations. Since 2016 he is the President of the German Association of Dental Technology (ADT).

ABSTRACT:
CAD/CAM-Polymers as Innovative Pre-treatment Option for Complex Rehabilitations
Digital technologies offer access to more diagnostic information and enable a higher predictability. With the transfer into monolithic polymer materials innovative options for the clinical evaluation of esthetics, phonetics and function are available. Tooth-colored CAD/CAM-fabricated full-anatomic splints allow to exploring the final treatment goal in reversible test drives. Based on removability of the splints, surgical, periodontal, and restorative pre-treatments can be integrated in this period. The transfer into definitive restorations can be divided into multiple treatment steps minimizing risk factors of complex rehabilitations.
Attendees will learn:
1. To differentiate pretreatment options with CAD/CAM-fabricated polymers.
2. To understand material selection criteria to ensure durable CAD/CAM-fabricated temporaries
3. To identify the treatment steps for the transfer into definitive restorations.
Disclosure Statement: Dr. Edelhoff receives financial support for research projects with 3M, Amann Girrbach, Camlog, Dentsply Sirona, Heraeus Kulzer, Ivoclar Vivadent, Komet Dental, Straumann, Dentsply VDW, zirkonzahn.

Sreenivas Koka
Koka Dental Clinic
Loma Linda University
UCLA (Advanced Prosthodontics)
San Diego, CA USA

Dr. Sreenivas Koka received DDS and MS (prosthodontics) degrees from The University of Michigan. He joined the University of Nebraska faculty in 1992, became a Diplomate of the American Board of Prosthodontics in 1995, and received his PhD in Oral Biology from the University of Nebraska in 1999. While at the University of Nebraska, Dr. Koka received the Outstanding Teacher Award on numerous occasions and was the inaugural Merritt C. Pedersen Professor of Dentistry. He joined the Staff of Mayo Clinic in 2004 and is former Consultant, former Professor of Dentistry and former Chairman of the Department of Dental Specialties in Rochester, Minnesota. Dr. Koka received an MBA from MIT's Sloan School of Management in 2013 and moved to Zurich, Switzerland to be Executive Director of the Foundation for Oral Rehabilitation. Dr. Koka moved back to the US to focus on patient care and student education and open Koka Dental Clinic in San Diego, a private practice focused on implant and removable prosthodontics. Dr. Koka is Clinical Professor in Advanced Prosthodontics at Loma Linda University School of Dentistry, a Fellow and Past-President of the Academy of Prosthodontics, a Fellow of the American College of Dentists, a member of the ADA/CDA/SDCDS, was interim Chair of Restorative Dentistry at UCLA School of Dentistry from 2017-2018, and is currently Vice President of the International College of Prosthodontists. Dr. Koka has published over 100 journal articles and book chapters and lectures extensively nationally and internationally including being a TedX speaker. Dr. Koka has been a reviewer for NIH grants and been a principal investigator on grants funded by NIH and industry sources. Dr. Koka is an Associate Editor for the Journal of Prosthodontic Research and a past Associate Editor for the International Journal of Oral and Maxillofacial Implants. In addition, Dr. Koka is the founder of Career Design in Dentistry and the co-founder of the Future Leaders in Prosthodontics workshop series. Affiliations: Koka Dental Clinic, Loma Linda University (Advanced Prosthodontics), UCLA (Advanced Prosthodontics).

ABSTRACT:
Prosthodontic Therapy for a Super-Aging Population
Outline: Improvements in health care implicate human longevity as a necessary consequence. The aging patient presents special challenges to oral health care providers as his/her functional, physiological and psychosocial needs manifest differently compared to patients who are young or middle-aged. This presentation seeks to elucidate some of the challenges faces by the elderly and by oral health care providers and focuses on the special importance of individualized care that considers a patient's values, beliefs and preferences in the context of their social and physical capabilities and desires. It is mandatory to do no harm to patients as the prime directive and to carefully consider harmful and beneficial outcomes of prosthodontic and dental implant care. At the end of the presentation, the listener will have a conceptual framework on which to settle their conversations with patients and families about how best to service patients' prosthodontic needs.

Carlo Poggio
Adjunct Assistant Professor, Division of Prosthodontics
Eastman Institute for Oral Health, University of Rochester (NY)
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Professore a c., Corso di Laurea In Odontoiatria e Protesi Dentaria
Università degli Studi di Siena

Carlo E. Poggio DDS, MSD, PhD is an Associate Fellow of the Academy of Prosthodontics, an Active Member of the Italian Academy of Prosthetic Dentistry (AIOP), the Italian Society of Orthodontics (SIDO) and the Italian Society of Periodontology and Implantology (SIdP). He is a Visiting Professor in the Departments of Prosthodontics of the universities of Siena (Italy) and Rochester (NY) and in the postgraduate program of Orthodontics of the University of Milan (Italy). He is President-elect of the Italian Academy of Prosthetic Dentistry (AIOP) and a member of the Executive Board of the American Prosthodontic Society. He is in private practice in Milan and is active in research and publishing freeze (H-index 20).

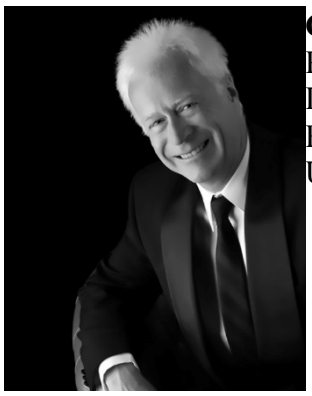
ABSTRACT:

Current and Future Trends in Prosthodontics

The field of prosthetic dentistry is undergoing a deep transformation. Techniques and protocols that have been unchanged for decades are currently undergoing disruptive changes. Current trends and challenges include the following issues:

•minimally invasive dentistry
•digital workflows & monolithic materials
•interdisciplinary integration
•evidence-based treatments
•long term prognosis

To face these ongoing changes clinicians should focus on strategic objectives of treatment, achieving from every innovative technique the best available advantages for patient centered outcomes.



Christopher Wyatt
Professor, Chair
Division of Prosthodontics & Dental Geriatrics
Faculty of Dentistry
University of British Columbia

Chris Wyatt is Professor and Chair of the Division of Prosthodontics & Dental Geriatrics in the Faculty of Dentistry at the University of British Columbia. Dr. Wyatt graduated with a DMD degree from the University of British Columbia in 1986, a diploma in Prosthodontics in 1995, and an MSc in Dentistry in 1996 from the University of Toronto. He is a founding member of the ELDERS group (Elder's Link with Dental Education, Research, and Service), and the director of the UBC Geriatric Dentistry Program. In 2010, Dr. Wyatt was appointed as head of the new Graduate Prosthodontics Program at UBC. He is past President of the Association of Prosthodontists of Canada and the British Columbia Society of Prosthodontists and is a member of the Geriatric Dentistry Committee of the British Columbia Dental Association.

ABSTRACT:
Dental Treatment Planning for Older Adults: Issues, Process, & Success
The World's population is aging, and an increasing number of people are presenting to dental clinics with the positive and negative effects of old age. A growing number of older adults are successfully aging at home and living active lifestyles. The prevalence of chronic conditions and disabilities has declined over the past seventy years due to improvements in diet, an increase in physical activity, and reduction in smoking. In addition, medical advances in orthopedics, implants/transplants, and cardiac pacemakers have helped people live longer and healthier. However, many older adults suffer chronic disease and disabilities including cardiovascular disease, cancer, arthritis, and senile dementia. In addition, the provision of dental care for older adults is affected by polypharmacy and xerostomic effects of many medications.
Older adults are retaining teeth longer and have experienced sophisticated dental care over their lifetime. They have invested a considerable amount of time and money in their mouths and expect to retain their teeth, implants and dental prostheses. However, for many older adults, poor oral hygiene predisposes them to gingivitis, periodontitis, denture stomatitis, and especially dental caries. Poor oral health and tooth loss often results in discomfort, poor aesthetics, halitosis, compromised mastication, and these combined decrease quality of life. The consequences of missing teeth are compromised aesthetics, phonetics, mastication, and occlusion. The loss of a maxillary incisor is just as much an aesthetic concern for an older adult as a younger adult. The options for replacement of teeth is no different from those who are younger. However, frailty (physical and cognative) pose significant limitation on a patient's ability to undergo a complex dental treatment and comply with maintenance recommendations. The provision of dental care for older adults sometimes involves consent for treatment from others (family and guardians), determining the best environment to provide services, and the support from others for daily oral hygiene, and maintenance of the dental prostheses. Increasingly, dental professionals must work with fellow health care providers (physicians, social workers, and community nurses) to better serve their elderly patients.

Invited Speakers

Wael Att
Professor, Chairman
Dept. of Prosthodontics
Tufts University School of Dental Medicine
Freiburg, Germany

Dr. Att is a Professor and Chairman of the Department of Prosthodontics, Tufts University School of Dental Medicine. He is also a Professor of Prosthodontics at the School of Dentistry, University of Freiburg, Germany. Dr. Att is board-certified prosthodontist from the German Society of Prosthodontics and Biomaterials (DGPro) and an active member of the European Academy of Esthetic Dentistry (EAED). He serves as President of the International Academy for Digital

Dental Medicine (IADDM), Past-President of the Prosthodontics Group of the International Association for Dental Research (IADR) as well as President of the Arabian Academy of Esthetic Dentistry (ARAED). Dr. Att obtained his DDS degree in 1997 and received the Dr Med Dent (2003) and PhD (2010) degrees as well as the title of extraordinary professor (2013) from the University of Freiburg. He was a Visiting Assistant Professor from 2005 to 2007 at the Weintraub Center for Reconstructive Biotechnology, UCLA School of Dentistry and the Director of Postgraduate Program in Prosthodontics in Freiburg from 2007 to 2017. Dr. Att's teaching and clinical activities focus on perio-prosthetic rehabilitation of multidisciplinary cases as well as the implementation of digital technologies in reconstructive dentistry.

ABSTRACT:

Three-Dimensional Engineering in Dentofacial Rehabilitation

The progressive shift towards implementing digitally driven 3D engineering tools in reconstructive dentistry is obvious. Compared to conventional methods, the ultimate goal of digital technologies is to improve the quality and capabilities in examination, diagnosis, and treatment of the dental patient. It is still questionable, however, whether such digital tools facilitate improved accuracy in data acquisition and assessment, superior efficacy in treatment planning, and more controlled and faster manufacturing process. This presentation will provide an overview about 3D engineering in comprehensive dento-facial rehabilitation and discuss different possibilities and advantages when using a conventional or a digital approach.

Limor Avivi-Arber
University of Toronto Prosthodontics
Faculty of Dentistry
Assistant Professor, Department of Prosthodontics
University of Toronto, Faculty of Dentistry
Toronto, ON Canada

Dr. Limor Avivi-Arber, Assistant Professor, Prosthodontics and Oral Physiology, Faculty of Dentistry, University of Toronto. Double BSc (Med &Pharm,1986) and DMD (1989), Hebrew University, Jerusalem; MSc (1993), Prosthodontics speciality diploma (1994) and PhD (Neuroscience, 2009), University of Toronto. My research focusses on the orofacial somatosensory and motor cortices, brain regions that play critical roles in processing tactile and pain perception and in the generation and control of the most vital and rewarding motor functions in humans, i.e, chewing and eating. My research goal is to elucidate the impact of age, sex and genetic on the capacity of these brain regions to

undergo structural and functional changes following central and peripheral injuries. I have been utilising behavioural, pharmacological (astroglial), electrophysiological (neuronal recording and stimulation), and brain imaging (sMRI, CLARITY) techniques in rats and in mice of different genetic background and sex (support: CIHR, NIH, University of Toronto and dental professional organizations).

ABSTRACT:
How the Brain Controls Everything: From Bone Remodeling, through Chewing Efficiency to Cognition
The brain controls most, if not all, of our body physiological functions, including our thoughts, feeling, our ability to learn and remember information, and complex motor actions including our heartbeat, breathing, walking, chewing and swallowing. Recent advances in neuroscience had opened up unique opportunities for research that promise to advance prosthodontics into different and unique directions that have not been thought of until now. This presentation will introduce new hypotheses on inter-relations between brain functions, chewing, bone remodelling and healing, and cognitive functions.

Nadim Baba
Professor, Advanced Specialty Education Program in Prosthodontics
Loma Linda University, School of Dentistry
Loma Linda, CA USA

Nadim Z. Baba, DMD, MSD, FACP. Dr. Baba received his DMD degree from the University of Montréal and completed a Certificate in Advanced Graduate Studies in Prosthodontics and a Masters degree in Restorative Sciences in Prosthodontics from Boston University School of Dentistry in 1999. Dr. Baba serves as a Professor in the Advanced Education program in Prosthodontics at Loma Linda University School of Dentistry, an Adjunct Professor at the University of Texas Health Science Center School of Dentistry in the Comprehensive Dentistry Department, and maintains a part-time private practice in Glendale, CA. He is currently the President of the American College of

Prosthodontists and an active member of various professional organizations. He is a Diplomate of the American Board of Prosthodontics, a Fellow of the ACP and the Academy of Prosthodontics, and a member of the ICP. He is also the Associate Editor for the Aesthetics/Prosthetics/Restorative section at the Journal of Dental Traumatology and a reviewer for the Journal of Prosthodontics and the Journal of Prosthetic Dentistry.

ABSTRACT:

ACP Digital Dentistry Curriculum

Dr. Nadim Z. Baba, President of the American College of Prosthodontists, will introduce the ACP Digital Dentistry Curriculum. This pioneering educational resource is designed to prepare dental students and specialty residents to use advanced digital technology in patient care, throughout diagnosis, assessment, and treatment. It is available at no cost to dental schools around the world. Dr. Baba will describe the development and format of the curriculum, how to gain access, and the support available to educators from the ACP and ACP Education Foundation.

Denture Adhesives: where can they be beneficial for the complete denture patients

Computer-aided design and computer-aided manufacturing (CAD/CAM) of complete dentures have seen exponential growth in the dental market with the number of commercially available CAD/CAM denture systems growing every year. There is evidence to document improved physical properties of the CAD/CAM milled dentures when compared to conventionally fabricated ones; one of these properties being denture base adaptation. The improved fit of maxillary CAD/CAM milled denture allows their fabrication with a light tissue compressibility or no compressibility at all in the posterior palatal seal area. In spite of the better fit, some patient still apply denture adhesives to increase not only retention and stability but also their biting force and their satisfaction. Some patients need the security they feel when using an adhesive. This presentation will discuss where denture adhesives could be beneficial for today's complete denture patient.

Izchak Barzilay
Prosthodontics and Restorative Dentistry
Mt. Sinai Hospital
Toronto, ON Canada

Dr. Barzilay received his DDS from the University of Toronto in 1983, a Certificate in Prosthodontics from the Eastman Dental Center in Rochester, NY in 1986, and a MS from the University of Rochester in 1991. He is currently President of the American Prosthodontic Society; CEO of the Build Your Smile Dental Foundation, Toronto, ON; Head of the Division of Prosthodontics and Restorative Dentistry, Mt. Sinai Hospital, Toronto, ON; Adjunct Assistant Professor, Division of Prosthodontics of the Eastman Department of Dentistry, University of Rochester, Rochester, NY; Professor, George Brown College of Applied Arts and Technology, Toronto, ON; Associate in Dentistry, University of Toronto, Toronto, Ont.; Chief Examiner in Prosthodontics – Royal College of

Dentists of Canada; He is past president of multiple Prosthodontic organizations and has received many teaching and research awards. He spends his time teaching, mentoring, volunteering on dental missions and is in private practice limited to prosthodontics and implant dentistry in Toronto, ON.

ABSTRACT:

Implant Problem Solving and Trouble Shooting Over the Past 30 Years

Implants dentistry is a well-established and proven treatment protocol for any prosthodontist. Due to the implant's inherent structural, connection and material differences when compared to teeth, it has its own set of problems and complications (both surgical and prosthetic) that must be managed in the short and the long term. The quality of implant treatment has improved over the years but the same problems seem to crop up on different levels. Complications can take the form of mechanical, biologic, social, as well as financial difficulties. This presentation will touch on the many types of problems and their solutions that have been undertaken over the past three decades.

Markus Blatz
University of Pennsylvania
School of Dental Medicine
Dept. of Preventive & Restorative Sciences
Philadelphia, PA USA

Dr. Markus B. Blatz is Professor of Restorative Dentistry, Chairman of the Department of Preventive and Restorative Sciences, and Assistant Dean for Digital Innovation and Professional Development at the University of Pennsylvania School of Dental Medicine in Philadelphia, Pennsylvania, where he also founded the Penn Dental Medicine CAD/CAM Ceramic Center. Dr. Blatz graduated from Albert-Ludwigs University in Freiburg, Germany, and was awarded additional Doctorate Degrees, a Postgraduate Certificate in Prosthodontics, and, most

recently, Professorship from the same University. Dr. Blatz is co-founder and President of the International Academy for Adhesive Dentistry (IAAD). He is a Board-certified Diplomat in the German Society for Prosthodontics and Biomaterials (DGPro) and a member of multiple other professional organizations, including the European Academy of Esthetic Dentistry, the American College of Prosthodontics, Academy of Osseointegration, and O.K.U. Honor Dental Society. He serves on the editorial boards of numerous recognized scientific dental journals and is Associate Editor of Quintessence International as well as coauthor of the international bestseller "evolution – contemporary protocols for anterior single-tooth implants". Dr. Blatz is the recipient of multiple teaching and research awards and has published and lectured extensively on dental esthetics, restorative materials, and implant dentistry.

ABSTRACT:
CAD/CAM Ceramics Update
The recent evolution in CAD/CAM technologies is breathtaking and enables clinicians and dental technicians to fabricate indirect restorations in the laboratory or chairside in the dental office from a variety of ceramic materials, from resin matrix ceramic materials to silica-based and high-strength ceramics such as lithium silicates and zirconia. It appears, however, that some of these materials lack long-term scientific support and are used profusely with only limited understanding of optical, physical, and biologic material properties. This does not only relate to material properties and fabrication parameters but even more so clinical applications such as cementation and resin bonding protocols, which are critical for the success and survival of ceramic restorations. This presentation will answer some of the questions surrounding CAD/CAM ceramics and provide an update on the state of the science on functional, biologic, and esthetic properties of current ceramic restorations.

Robert Carmichael
Holland Bloorview Kids Rehabilitation Hospital
Faculty of Dentistry
Toronto, ON Canada

Robert Carmichael, BSc, DMD, MSc, FRCDC was born in Powell River on Canada's West Coast. He completed his dental training at the University of British Columbia in 1981. Following a 3-year residency in the department of masticatory disorders and removable prosthodontics at the University of Zurich, he attended the University of Toronto where he completed a diploma in prosthodontics. While a fellow of the Medical Research Council of

Canada at the University of Toronto, he received his Master of Science in oral biology. Presently he serves as head of dentistry and director of the Ontario Cleft Lip & Palate/Craniofacial Dental Program at Holland Bloorview Kids Rehabilitation Hospital in Toronto. He is also chairman of the International Team for Implantology (ITI) Scholarship Center at Holland Bloorview, coordinator of prosthodontics at Toronto's Hospital for Sick Children and assistant professor at the University of Toronto. In 2015 Robert was a recipient of the Ontario Dental Association Service Award.

ABSTRACT:

A Multidisciplinary Approach to Habilitation of Children, Adolescents and Young Adults with Congenital Absence of Teeth.

This presentation will review the prevalence, etiology and consequences of congenital absence of teeth, and explore the evidence base supporting the use of dental implants in the treatment of young adults and, in some cases, children. A holistic, multidisciplinary approach is advocated. General guiding principles will be reviewed that govern decision-making around: pediatric dental care, orthodontic treatment goals, determination of skeletal maturity, surgical management, prosthodontic habilitation and aftercare. Hopefully, this presentation will help practitioners to organize their thoughts and care plan when dealing with congenital absence of teeth superimposed on the dynamic framework of growth and development.

David Chvartszaid
University of Toronto
Graduate Program Director, Prosthodontics
Assistant Professor, Faculty of Dentistry
Toronto, ON Canada

David Chvartszaid is the Program director of Prosthodontics at the University of Toronto and the chief-of-dentistry at Baycrest Rehabilitation Hospital (Toronto). He is a specialist in Prosthodontics and Periodontics and holds master's degrees in both from the University of Toronto. He is the vice-president of the Association of Prosthodontists of Canada, a fellow of the Academy of Prosthodontics, and the scientific co-chair of the 18th biennial meeting of the ICP.

ABSTRACT:
Are Strong Forces Detrimental to Osseointegration?
The influence of forces on the development and maintenance of osseointegration continues to be a matter of debate. While the negative impact of strong forces on the occurrence of mechanical complications is indisputable, animal and clinical research into the impact of strong forces on implant success has not painted a convincing and consistent portrait. This presentation will summarize the current state of knowledge in this important topic.

Hiroshi Egusa, DDS, PhD
Professor and Chair
Division of Molecular and Regenerative Prosthodontics,
Tohoku University Graduate School of Dentistry
Sendai, Japan

Professor Hiroshi Egusa is the Vice Director of Tohoku University Hospital and Director of the Liaison Center for Innovative Dentistry at Tohoku University. He received his DDS (1998) and PhD (2002) degrees from Hiroshima University, and worked in the Department of Oral Microbiology at the University of Hong Kong in 1999. He was awarded a postdoctoral fellowship by the Japanese government for regenerative medicine research at UCLA in 2002-

2004. In 2004, he became an Assistant Professor in the Department of Fixed Prosthodontics at Osaka University. In 2014, he was appointed as Professor and Chair in the Division of Molecular and Regenerative Prosthodontics at Tohoku University. He is a board-certified prosthodontist of the Japan Prosthodontic Society. He has received several international awards, including 1st place for the IADR Edward Hatton Award (2002), 1st place for the IADR Arthur Frechette Award (2004), and the IADR Distinguished Scientist Award (Young Investigator Award: 2012).

ABSTRACT:

Emerging Approaches for Regenerative Prosthodontics

Historically, the field of prosthodontics originated from the idea of managing missing or decayed teeth by "replacement prosthodontics" using artificial materials, such as removable dentures and fixed prosthetics. In the 1980s, the requirements of alveolar ridge preservation/augmentation associated with esthetic prosthetic/implant treatments gradually expanded the clinical concept to include tissue engineering and regenerative medicine. Currently, bone augmentation techniques using scaffolds and growth factors are widely used in clinical practice; however, they are not always effective to maintain the augmented bone height and volume, particularly in challenging bone defects. Solutions to overcome these limitations may include stem cell-based regenerative medicine, which provides more a robust concept of "regenerative prosthodontics" for our field. We have successfully fabricated osteoinductive bioengineered bone grafts using induced pluripotent stem cells, which possess high bone regeneration capacity even after lyophilization as a freeze-dried bone graft material. We have also found that titanium implants with nano-surfaces, mimicking properties of tooth cementum, generate periodontal ligament (PDL)-like structures around the implant. It is thus expected that PDL-hybrid implants will provide a future alternative to current osseointegrated implants. In this presentation, progress in regenerative dentistry in the field of prosthodontics will be overviewed, with an emphasis on cutting-edge research approaches using stem cells and nanotechnologies.

Egon Euwe
Periodontics
Implant Dentistry
Milan, Italy

After his dental degree Egon left the Netherlands to work and study abroad in Monte Carlo and Italy where he opened his own clinic in which his main focus soon became Periodontics, Implant Dentistry and Esthetics. He followed a series of post-graduate courses at UCLA and started a collaboration and a long-lasting friendship with Dr. Sascha Jovanovich, the founder of gIDE (Global Institute for Dental Education). In the Global Master Clinician program Egon is a very

much appreciated gIDE faculty member, known for his fine A to Z clinical work, keen eye for details and his realistic humble way of teaching sharing all his tricks and tips with the audiences worldwide. His annalistic and educational capacities resulted in collaborations with the Milan Universities, several Implant and Dental companies like Nobel Biocare (over 20 years), Mc Bio, HuFriedy and since 2016 with the innovative French implant company Anthogyr.

ABSTRACT:
The Bio-logic Prosthetic Interface in Modern Esthetic Implantology:
Revealing the Hidden Secrets of the Transgingival Part of the Implant Supported Prostheses.
A Proposal for a Bio-Friendly Design in Surgically Augmented Soft Tissue.
"Invisible Single Tooth Replacement" in the Esthetic zone has been considered for decades one of the pinnacles of Implantology. This procedure embraces surgical aspects of both hard and soft tissue preservation, reconstruction & remodeling. Implant, connection and abutment design play an Important role as well, and recent Prosthodontic advances in the field metal free CAD CAM technology with materials like Zirconia, Alumina and Lithium Di-Silicate created an Esthetic and Biological breakthrough. Going through the Gingival section from the neck of the implant towards the visible part of the Emerging tooth-like restoration, the team technician-clinician has to position up to four different interfaces between the different components and materials in this 3-4mm of running space. They have to widen also substantially the emergence profile going from a narrow connection to a much wider anatomical perimeter crossing different layers of soft tissue, every layer with its own specific characteristics and features. At the end of this process stable crestal bone levels remain still today one of the most wanted features of successful implant treatment. The Lecture addresses the key elements on the way to excellence were the different pieces of carefully designed hardware have to respect the layer specific tissue features to obtain a long-lasting clinical stability.
Keywords: multilayer soft tissue philosophy, Bottle neck emergence profile, Oral, Sulcus and Junctional Epithelium , CT attachment, crestal bone, Soft Tissue thickness, Esthetic excellence.

David Felton
Dean and Professor
University of Mississippi Medical Center
School of Dentistry
Jackson, MS US

David A. Felton, DDS, MS. Dr. Felton completed his undergraduate training at NC State University, his DDS degree (1977) and MS Degree in Prosthodontics (1984) at the University of North Carolina School of Dentistry. He taught in the Department of Prosthodontics at UNC from 1984-2011, serving as Director of Graduate Prosthodontics (1982-1992) and Chair of Prosthodontics (2992-2002). He moved to the West Virginia University School of Dentistry as Dean in 2011, serving in that role for three years. In January 2016, he assumed the role of Dean at the University of Mississippi School of Dentistry in Jackson, MS. Dr. Felton is the current president of the American Board of Prosthodontics, and

Councilor for the ICP. He is past-president of the American College of Prosthodontists, and the Academy of Prosthodontics. Dr. Felton has authored over 50 peer reviewed articles, lectures nationally and internationally, and holds memberships in multiple dental organizations.

ABSTRACT:
Denture Adhesives—Prosthodontic Failure, or Acceptable Therapy?
The use of denture adhesives has previously been associated with poor prosthodontic care, or with misuse by patients. Complete denture use globally is expected to remain constant, or even increase, over the next few decades. While the Prosthodontic community remains concerned about the use of adhesives beneath ill-fitting complete dentures, growth in the dental adhesive industry continues. This presentation will evaluate the global incidence of complete denture use, compare different ways for improving denture retention, discuss means for obtaining optimum "fit" of dentures, and explore some of the benefits (and myths) associated with the use of dental adhesives. Evidence based literature will be provided to support recommendations for use of adhesives beneath even well-fitting complete dentures.
Disclosures: This presentation is sponsored by Proctor and Gamble Oral Care Clinical Operations

Alberto Fonzaer
Univerity of Triest and Modena
Italian Academy of Prosthetic Dentistry
Campoformido, Italy

Dr. Fonzar was born in Gorizia in 1959. He graduated Cum Laude in 1986 in Medicine and Surgery at the University of Trieste and in 1989 earned his specialization in Dentistry and Prosthodontics at the University of Pisa. Since 1996, he and his sister Dr. Federica Fonzar have directed their multidisciplinary private practice 'Stomatologico Friulano "E.Fonzar"' in Campoformido (Udine) . Over the last 30 years, Dr. Fonzar has specialized in Periodontology, Implantology and Prosthodontics, becoming one of the top European experts in his field. He is an active member and a past President of The Italian Society of Periodontology (S.I.d.P.) where he has held the role of both Treasurer and

Secretary on the Executive Board. He is also visiting professor at the University of Triest and Modena and a member of the Italian Academy of Prosthetic Dentistry (AIOP) and of the International College of Dentists. Dr. Fonzar is involved in numerous clinical studies. Several Italian and international publications have reported his scientific research projects. Dr. Fonzar frequently lectures throughout Europe and U.S. at conferences and congresses dealing with Periodontology and Implantology.

ABSTRACT:
Science and Art in the Prosthetic Rehabilitation of Patients Affected by Severe Periodontal Disease: A Critical Analysis
The combined prosthetic-periodontal treatment with construction of fixed partial prosthesis has been using for over 50 years in the treatment of patients affected by severe periodontitis in order to restore dentitions in good health, function and esthetics. The literature has proven the biological capability of teeth with reduced but healthy periodontium to support successfully over time a fixed partial prosthesis. The control of both infection (pocket & furcation defects elimination), secondary occlusal trauma and self-performed oral hygiene facilitation are the basic principle of the treatment. Is periodontal prosthesis a science or art? And are its concepts still valid? How they have been changed by the use of implants in the treatment of patients affected by severe periodontal disease? The aim of this lecture is to highlight the benefit but also the limits of periodontal prosthetics therapy by carefully analyzing the literature (science?) and presenting several clinical cases and the personal own data (art?) in an attempt to find the best solution for our patients.

David Gratton
Associate Professor
Maxillofacial Prosthodontics
Iowa City, IA USA

Dr. David G. Gratton is Associate Professor, Department of Oral and Maxillofacial Surgery and Director, Division of

Maxillofacial Prosthodontics at the University of Iowa, a position he assumed in 2015. Dr. Gratton received his DDS from The University of Michigan (1994), and his Certificate in Prosthodontics (1996) and Master's of Science (1997) from The University of Iowa. Before joining the UI College of Dentistry and Dental Clinics faculty in 2002, Dr. Gratton was Assistant Professor, Schulich School of Medicine & Dentistry, University of Western Ontario, Canada. He has achieved Fellow status in the Academy of Prosthodontics and the International Team for Implantology. His scholarly and lecturing activity comprises evolving digital prosthodontic technologies and CAD/CAM materials. Dr. Gratton's prosthodontic and maxillofacial prosthetics practice incorporates multiple digital technologies to restore function, form, and aesthetics for straightforward through complex patients at the Hospital Dentistry Institute at the University of Iowa Hospital and Clinics.

ABSTRACT:

Digital Dentistry: Just Because We Can, Should We?

Technology is deeply engrained in our personal and social lives, but what about our professional lives as prosthodontists? Clinical dentistry (well, at least the dental laboratory industry) is embracing the application of digital technologies to replace the analog techniques with which we are so comfortable. While this is especially true in the realm of impression making procedures and prosthesis manufacturing, processes can be digitized at each phase of treatment, resulting in the virtualization of the patient from diagnosis through treatment delivery. These digital dentistry platforms not only allow patients greater access to a variety of treatment modalities, but also allow clinicians access to treatment modalities they otherwise would not have considered providing directly for their patients. With the adoption of these technologies, the roster of the care team may change, the role of some players may be enhanced, while others may be minimized, and ultimately new members may be recruited. Critically, the clinician is correct to ask: Does the scientific evidence support the routine clinical use of these emerging technologies for the evolving virtual dental patient? And what impact does the adoption of digital dentistry have on patient care? These clinical outcomes should always be a primary consideration. Just because we can, should we? This course will trace the integration of digital dentistry into clinical practice and the resulting disruptions. Course Objectives: Upon completion of this course, the participant will: Appraise current and emerging technologies for each phase of prosthodontic care, especially digital intra-oral impression systems, Describe the disruptive impact that technology is having on the specialist/generalist practice model, Recognize the implications of a digital workflow on the patient's involvement in his/her treatment.

Marco Gresnigt
DMD PhD, Dentist, Lecturer, Researcher
University of Groningen
Center for Dentistry and Oral Hygiene
The Netherlands

Marco Gresnigt graduated summa Cum Laude in 2005 at the university of Groningen, the Netherlands. In January

2012 he obtained his PhD on clinical and laboratory evaluation of laminate veneers. Besides working at the university, he works as a dentist in a center for special care. Marco lectures at the Center for Dentistry and Oral Hygiene, where he is the current head of direct restorations and teaches masters students in a specialized program on esthetics and prosthetic dentistry. He works together with national and international researchers on studies and has published several articles on minimally invasive and adhesive dentistry in high impact factor dental journals. He obtained several awards like: the NVGPT publication prize, Boering prize and Cavex prize. Marco is the current president of the international bio-emulation group.

ABSTRACT:

Partial Ceramic in Compromized Situations

In treating complex cases and special care patients we sometimes face failures (debonding, fractures and marginal discoloration) using partial ceramic restorations. These failures often lead to a more aggressive approach thereby using full crown preparations. However due to improvements in surface conditioning and adhesive technology we can overcome these failures. This lecture is a combination of clinical treatments, esthetic outcomes with own long term scientific background. We will address some of the discoveries which will change your way of treating patients on Monday.

Bassam Hassan
Prosthodontist
Acibadem International Medical Center
Amsterdam, The Netherlands

Bassam Hassan is an EPA certified prosthodontist with 15 years clinical and research experience and 9 years under- and post- graduate supervision experience specialized in digital dentistry, prosthodontics and implant surgery. Currently

employed as head of the department of dentistry at Acibadem International Medical Centre in Amsterdam and also appointed as a visiting professor at UCM University in Madrid and at Vienna faculty of Dentistry. He has published more than 50 articles in cited international journals and has lectured numerously on national and international level. His research focus is on digital CAD-CAM implant supported full mouth rehabilitation.

ABSTRACT:

Integration of Functional Occlusion Using Virtual Articulation in CAD-CAM Full Mouth Prosthetic Rehabilitation

Modern CAD-CAM 3D designed and manufactured monolithic zirconia restorations have concurred the dental market in recent years for full mouth reconstructions owing to their excellent material properties, reduced costs and the ability to fully integrate in a digital workflow. However, a major drawback of monolithic zirconia is the lack of a realistic 'teeth setup try-in phase' prior to milling and the difficulty in chair-side occlusal adjustments. Therefore, an exact digital record of static and dynamic maxillary-mandibular relationship is mandatory especially in full mouth advanced prosthetic cases. This lecture will examine a state of art approach for digitally recording the maxillary-mandibular jaw relations and to CAD-CAM manufacture full mouth reconstructions using digital functional occlusion concepts.

Dale Howes
Associate Professor
The University of Sydney School of Dentistry
Sydney, Australia

Dale Geoffrey Howes B.Sc. (Dent); BDS; M.Dent (Wits); FCD (SA) Pros; FICD.
Dale Howes has been recently been appointed Associate Professor in prosthodontics, School of Dentistry, Faculty of Medicine and Health, at the University of Sydney, Australia. He was previously in full time private practice with part time appointment as adjunct professor in the department Oral Rehabilitation University of the Witwatersrand before taking over as the Professor and Head of that Department. He is the Immediate Past President of the ISMR (International Society for Maxillofacial Rehabilitation), board member and Treasurer of the ICP (International College of Prosthodontists)
He has received peer review fellowships from the Colleges of Medicine of South Africa and the International College of Dentists serving as the regional Vice Regent. He is a past president of the Academy of Prosthodontics of South Africa, and founder member of the P-I Brånemark Institute of South Africa as well as the Face Value Foundation Trust, a Public Benefit Organisation. This PBO is dedicated to enhancing head and neck treatment and rehabilitation through comprehensive multidisciplinary care, research and education. He was also awarded the Premier Award of the South African Dental Association (2016) and the I.Y. Sendulskogo Commemorative Medal of the Russian Partnership of Head and Neck Oncology Specialists for outstanding achievements in medicine. (2015). He has Awarded Best Presentations at the Nobel Biocare World Congress 2005 and the Academy of Osseointegration Boston 2008. He has lectured worldwide and supervised Masters and PhD projects, been external examiner nationally and internationally as well as publishing research and book chapters in fields including head and neck cancer rehabilitation, occlusion and biomechanics. He has developed innovative implant fixtures, components and protocols to solve hard and soft tissue constraints facilitating screw retained implant prostheses optimising patient management in the regular implant patient as well as for the patient compromised by head and neck trauma and cancer.

ABSTRACT:
Osseointegration and Malignancies
WHO statistics show that Head and Neck tumours carry similar incidence but greater mortality than breast cancer. In addition, it can be argued that these tumours carry the greatest morbidity as they easily affect swallowing and the five senses of touch, taste, smell, speech and sight that define human quality of life. Surgery is often considered the mainstay of management for head and neck cancer, but nearly 75% of head and neck cancer patients offered radiotherapy with or without associated chemotherapy with curative for palliative intent. Osseointegration and implant technology is documented to improve the quality of life through implant supported rehabilitation of craniofacial imputation or pre-treatment dentectomy. Compromised wound healing and biomechanics as a result of radiation therapy, chemotherapy and surgical ablation violates the very recommendations for success in implant supported rehabilitation. This presentation will evaluate the effects of the treatments for head and neck malignancy on the principles of osseointegration and attempt to offer protocols in maxillary and mandibular ablation for implants supported rehabilitation in compromised native bone as well as in free flap tissue transfer.

Xinquan Jiang
Ninth Peoples Hospital affiliated to Shanghai JiaoTong University,
School of Medicine
Director of the Department of Prosthodontics
Shanghai Jiao Tong University
Shanghai, China

Xinquan Jiang, Ninth Peoples Hospital, Shanghai Jiao Tong University, China
He is the vice dean of College of Stomatology, Shanghai Jiao Tong University, director of the Department of Prosthodontics. Currently, he is an honorary professor in the University of Sydney and serves as councilor of ICP and fellow of International College of Dentists. Jiang was also invited as editorial member of 6 International Journals.
He is a clinician, researcher and educator, specializing in prosthodontics and regenerative medicine. He studied in the University of Alberta in Canada and UCLA in United States after the PhD program in China. Now he serves as the PI/Co-PI for more than 20 national or international grants with over 4 million USD and carries out 3 key clinical trials. He has over 114 peer-reviewed publications including Advanced Materials (IF 25.8) and the cover story in JDR and Advanced Science (IF 15.8) invited commentary IJP. He won the prestigious IADR/Unilever Hatton Award in 2005 and secured the distinguished young investigator grant in NSFC.

ABSTRACT:
New Strategies for the Restoration of Oral-Maxillofacial Morphology and Function
Recently, with the development of science and technology, tremendous changes are taking place in the field of prosthodontics. Regenerative medicine provides new ideas for oral functional restoration. Our team focuses on bone regeneration and oromaxillofacial functional restoration, combined with regenerative medicine and traditional prosthodontics. In this presentation, we will systematically summarize our research results on optimization and modification of osteoinductive biomaterial, exploration, and application of osteoinductive factors, optimum selection of jaw seed cells. In our latest research, we have successfully adopted magnetic technology to control growth-factor-immobilized multilayer cell sheets for complex tissue regeneration (Advanced Materials 2017). At the same time, we have been working to explore the bone development mechanism and build a 3D culture system for vascularized bone regeneration (Advanced Science 2019). Furthermore, we are engaged in promoting clinical translation by integrating stomatology, regenerative medicine, materials science, and other disciplines, to better meet patients' needs. In recent years, our research group actively carried out the clinical trials of CPC/BMP-2 bioactive scaffold for alveolar ridge site preservation. In future, our team will focus on the maxillofacial bone regeneration and collaboratively promote clinical transformation and application, aiming to achieve individual scaffold design, precisely targeted delivery of drugs, together with the enrichment and recruitment of stem cells simultaneously.

Yasuhiro Kawai
Professor, Chair
Department of Removable Prosthodontics
Nihon University Scholl of Dentistry at Matsudo
Chiba, Japan

Professor Yasuhiko Kawai is currently chief at the department of prosthodontics at Nihon University School of Dentistry at Matsudo since 2010. His major research interest is clinical epidemiology in the dental field, including randomized control trial (RCT). Yasuhiko holds a Master of Medical Science of clinical epidemiology (MMedSci) at The University of Newcastle, New South Wales, Australia, and conferred Ph.D. at Nihon University, adjunct professor at McGill University.
He stayed at McGill University, Montreal for a 2-year sabbatical leave from 1999 to 2001 as a Visiting Professor and run an RCT comparing simplified and conventional complete dentures focusing on patient-reported outcomes. He also completed micro-costing research and recently completed the 10-year follow up. He is currently working with multicenter RCT on denture adhesives, and he continues the interest in decision-making and predicting the prognosis from the evidence through the RCT.

ABSTRACT:
How Can We Implement The Result of The Clinical Trial In The Prosthodontics Practice?
For two decades, my colleagues and I have been running randomized clinical trials (RCT) in the prosthodontics. We are not complacent, but we are pleased with the work we have done. On the other hand, we have learned the lesson in various aspect. Notably, "The proof of the pudding is in the eating"; the implementation of the results in clinical settings is essential. The first RCT compared the simplified and traditional method in the fabrication of complete denture. Our result revealed that there were no significant differences between the two arms without no negative consequences that detract from the cost savings (Kawai et al. 2005, 2010). Also, the 10-years follow-up indicated that the simplified method remained more cost-efficient than the traditional method over 10-years (Kawai et al. 2018). However, in this trial, we have failed to show "who would be happy with the simplified?": the lesson was to design the future trial by seeking a practical decision-based baseline examination item. The second RCT included the assessment of the mandibular bone height as a baseline item and analyzed the influence of the bone height on the selection of the occlusal scheme. The results indicated that the lingualized occlusion is more efficient for patients with severely resorbed mandibular ridges (Kawai et al. 2017). The third RCT focused on the difference between the conventional and resilient denture liner for a mandibular complete denture. We are focusing on the pain threshold as a diagnostic item to decide which remedies to apply (Ito et al. 2014, Kimoto et al. 2019). Current RCT on the denture adhesives is the collaboration of Ten centres. This trial not only looked at the difference in the outcomes but also seeking the diagnostic items for a recommendation to use or not to use the adhesives; which in this case, a prior subjective assessment. This presentation would like to mention the pitfall and important issue before and during the clinical trial to make the results of RCT more practical in the clinical settings of the prosthodontics.

Matthias Kern
Prof. Dr. Med Dent Habil
Germany

Matthias Kern graduated 1985 in Dentistry from Albert-Ludwigs University at Freiburg, Germany. He was Assistant Professor in the Department of Prosthodontics in Freiburg, from 1985-1991 and from 1994-1997. From 1992-1993 he was Visiting Research Associate Professor at the University of Maryland at Baltimore. Since 1997 he is Professor and Chairman of the Department of Prosthodontics, Propaedeutics and Dental Materials at the Christian-Albrechts University at Kiel, Germany. In Dec 2011 Dr. Kern received the Schweitzer Research Award of the Greater New York Academy of Prosthodontics (GNYAP). From 2012-2016 Dr. Kern served as President of the German Society for Prosthetic Dentistry and Biomaterials (DGPro). Dr. Kern serves in the Editorial Board of more than 10 peer-reviewed scientific journals and has published more than 300 scientific articles.

ABSTRACT:

Resin-Bonded Fixed Dental Protheses Made from Zirconia Ceramic
- A Minimally Invasive Alternative to Single Tooth Implants

Resin-bonded fixed dental prostheses (RBFDPs, so-called Maryland bridges) with two metal retainer wings have been introduced over 30 years ago for a minimal invasive replacement of missing teeth. However, RBFDPs are still not considered a comparable treatment modality to implants by most of the dentists. Cantilevered anterior RBFDPs with a single ceramic retainer wing were introduced 20 years ago. They provide better esthetics and are less invasive than two-retainer RBFDPs. In the meantime, excellent long-term data of this minimal invasive treatment option are available. Similar concepts are now also implemented for the replacement of posterior teeth that show promising medium-term outcomes comparable to single tooth implants. This lecture summarizes when zirconia ceramic RBFDPs present a favorable, minimally invasive and less costly treatment alternative to single tooth implants.

Jongyub Kim , DDS, MS, Ph.D
Boston SMart Dental Private Practice
Seoul, Korea

Dr. Jongyub Kim graduated from Dan-kook University Dental School in 1996. He finished oral and maxillofacial surgery residency at the same institution from 1996 to 2000. He also had postdoctoral prosthodoctics training at Boston University, Henry M. Goldman school of Dental Medicine from 2004 to 2007. Dr. Kim is a Korean Board-certified Prosthodontist.
Presently, he is serving as a board member of Korean Academy of Prosthodoctics, Korean Academy of Oral and Maxillofacial Implantology, Korean Academy of Digitalized Dentistry, etc. And He is working as an adjunct professor of Catholic university medical school, Dan-kook university dental school, Ehaw women's university medical school, Korea university medical school, etc. He in a co-author of 'Minimally Invasive Sinus Surgery (Well publishing)' published in 2016. As a trained Oral surgeon and Prosthodontist, his practice is mainly focus on Implant dentistry and Digital restorative dentistry.

ABSTRACT:
Analog to Digi-log, Digital in Implant Dentistry
As all we know, location, depth and angulation of dental implant is so important. After the placement, most of time, it is impossible to change the location and also affects final result, long term success, and maintenance. Recently, many clinicians are using CT-based static surgical guide not only for implant placement but also for simulation before implant placement during the planning phase. Static guide still has some errors and limitations but better than 'free-hand placement' and also can be used for flapless approach and immediate loading in limited cases. The intra-oral scanning devices have become more accurate and popular, so intraoral scan, so called 'digital impression' of Implants widely has been used. For intra-oral scan of implants, there are many different ways to do. We can use scan bodies instead of impression coping or prefabricated abutment directly in the oral cavity that has already registered in CAD/CAM software library in simple case. The impression using coded healing abutment has also been introduced long time ago. The advantage of this method is that it is possible to make prosthesis during the period of waiting for osseointegration because the timing of impression scan of coded healing abutment is more free than other methods. In this presentation, I would like to introduce and share digital implant workflow from clinical cases of guided implant placement and various intra-oral scanning procedures of dental implant.

Frank Lobbezoo
TMD/Orofacial Pain
President of the Dutch Dental Society (NTG)

Frank Lobbezoo graduated cum laude as dentist in 1988 from the University of Utrecht (UU), The Netherlands. In 1992, he obtained his PhD degree from the UU, after which he worked for three years as a postdoctoral fellow at the University of Montreal in Quebec, Canada. As of September 1996, he works at the Academic Centre for Dentistry Amsterdam (ACTA), The Netherlands, where he was appointed as a full professor in 2005. In 2014, he was appointed as Chair of the Department of Oral Health Sciences and Vice-Dean. Frank Lobbezoo is specialized in TMD/Orofacial Pain, President of the Dutch Dental Society (NTG), Past President of the European Academy of Craniomandibular Disorders (EACD), and Past President of the International RDC/TMD Consortium. He served as Visiting Professor at the University of Adelaide in South-Australia, Australia (2006) and at the College of Dentistry of the New York University in New York, USA (2014-2015).

ABSTRACT:
A Bite of Bruxism: Shifting Paradigms
Brief summary: Bruxism is a phenomenon that is well-known to dentists and about which knowledge has accumulated for many decades. Over the past years, however, new insights have emerged that represent a true paradigm shift. Where in the (recent) past bruxism was considered the patient's and dentist's enemy, being responsible for a host of dental problems like extreme tooth wear and intense pain in the masticatory muscles and temporomandibular joints, nowadays evidence is piling up on possible positive health outcomes for bruxers, thus making bruxism not only a foe but also a friend!

Leonardo Marchini
Assistant Professor, Department of Preventive and Community Dentistry
The University of Iowa College of Dentistry and Dental Clinics
Iowa City, IA USA

Dr. Leo Marchini (DDS, MSD, PhD) teaches pre-doctoral and grad students in the geriatrics and special needs program and treats patients in the faculty general practice at the University of Iowa College of Dentistry and Dental Clinics. He has been working as a general practitioner since graduating in 1996, with an emphasis in prosthodontics and geriatric dentistry. His current research focus includes geriatric dental and general health epidemiology and patients satisfaction with prosthodontic treatments. He is also interested on researching about the best way to teach dentistry, with particular interest to geriatric dentistry teaching.

ABSTRACT:
The Science and Art of Patient Satisfaction
Objectives: Attendees should be able to 1) recognize the need for complete dentures among a growing elderly population; 2) understand the differences between dentists' and patients' perspectives about dentures; 3) recognize key factors for patient satisfaction; and 4) be able to apply current evidence-based knowledge to improve their patients' satisfaction with complete dentures.
Need for complete dentures among a growing elderly population:
-Edentulism prevalence are on decline.
-High-income households experienced a greater relative decline.
-The prevalence of edentulism is predicted to decrease even more from now to the year 2050.
Denture satisfaction rates:
-Patients usually present high satisfaction levels.
-However, a small number of patients are not satisfied with their dentures.
Differences among dentists' and patients' perspectives about dentures:
-Patients had higher expectations about their denture treatment than dentists.
-Patients expected more benefits from dentures than dentists did, but patients' perceived post-treatment benefits exceeded dentists' expectations.
-Dentists should be fully aware of a patient's expectations before treatment and provide the patient with detailed explanations about the limitations and possibilities of complete denture therapy to improve the dentist-patient relationship.
-A good relationship between dentist and patient is more important than prosthodontic factors for a positive outcome.
Recognize key factors for patient satisfaction:
The factors presenting reasonable evidence of influencing patient satisfaction are 1) the kind of therapy chosen (implant-retained overdentures rated more favorably than conventional dentures); 2) patient personality and psychological factors; 3) patient oral conditions; 4) patient perception of the dentist and dental care; and 5) patient-dentist communication issues.
How can I apply this to my practice?
-Methods to improve patient-dentist communication
-The interpersonal factor
-Understanding body language
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Brian Millar
Professor
Blended Learning in Dentistry at Kings College
London, United Kingdom

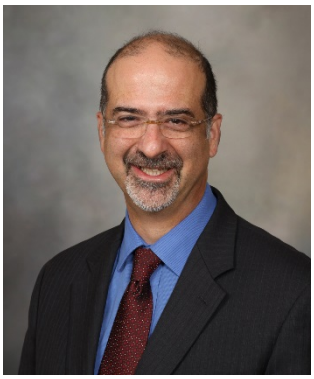
Professor Brian Millar BDS, FDSRCS, PhD, FHEA. Professor of Blended Learning in Dentistry at King's College London and NHS Consultant in Restorative Dentistry at the King's College London Dental Institute at Guy's, King's and St Thomas' Hospitals. Specialist in Prosthodontics and in Restorative Dentistry. Programme Director for the internationally popular MClinDent (Fixed & Removable Prosthodontics) now in its 20th with graduates in over 60 countries practising a high level of clinical dentistry. In the past set up the highly successful MSc programmes in Aesthetic Dentistry and also Advanced General Dental Practice by blended learning at the KCL Dental Institute. With 37 years experience in clinical practice and currently an active specialist clinician in both hospital and private practice, particularly in treating tooth wear, aesthetic and occlusal problems utilising MI philosophies where possible. Experienced teacher to undergraduates and postgraduates and well-known provider of postgraduate education nationally and internationally at conferences through lectures, seminars, webinars and hands-on courses. Published over 180 papers, supervised over 200 PhD and Masters students, involved in setting up MOOCs with over 20,000 students. Series Editor of three books on Essentials in Esthetic Dentistry. As well leading on the silencing of the dental drill collaboration, research includes management of occlusal problems using MI techniques, bringing together aesthetics and function with a focus on tooth preservation.

ABSTRACT:
Teaching Prosthodontics Internationally
The FRP programme in Prosthodontics at KCL is now in its 22nd year and continually evolves to remain learner focused with the aim of delivering high-quality, contemporary education to dentists around the world in an easily accessible format. As technology improves it utilises a blend of techniques best suited to individual topics, learner's styles and allows learning at a time and place to suit the busy dentist. It attracts 40 dentists per year worldwide who seek to become enhanced practitioners while learning in their workplace. The majority of students continue to take the full MClinDent degree over 4 years part-time but some choose to exit with an MSc after 3 years with shorter PGCert and PGDip options available along the way. This non-specialist programme trains dentists in all parts of the world, some where there are no other options to improve their clinical skills as many cannot attend a traditional on-campus programme. This lecture will give examples of how we teach including synchronous tutorials, face-to-face sessions with intensive phantom head exercises and case supervision. Methods of assessment will be illustrated with the difficulties and limitations of online training being considered. There is ongoing programme assessment at every stage throughout the 4 year programme, as well as from recent graduates, and this is used to reformulate teaching methods. It seems that the increasing limitations of a BDS are being recognized by dentists who seek to progress their careers as competent clinicians and online education provides a pathway. Evidence supports the aim that the FRP graduates are highly satisfied and carry out prosthodontics in primary care with some becoming teachers in their local dental institutes.

Harry Reinstema
Maxillofacial Prosthodontist
University Medical Center Groningen, The Netherlands, dept. Oral Maxillofacial Surgery
Groningen, The Netherlands

- Graduated from Dental School in Groningen, The Netherlands in 1982, and defended his PhD-thesis ('the effect of fluoridated toothpastes on plaque covered enamel in vivo') in Groningen in 1988.
- Assistant professor Dental School University Groningen, 1982-1991.
- Maxillofacial prosthodontist since 1984 (NVGPT registered since 2000)
- Head of the UMCG Center for Special Dental Care and Maxillofacial Prosthetics since 2003.
- Head training program Maxillofacial Prosthodontics UMCG since 2003.
- Chair of the NVGPT National MFP - Training Program Committee
- Past president International Society for Maxillofacial Rehabilitation (ISMR)
- Honorary member Dutch Society for Gnathology and Prosthetic Dentistry (NVGPT); served on the board of the from 1992- 2002
- Rewarded with the J.G. Schuiringa Award on maxillofacial prothetics (2000)
- (Co)Author of several articles on maxillofacial rehabilitation and implant dentistry
- Co-promotor PhD studies PJ Schoen (2008), A. Korfage (2015), JI Kamstra (2017)
- Participated in the organization of several conferences and workshops on maxillofacial rehabilitation.
- Fields of interest concern e.g. the dental/prosthetic treatment of Head-and-Neck Oncology patients and patients with congenital or acquired orofacial defects, and dental (implant-)treatment in general.

ABSTRACT:
Science and Art in Maxillofacial Prosthetics. How to Derive Functional Rehabilitation?
Maxillofacial prosthetics encompasses the dental / prosthetic care for patients with congenital or acquired defects / anomalies in the head and neck region. Recapturing form and function are the main goals and is in general achieved in multidisciplinary cooperation with several other (medical) disciplines. Especially in restoring defects of the jaws and/or the face in head and neck oncology patients a proper (digital) prosthetic planning is a prerequisite for an optimal result, and needs to be attuned to the oncology treatment planning. Gross changes in anatomy, functional impairment, and an increased vulnerability of the remaining tissues need to be taken into account to achieve a proper functional rehabilitation. The later use of implants to retain resection- and facial prostheses, and refined plastic surgical techniques in using free vascularized grafts have been most helpful in this process. Also new techniques trying to spare sound tissues from the devastating (side)effects of (chemo-)radiotherapy are slowly accepted and will change rehabilitation options. Digital technology has entered workflows and can ease treatment. Changes in treatment and treatment planning will be elucidated, and especially the combination of specific prosthetic skills still needed and the added use of digital technology to help the patients to overcome the consequences of head and neck oncology treatment will be presented. Careful evaluation of these treatments, however, are still needed to establish best practices.



Thomas Salinas
Mayo Clinic
Department of Dental Specialties
Rochester, MN USA

Thomas Salinas is Professor of Dentistry at the Mayo Clinic, where his time is dedicated to rehabilitation of patients with complex care needs. He has authored over 75 publications related to prosthodontics and interdisciplinary care. His research interests are biomaterial behavior and clinical outcome studies. He is advanced prosthodontic program director since 2010 and has leadership roles within the clinical practice and department. He represents the Academy of Prosthodontics on the Editorial Council for the Journal of Prosthetic Dentistry. A native of New Orleans, he was educated at Louisiana State University Health Science Center and MD Anderson Cancer Center.

ABSTRACT:
Maxillofacial Reconstruction: Contemporary Approach and Application
The increasing demand for surgical reconstruction of the jaws has prompted a heightened synergy between prosthodontists and surgical specialists. The approach taken in recent years is of digital perspective with placing osseous flaps into optimal spatial orientation and likewise with the use of dental implants. Outcomes of these patients will continue to serve as a reference to determine the efficacy of these modes of therapy.
Objectives: At the conclusion of the lecture, the participant will be able to;
1.Identify factors that are integral to reconstruction of the maxilla and mandible based on biomechanic/physiologic need.
2.Understand the rationale and advantages of using 3-dimensional virtual planning for reconstruction of maxillary and mandibular defects.
3.Understand the steps needed for imaging and spatial requirements to create surgical guides and specific products that facilitate maxillofacial reconstruction.
4.Compare the advantages in using 3-dimensional reconstructive planning over traditional techniques for optimal outcomes.

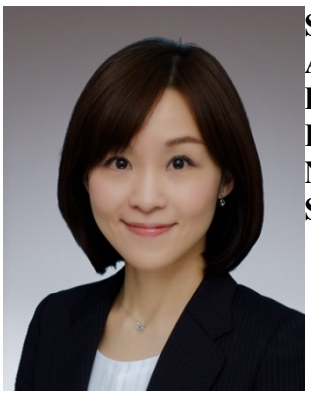
Ami Smidt
The Hebrew Univ.- Hadassah, Faculty of Dentistry
Head, The center for Graduate Studies in Prosthodontics,
Department of Prosthodontics
Tel-Aviv Israel

Prof. Smidt is a staff member at The Hebrew University-Hadassah School of Dental Medicine, Jerusalem, Israel in the Department of Prosthodontics. He received his D.M.D. degree from Jerusalem's Hebrew University in 1986 and his M.Sc. degree in Oral Microbiology (Cum Laude) in 1988. In 1990 he received his certificate in Prosthodontics. Prof. Smidt is a Diplomat of the Israeli Board of Prosthodontics and held teaching, research, and clinical positions at this University and headed The Center for Graduate Studies in Prosthodontics in the school. Prof. Smidt has published extensively and serves as a member on the editorial review boards of several international journals. He lectures frequently in international forums on topics related to orthodontics for better prosthodontics and on esthetic and implant dentistry. His current research focuses on bleaching materials and their effect on tooth structure and on crown marginal leakage and on the fit of milled copings in chairside operating systems. Prof. Smidt served as President and Editor of the Israel Society of Prosthodontics, is a member of several professional organizations, board member of the International College of prosthodontists and maintains a private practice dedicated to prosthodontics and esthetic dentistry in Tel Aviv, Israel.

ABSTRACT:

Aspects and Conditions in Treatment with a Single Implant Supported Crown Restoration in the Anterior Maxillary Area

To perform a periodontal procedure to save a natural tooth in anterior area affects neighboring teeth, especially when they are sound and healthy. Several aspects need to be considered before a decision to extract a tooth in the anterior area is taken as it is a clinical event in with direct implications in the short and long term of life. Not only the definite procedure, as part of the treatment plan, and the interim restoration type for the missing tooth area, but also surgical preparations of the site, to pave the way for a future life like restoration. The vulnerable labial bundle bone is expected to lose its coronal portion due to a thin nature in general and reduction in blood supply, being a root related structure. The maintained or augmented labial marginal bone in the missing tooth site, is a prerequisite for a correct anatomical restoration, whether it is an implant supported restoration or a pontic restoration. Once a tooth is declared irrational to treat, and an implant supported restoration is planned, the timing and the sequence of therapy is an issue with a careful examination of the existing hard and soft tissue in the area. It is important to preserve healthy supporting tissues and perform properly so the tissues will serve the treatment and remain stable with the time. These issues include atraumatic extraction, complete induced healing, correct implant placement and developing the soft tissue support for the clinical crown, on top of a sound augmented area. The literature confirms that the success rate of anterior single implant integrations is high while the main concern is the aesthetic appearance after time in function. Is the timing of placement crucial, is it the placement procedure with the augmentation upon the need which creates the difference or maybe and unfortunately, it is a procedure with an unpredictable nature? The aspects of placing single implants in the anterior area will be reviewed and discussed with clinical results of single anterior implant restorations after 10 years and more.



Sayaka Tada, DDS, PhD
Assistant Professor
Discipline of Operative Dentistry, Endodontics & Prosthodontics,
Faculty of Dentistry,
National University of Singapore
Singapore

Dr. Sayaka Tada is Assistant Professor of the department of Prosthodontics at National University of Singapore since 2018. Her major interest is about the management of partially dentate older adults, which ranges from a clinical decision-making process to a public healthcare system. She received her D.D.S. degree in 2007 and Ph.D. degree in 2012 from Osaka University, Japan. In 2014, she was qualified as prosthodontists from Japanese Society of Prosthodontics. After post-doc training in University College Cork (Ireland) and Osaka University (Japan), she worked as Assistant Professor of the Preventive Dentistry (WHO collaborating center) at Niigata University (Japan) between 2016 and 2017. Also she is currently appointed as a board member of European College of Genrodontology and an associate editor of Journal of Prosthodontic Research. She received the ICP Poster Award in 2015.

ABSTRACT:

Dilemma of Developing Dentistry in The Super Ageing Population:
How can The Burden of Prosthodontic Treatments be Handled?

Advances in modern society have succeeded in extending lifespan across the world. More nations have come into the super ageing era. However, the prolonged years of life, in a significant proportion of older adults, are unfortunately associated with rapid decline in physical and mental capacity. For many older adults, life ends generally with a dependent stage ranging over the period of 5 to 10 years long. Those dependent older people are more likely to have complex, compromised and chronic systemic conditions. This demographic change is a great threat since the health care demands and costs of managing chronic disease will increase alarmingly. In Dentistry, remarkable progress has been made for the past several decades. Older adults are retaining more natural teeth longer in life, whereas requiring a higher level of maintenance. The evolution of Prosthodontics such as dental implants offers a variety of treatment alternatives in place of the conventional ways to replace missing teeth. These accomplishments have brought in substantial benefits to the well-being of people with tooth loss. However, at the same time, it creates a number of disadvantages. The oral environment is becoming more complicated, so that there is a heavier burden of self-care and professional help with maintenance to preserve good oral health. Prosthetic treatment increases this burden, and there may be unexpected complications as a patient becomes more dependent because of chronic illness.

Bart Van Meerbeek
Co-Editor-in-Chief
Journal of Adhesive Dentistry
KU Leuven (University of Leuven)
Department of Oral Health Sciences
BIOMAT – Biomaterials Research Group
Leuven, Belgium

Bart Van Meerbeek obtained his DDS in 1988 and his PhD in 1993 at KU Leuven (University of Leuven) in Belgium. He continued his research activity abroad for one year at the University of Texas Health Science Center at San Antonio, Texas, and later also at the University of Missouri-Kansas City. In 1995, he became Assistant Professor ('Docent') at KU Leuven and since then teaches Dental Biomaterial Sciences. In 1998 and 2002, he was promoted respectively to Associate Professor ('Hoofddocent') and Professor ('Hoogleraar'), and in 2005 to Full Professor ('Gewoon Hoogleraar'). His primary research interest involves studies related to the broad field of Adhesive Dentistry, including fundamental as well as clinical research regarding dental adhesive technology in particular. Newer research lines deal with Dental Ceramics, Cariogenicity & Biocompatibility of Dental Materials, Bioactive Materials and Pulp-preservation Material Technology. His research work has been published in more than 400 peer-reviewed journals and has been honoured with awards such as the 1996 triennial Robert Stock Award for best PhD dissertation in Biomedical Sciences, Albert Joachim Award in 1997, Award in Biomedical Sciences of the Research

Council of KU Leuven in 1998, IADR Young Research Award in 2000, SmithKline Beecham Award in 2001, Academy of Operative Dentistry Buonocore Memorial Lecturer in 2003, CED-IADR (Continental European Division of IADR) Robert Frank Lecturer in 2008, 2014 IADR/AADR William J. Gies Award for the best 2014 JDR paper in the Biomaterials & Bioengineering Research category, and the 2015 IADR Wilmer Souder Award (IADR Distinguished Scientist award for Dental Materials). In 2003, he became holder of the Toshio Nakao Chair for Adhesive Dentistry. He was President of the Pan-European Federation of IADR in 2006-2007 and is currently serving as Secretary of the CED-IADR. Since 2004, he is Editor-in-Chief of the Journal of Adhesive Dentistry.

ABSTRACT:
Current Approaches for Adhesive Luting of CAD-CAM Restorations
Digital technology is indispensable in today's dental practice. The first digital revolution occurred several years ago with the introduction of CAD-CAM technology for the production of semi-direct (chair side) and indirect (via dental lab) restorations. Currently, most CAD-CAM systems are based on 'subtractive' manufacturing processes, where restorations are milled out of industrially manufactured blocks. Various types of ceramic, resin-based composite and polymer-infiltrated ceramic CAD-CAM blocks are today available for semi-direct and indirect partial and full crown restorations. This lecture will address the different clinical approaches for (adhesive) luting of CAD-CAM restorations, thereby focusing on both the cement-tooth as the cement-restoration interface. Inevitably, one may expect that 'additive' manufacturing processes or so-called '3D printing' will soon find more applications in restorative dentistry.

Richard van Merkesteyn
Head of Dept. Oral & Maxillofacial Surgery
Head of Training Oral at Maxillofacial Surgery
Leiden, the Netherlands

Prof dr JPR van Merkesteyn. Dental degree in 1977. Training in Oral and Maxillofacial Surgery 1978-1982. Thesis on Fibrous dysplasia in 1988. Medical degree in 1999. Head of training in Oral & Maxillofacial Surgery LUMC in 1999. Appointed professor in Oral & Maxillofacial Surgery in Leiden University Medical Center in 2005. Current: Head of dept. Oral & Maxillofacial Surgery. Head of training Oral @ Maxillofacial Surgery. Oral Oncologist and Implantologist. Chairman working group Head and Neck tumors, Leiden region of the Netherlands comprehensive cancer organization. Member of the Center for bone quality LUMC for fibrous dysplasia, osteomyelitis and osteonecrosis of the jaws. Leader of research programme "Reactive and inflammatory lesions of the jaws" and "Complications in orthognatic surgery".

ABSTRACT:
Medication Related Osteonecrosis of The Jaws (MRONJ)
Medication related osteonecrosis of the jaws is seen in increasing frequency. The MRONJ may lead to denuded bone, pain and suppuration or, in progressive cases, loss of parts of the jaw. Although there has been discussion on the exact pathogenesis, recent publications suggest that in most cases a dental focus is the start of MRONJ. This makes the awareness of MRONJ and possible prevention even more important. When MRONJ is already present, recent reviews however show that a relatively simple surgical and antibiotic treatment protocol leads to a cure in approximately 90% of the patients. The treatment results and surgical technique as used in a series of 200 cases in the LUMC will be discussed.

Sandy van Teeseling
VU Medical Centre and the Academic Medical Centre
Department of Oral and Maxillo-Facial Surgery
The Netherlands

Dr. Sandy van Teeseling maintains a private orthodontic practice in Haarlem since 1984. He studied dentistry at the Free University in Amsterdam and received his orthodontic training at the University of Nijmegen (1979 - 1983). At present he is also affiliated at the department of Oral and Maxillo-Facial Surgery at the VU Medical Centre and the Academic Medical Centre both in Amsterdam where he is involved in the interdisciplinary management of orthognathic patients. Furthermore, he is staff member at the Orthodontic Department of the University Medical Centre Groningen where he is involved in teaching and training of orthodontic residents. He is a member of several interdisciplinary teams managing and treating complex dental patients and he gives lectures and courses on the subject, with emphasis on the orthodontic aspects.

ABSTRACT:
Interdisciplinary Management of Complex Dental Cases - the Orthodontic Perspective
In the treatment of complex dental cases, a paradigm shift from multi-disciplinary treatment to inter-disciplinary treatment is taking place. This treatment philosophy is already common throughout the profession in the management of surgical-orthodontic patients. Interdisciplinary teamwork with a focus on restorative treatment outcome defines the steps necessary for successful treatment, involving a top-down treatment planning. Orthodontic movement of teeth in the treatment of complex dental cases to provide (more or less) space in the three dimensions will facilitate the creation of effective restorations with or without the use of implants. It is apparent that implants in orthodontic treatment have created a new dimension in teeth movement. Through the use of implants, as temporary anchorage devices during

orthodontic treatment, more predictable and efficient tooth-movements are possible. The session will demonstrate that through careful planning, the best of all treatment options can be used to achieve an optimal starting point for restorative dentistry.

Anita Visser
Maxillofacial Prosthodontist
University Medical Center Groningen
Groningen, the Netherlands

Dr Anita Visser (DDS PhD) graduated in 1996 as a dentist from the Radboud University Nijmegen, the Netherlands. Since her graduation, she works as a Maxillofacial prosthodontist and geriatric dentist at the department for oral surgery and special dental care of the University Medical Center Groningen (UMCG) which is part of the University of Groningen, the Netherlands. In 2005 she qualified as a maxillofacial prosthodontist where after she became a senior staff member on the department. She obtained her PhD in 2009 and was recognized as a geriatric dentist in 2014 and a restorative dentist in 2015. Furthermore, she coordinates research projects in special dental care. Education, patient care and research is focused on oligodontia, implant dentistry, head neck oncology and geriatrics. She has contributed to a numerous papers, international conferences and book chapters, and she participated as an invited speaker in many national and international congresses.

ABSTRACT:

Implant Dentistry in Frail Elderly: Blessing or Burden?

Healthy aging is something one would like to wish for every citizen on this planet, however aging is often a complex process. The older one gets the higher the change for developing comorbidities and becoming frail. In the next decade we will have more and more elderly and most of them will keep their own dentition until death. From literature we know that keeping the own dentition healthy and functional during aging is a challenge. Many elderly face severe oral health problems which in turn is a threat for social wellbeing and general health. Maintaining good oral health is therefor a priority for the dental care professional. Treating frail elderly however is complex and means often that one

has to deal with polypharmacy, severe health problems, mobility problems, dementia, complex health, nursing homes, ancient prosthetic devices, old implant systems etc etc. In this lecture we will take you into the geriatric world and show you how to recognize and how to handle complex geriatric cases.

Terry Walton
Professor Affiliate in Clinical Dentistry
University of Sydney
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Dr Terry Walton AM, BDS (Syd), MDSc, (Syd) MS (Mich), FRACDS, FICD. graduated Bachelor of Dental Surgery and Master of Dental Science from the University of Sydney in 1974 and 1979 respectively; Master of Science (Prosthodontics) from the University of Michigan in 1981and Doctor of Dental Science from the University of Sydney in 2013. He is a Fellow of the Royal Australasian College of Dental Surgeons, the International College of Dentists and the Pierre Fauchard Academy. Dr Walton has been in Specialist Prosthodontist practice in Sydney since 1983 and holds the title of Professor Affiliate in Clinical Dentistry at the University of Sydney. He is a member of many Australian and International dental organisations and was the Co-President of the International College of Prosthodontists during 2000 and 2001. Dr Walton has been involved in practice-based clinical research into the long-term outcome and patient evaluation of tooth and implant-supported dental prostheses.

ABSTRACT:
Has the Evolution of the Implant-Abutment Interface Improved Long-Term Clinical Outcomes?
In a two-piece implant design, the abutment or a single-piece restoration attaches to the implant via the implant-abutment interface. This interface is a critical transition zone that has received significant research attention in an effort to improve joint stability, minimize physiologic and pathophysiologic osseous changes, and maintain soft tissue levels and aesthetic outcomes. Specifically, changes in implant-abutment interface design involved variations in the level of transition from the implant to the abutment or restoration (bone-level design vs. soft-tissue level design); geometry of the implant-abutment connection (internal vs. external); a smooth polished collar or textured implant surface up to the implant-abutment interface; modified micro-roughness of implant surfaces adjacent to the interface;

platform switch; microgrooves; material composition of abutment and restoration; and method of abutment/prosthesis retention (cement- vs screw-retained). The presence or absence of bacteria in the implant-abutment transition zone – the so-called microgap – has been a particularly hotly debated aspect with much effort devoted to supposedly eliminating, or at least minimising, this source of bacterial contamination. But have these developments significantly improved long-term clinical outcomes, especially from the patients' perspective, and who is driving them – the patient, the dentist or big business? This presentation will present data that questions the associated science, especially related to assessment of marginal bone levels, and identifies several unintended consequences.

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Daniel Wismeijer studied dentistry at the University of Nijmegen Dental School where he received his PhD in 1996 on the subject of overdentures on dental implants. 1985 – 2006: Worked at The Amphia teaching Hospital in Breda in the department of Oral Surgery and Maxillofacial Prosthodontics. In 1985 he started a dental practice which since 1990 is a referral practice for Oral Implantology in which he still works. He is a past president of the Dutch Prosthodontic Association and the Dutch Association for Gnathology. He is an ITI fellow since 1993, was a member of the ITI education Core Group for 8 years and a member of the ITI research committee from 2011 till 2015. In 2013 was elected as an ITI board member at large and in 2015 he became chairman of the ITI education committee. In 2006 he accepted the position of Professor of Oral Implantology and Prosthetic Dentistry at ACTA Amsterdam which he combined with his referral practice.

ABSTRACT:
The Rendered Reality of Digital Dentistry. A Fake Reality?
The digitization of Dentistry has become a hot topic and many researchers and clinicians in our field, including myself, have been advocating it's use in everyday practice. We also see that industry is pushing this new technology forward and up till now it's the dental technicians that have really started to digitize their labs in a big way. Now whilst we are getting more insight into the possible applications of the digital approach in our field we get to realize the limitations of the technology use when looking at reproducibility, preciseness and trueness. When using digital technology in

Dentistry we must understand that the digital reality is a rendered reality based on point clouds, voxels and pixels. As these are rendered into STL and DICOM files using different algorithms the information or changes / or even disappears. When then importing the files into software packages to create images and plan the treatment and or restorations we get even further away from the core information or source code. Digital tools such as for instance the Digital articulator then have a relative value in the CAD and CAM workflow when compare to the analogue workflow where Dentistry is coming from.
The STL and DICOM culture that is creeping into Dentistry is a Rendered reality. The information we have gathered from our patients has been changed into another state. In this lecture we will try to show how these changes can influence the preciseness and trueness of the digital workflow. We must understand that a Rendered reality is also a fake reality and with the technology as we use it today as such still has its limitations.

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Dr. In-Sung Yeo served as a dental officer (Captain) at Special Forces Commands in the Korean Army for three years (2003–2006). He got his Ph.D. in biomaterials, in vivo studies of implant surfaces, at Seoul National University in the year, 2007, and received his prosthodontic specialty certificate in 2017 from the Korean government. He was an Assistant Professor at Seoul National University from 2010 to 2014. Now, Dr. In-Sung Yeo is an Associate Professor at the same university. His major research is about biologic responses to artificial biocompatible surfaces. Also, he is trying to find physical or statistical solutions for biologic phenomena in prosthodontics and implantology.

ABSTRACT:
Three-Dimensional Evaluation of Bone–Implant Interface in Endosseous Dental Implants
Purpose: Nature of bone–implant interface remains unknown. Histologic findings from undecalcified specimens using light microscopes are helpful to understand the interface. However, other resources are still needed. This presentation introduces some approaches to evaluating quality of the interface: X-ray microtomography-based three-dimensional (3D) histomorphometry, biomechanical interpretation using a mechanical vibration model and calculation of shear bond strength from removal torque to estimate osseointegration force.

Methods & Materials: The rabbit tibia model was used in the 3D histomorphometric study, which used implants with a simple geometry and turned surface. Each tibia received 2 implants. After two weeks of healing, the implants and surrounding bone were surgically removed. Using x-ray microtomography (μCT), the 3D histomorphometric data of the interface were measured. A similar study was also performed for screw-shaped implants. The next study investigated physical contact between the bone and implant. Using the mass-spring-damper model of mechanical vibration, an analysis was tried to find a biomechanical relation between damping and resonance frequency at the interface. Lastly, the shear bond strength of osseointegration was measured using the rabbit tibia model. Grades 2 and 4 commercially pure titanium implants with identical dimensions and surface topography were prepared. The implant–bone blocks were removed at six weeks after implant installation. The bone–implant contact area was measured with μCT and removal torque was quantified with a motorized torque tester. Shear bond strength was calculated from these measurement values.
Results: The whole surface of bone attached to the implant surface was found with the 3D μCT technique. The linear relation was found between damping and resonance frequency. However, this relation was limited to physical attachment between the bone and implant. The grade 2 implants showed higher shear bond strength than grade 4 despite of similar topographic features and bone–implant contacts.
Conclusion: The 3D μCT-based technique produces the overall picture and enables the quantitative analysis of the bone–implant interface. The results of biomechanical analysis and shear bond strength calculation suggest that the actual bond might occur between bone and titanium implant surface beyond the physical contact of bone with the surface.

Oral Abstract Presentations

Listed in Alphabetical Order

Oral Abstract Presentations

ACCURACY OF STATIC COMPUTER-ASSISTED IMPLANT PLACEMENT: A SIMULATED LABORATORY STUDY COMPARING FULLY-GUIDED AND SEMI-GUIDED PROTOCOLS

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Keywords: CAD/CAM,3D, computer-guided surgery

Purpose/Aim: Implant placement must be planned to achieve an optimal prosthetic outcome. Thus, surgical guides were advocated to control implant location and angulation. With the advancement of digital technologies, fully- and semi-guided static computer-assisted implant placement protocols were proposed. This study compared the accuracy of fully-guided (FG) and semi-guided (SG) implant placement protocols against the conventional freehand (FH) protocol, and evaluated the influence of each protocol on the positions of single anterior and posterior implants.

Materials and Methods: Maxillary models mounted on manikin heads were used to simulate clinical situation of missing anterior and posterior teeth. Ten postgraduate students inserted 1 anterior and 1 posterior implants per protocol. The FG protocol involved designing the surgical guide via coDiangostiX software and all the drilling steps and implant placements were completed through the guide. Blue Sky Bio software was used to design the guides for the SG protocol that allowed for pilot drilling only. The FH implant placement was completed without the aid of any guide. For each implant, the trueness and precision, vertical and horizontal neck and apex, and angle deviations from planned positions were calculated. The differences between the anterior and posterior implants were evaluated for each protocol.

Results: The FG protocol provided the most accurate implant placement in relation to trueness, precision, horizontal neck (0.47 mm - 0.52 mm) and apex (0.71 mm - 0.74 mm), and angle deviations (2.42o - 2.61o). The vertical accuracy was not significantly different among the different protocols. The SG protocol was generally similar to the FH protocol with a horizontal neck deviation of 1.01 mm - 1.14 mm, horizontal apex deviation of 1.02 mm - 1.35 mm, and angle deviation of 4.65o - 7.79o. The FG protocol showed similarity in the accuracy of the anterior and posterior implants. There was a tendency for inferior accuracy for posterior implants compared with anterior implants for the SG and FH protocols.

Conclusions: The accuracy FG protocol was more superior to the other protocols and was not influenced by the position of the implants. The SG and FH protocols showed inferior accuracy for posterior implants than anterior implants.

BIONIC TM ROBOTIC ARTICULATOR OVER THE LIMIT OF FULLY ADJUSTABLE ARTICULATORS

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Keywords: ROBOTIC ARTICULATOR, FULLY ADJUSTABLE ARTICULATORS

Purpose/Aim: Fully adjustable articulators and pantographs are widely used to register the intermaxillary relashionship. However, their variety and number may be overwhelming. Therefore, a narrative review of the literature was performed on the principal devices with particular emphasis to their pros and cons. Moreover, here is presented an accurate and rapid robotic system for recording and reproducing the single mandibular movement.

Materials and Methods: Several primary studies were summarized and the conclusions were drawn in a holistic interpretation made by the experience of the reviewers.

Results: In the 1960s, fully adjustable articulators and pantographs were developed: Hanau 130-21, Stuart gnatology computer and Denar D5A. They reproduce single condylar movements better than the average-value articulators and semiautomatic arches. The pantographs register the mandibular movement in each direction and the curved condylar inserts inside these devices can reproduce the anatomy of the glenoid fossa hence condylar dynamics. Albeit accurate, these tools are hindered by several limitations such as the long acquisition time and the large amount of information required. BionicTM system integrates a particularly precise jaw movement analyzer adopting intraoral based reference system and a simplified robotic mechanics to reproduce recorded movements. The acquisition system uses an optoelectronic motion acquisition system that records 200 fps. The dedicated software recognizes the known geometries on the markers connected to each jaw at a predetermined distance. Markers do not interfere with oral functions. Each registration process takes five seconds.

To replicate the six degrees of freedom of movement needed to perform mandibular movements on a robot, 3 translations and 3 rotations, the previous robots used delta mechanics that required a different number of parallel effectors between the motors and the object to be moved by introducing tolerances mechanical inter-components. Bionic Robot is configured as a gyroscope, it has 3 motors that work in translation and 3 in rotation at a point where all the rotation and translation axes converge. This mechanical configuration eliminates the parallel effectors thus improving precision and reducing manufacturing costs. The recording system and the robotic machine both quantify movement as translations and rotations of a rigid body in space. This is an advantage compared to traditional delta mechanics robots that need to translate recorded movements by decomposing them into segmented information for each parallel effector.

Conclusions: The Bionic system allows the individual mandibular movements to be recorded and reproduced rapidly. It overcomes many of the limitations of the previous articulators and allows recording not only the border movements, but also the functional ones. The Bionic system has a main use in research, but the future goal is to interface it with CAD-CAM systems, to have a very precise occlusal adjustment phase on model and significantly reduce corrections made in clinical phase.

EVALUATION OF INTERNAL AND EXTERNAL HEXAGON CONNECTIONS IN IMMEDIATELY LOADED FULL-ARCH REHABILITATIONS: A SPLIT-MOUTH TRIAL

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Keywords: dental implants, immediate loading, implant abutment connection

Purpose/Aim: To evaluate if a different morphology of the implant-abutment connection (internal vs. external hexagon) is able to condition the behavior of hard and soft peri-implant tissues in full-arch immediate loading rehabilitations.

Materials and Methods: Twenty patients with signi? cantly unfavorable prognoses for their residual maxillary or mandibular dentitions

were selected and rehabilitated with immediately loaded ? xed full-arch rehabilitations following the Columbus Bridge Protocol in two different centres. Four to six implants with identical macro- and micro-topography were inserted in each arch: external hexagon implants (EHC) in one randomly selected side of the dental arch and internal hexagon implants (IHC) in the other side. Primary outcome measures were the success rates of the implants and prostheses. Any technical and biological complication was recorded. Secondary outcome measures were: peri-implant marginal bone level (MBL) changes, plaque index (PI), probing depth (PD) and bleeding on probing (BoP), evaluated at implant insertion and at 3, 6, 12 and 36 months post-loading.

Results: Forty-three EHC and 40 IHC implants were inserted in 20 patients. No patients dropped out. Two implants failed; one IHC after 3 months and one EHC after 6 months in two different patients (difference IHC vs. EHC at patient level: 0.06%; 95%CI: ?1.9 to 2.1; P=0.99). No prosthesis failed. No biological complications were identified and three loose prosthetic abutment screws were identified in three different patients (two EHC and one IHC); difference at patient level IHC vs. EHC: 2.1% (95%CI: ?0.8 to 5; P=0.43). Overall marginal bone loss was not significantly different between the two treatment groups at any time point. The mean difference of bone levels between EHC and IHC was 0.25 mm (95%CI: ?0.18 to 0.69) at implant placement. Mean difference between IHC and EHC was ?0.01 mm (95%CI: ?0.34 to 0.36) at 3 months, 0.13 mm (95%CI: ?0.48 to 0.22) at 6 months and 0.11 mm (95%CI: ?0.45 to 0.25) at 12 months. All the implants showed good periodontal health at the 3-year-in-function visit, with no statistically significant differences between groups regarding PI, PD and BoP. No significant effect of centres over all outcomes was identified (P=0.71 for MBL, P=0.14 for PI, P=0.14 for PD and P=0.20 for BoP).

Conclusions: On the basis of the present trial the two types of implant connections were clinically reliable. After 36 months in function, both implants provided good clinical outcomes, without statistically significant differences between the two groups

IMPLANT REHABILITATIONS AND GERIATRIC AGE: CONSIDERATIONS FROM LITERATURE

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Purpose/Aim: Dental implant rehabilitation is now considered as a conventional treatment and age as well is not a contraindication. This type of solution for edentulism is increasing, but is this always true? Is it the same everywhere and for every age?

Materials and Methods: This issue has been focalized through scientific literature.

Results: Literature shows that dental implants represent a reliable rehabilitation affordable by more and more people. If we think globally, the percentage of the world population of complete and partially edentulous individuals had received implant treatment is very low. Actually, implant treatment is inaccessible for the great majority of people, mainly because of economic and resource factors. Secondly, over the years, implants changed a lot and in different aspects: macro, micro morphology (cylindrical, conical, cylindro-conical, with spreads and different spreads), surface (machined, rough), different connections (internal, external), switching platform, surgical and prosthodontic protocols (immediate, early, delayed loading, fixed, removable) etc. These confounding factors make impossible to have reliable long-term studies. Literature shows that the longest period of follow-up (30 years) regards the same type of implant (machined, same brand), surgical and prosthodontic protocols (Bränemark) no more in use. Literature also shows that age is not a problem for dental implant treatments. Consequently, it is difficult to predict the situation of young-adult implant-patients after 20 years or in case they will be frail. Absurdly, based on these considerations, the new and contemporary dental implantology could more easily suggested and performed on the elderly patient where the longevity of a rehabilitation is less important. These data collected by literature must us reflect on dental implant rehabilitation as a simple solution for all the patients and all the situations. The young-adult age can be an important determinant unfavorable for the long-term success.

Conclusions: The so called "conventional prosthodontics" is still important, it has to be still taught and well-known and not only for a socio-economical reason.

EVALUATION OF MARGINAL FIT OF DIFFERENT PREPARATION DESIGNS USING MICRO-COMPUTED TOMOGRAPHY

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Keywords: marginal fit, crown restoration, micro-computed tomography

Purpose/Aim: The marginal fit is an important component for the clinical success of prosthodontic restorations. The aim of the study was to evaluate the marginal fit of ceramic crowns on different marginal preparation types with micro-computed tomography.

Materials and Methods: A knife edge preparation, a chamfer preparation and a shoulder preparation were made on 3 typodont maxiller first premolar. The teeth were scanned using CEREC Omnicam intraoral scanner and for each preparation types 3 full ceramic crowns were designed and manufactured. Each crown was fixed to the teeth and micro-computed tomography scanning was used to achieve the marginal gaps in the coronal and sagittal planes. The marginal fit (vertical fit and horizontal fit) was measured at 52 sites on each crown. Data were statistically analyzed using 1-way ANOVA, followed by the Tukey honestly significant difference test ($p<0.05$).

Results: The mean values of vertical misfit were 103.85±64.79 µm for the shoulder preparation type, 243,66±75,59 µm for the chamfer preparation type and 318.04±44.97 µm for the knife-edge preparation type. Shoulder preparation type presented the significantly best vertical fit among the other preparation types ($p>0.05$). The mean values of horizontal misfit were 89.79±18.78 µm for the shoulder preparation type, 35.37±28.27 µm for the chamfer preparation type and 254.59±30.37 µm for the knife-edge preparation type. No significant differences were noticed between chamfer and shoulder preparation types for horizontal fit ($p>0.05$). Knife-edge preparation type showed significantly higher marginal gap values than the other groups ($p<0.05$).

Conclusions: Shoulder preparation type exhibited a significantly smaller vertical misfit than knife-edge preparation type and shoulder preparation type was within the range of clinical acceptability. Shoulder and chamfer preparation types showed the best horizontal fit.

IS DIRECT COMPOSITE RESIN THE MOST EFFICIENT MATERIAL FOR PARTIAL RESTORATIONS IN POSTERIOR TEETH?

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Keywords: Adhesion, esthetics, long-term study

Purpose/Aim: To analyze the clinical success of direct light-activated composite resin restorations in posterior teeth. The quality of the margins and occlusal surfaces were evaluated, as well as their survival, according to their extensions and locations. All restorations were performed by one operator in his private practice, in a 5 to 20 year period.

Materials and Methods: Included patients must have been treated in the operator's office for at least 7 years and still in the practice through 2013; all patients had complete dental arches. Patients with removable dental prostheses or disabilities, who had moved, or who had died were excluded. After isolation with rubber dams, different types and brands of composite resins, were placed in posterior teeth. To be included in the study, the restorations had to have been in function for at least 5 years and had to have been placed between October 1993 and October 2008. The established failure criteria were: removal of the restoration or tooth loss. Out of 2552 registered patients, 210 fulfilled the inclusion criteria. Of these 210 patients, 136 constituted the statistical representative sample and 138 randomly selected subjects were clinically examined between November 2013 and April 2014. Of these 138 patients, 61 had received 105 direct light activated composite resin restorations in posterior teeth. Twentynine patients (47.5%) underwent annual maintenance therapy. The patient-based data collected from clinical exams and personal records were recorded on a specially designed form. Age, gender, period of clinical attendance, tooth preparation, location, size, quality and longevity of the restorations, restorative materials, adhesive systems, parafunctional habits, secondary caries, and maintenance therapy were the variables evaluated. Authors were blinded to the clinical assessments. Cohen's Kappa coefficient of the quality analysis of the margins and occlusal surfaces of the restorations ranged from 0.78 to 1. Data processing was performed using Epidat software, v3.1, developed by the Consellería de Sanidade de la Xunta de Galicia with the support of PAHO?WHO and SPSS software v13.0. If the number of complete values was too small, a Kaplan?Meier curve could not be used. Therefore the Fisher's exact test, Chi?square test, Kruskal?Wallis test, and Mann?Whitney non?parametric test were indicated to analyze significant differences.

Results: At the time of the examinations, two restorations failed (2%) and 103 (98%) were in function. Ninety-eight restorations (95.1%) were rated as clinically successful. The observed mean survival time of restorations that remained functional was 11 years and 7 months.

Conclusions: Direct light-activated composite resin restorations in posterior teeth showed a high clinical success rate and long-term mean survival time. These composite resins might be considered as the most efficient and the first material of choice to restore medium, extended, and in some clinical situations, large preparations in posterior teeth.

COMPREHENSIVE TREATMENT AND REHABILITATION OF PATIENTS WITH VASCULAR MALFORMATIONS: 3 CLINICAL REPORTS

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Keywords: Vascular malformations, osseointegration, rehabilitation

Case Presentation: This presentation describes the management of three cases of maxillofacial vascular malformations (VMs) and our experience in the treatment of these rare entities with a multidisciplinary approach. The first case illustrates the surgical correction of an AV malformation of the mandible followed by distraction osteogenesis, placement of three implants and an implant-borne screw-retained fixed partial denture (FPD). The second case refers to the surgical correction of an AVM of the maxilla, free skin graft placement for deepening the maxillary vestibule, interim removable partial denture, implant placement and provisional implant borne FPD, orthognathic surgery of the mandible for open bite correction and the definitive screw retained FPD. The third case, which is the most complex one, depicts the treatment of a patient diagnosed with a severe lymphatic malformation of the face causing a marked mandibular bony hypertrophy and an excessive open bite of 45mm. Following mandibular resection, a fibula-free flap (FFF) was used for reconstruction and an interim RPD fitted. Dental rehabilitation was achieved with the placement of osseointegrated implants in the fibula graft and a screw-retained provisional metal-acrylic FPD fitted facilitating the gradual reduction of the excessive open bite. When the vertical dimension reached the desired point, a definitive overdenture supported by a cast bar was constructed to compensate for excessive crown height space, unfavorable crown-to-root ratio and implant position. Dental rehabilitation of these patients can be extremely challenging because of the multiple surgical interventions and staged treatment phases required. A close collaboration between the maxillo-facial surgeon and the prosthodontist is necessary to optimize the results. We conclude that the previously mentioned surgical techniques along with the use of osseointegrated implants for an implant-supported prosthesis are a reliable rehabilitation option in the long-term treatment of intraosseous VMs. Three-dimensional imaging and the implementation of digital surgical design will facilitate the treatment planning as well as reduce the overall necessary time to complete the rehabilitation on these extremely demanding cases.

PARTIAL INDIRECT RESTORATIONS WITH DEEP MARGIN ELEVATION IN THE POSTERIOR REGION: LONG TERM RESULTS

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Keywords: clinical trial, immediate dentin sealing, deep margin elevation

Purpose/Aim: Deep margin elevation (DME) relocates the cervical outline of large-sized cavity dimensions in the posterior area supragingivally, using a resin composite in a direct technique. The aim of this study is to evaluate the long-term clinical performance of partial indirect restorations with DME and compare the effects of selected baseline variables on the (quality of) survival of the restorations.

Materials and Methods: All teeth that were restored in combination with indirect restorations and DME between 2007 and 2016 were eligible for inclusion in this retrospective cohort study. Overall cumulative survival rates were calculated (Kaplan-Meier estimates) and compared amongst subsets of variables that were considered of influence over time (endodontic treatment, material used for indirect restoration, emergence profile of the DME, cusp coverage, quality and location of the contact point; Log Rank Mantel-Cox). Qualitative evaluation of all surviving restorations was performed using the modified United States Public Health Service (USPHS) criteria. The outcomes of these USPHS subsets were compared amongst time (<3 years, >3 years), type of material (ceramic or composite) and the

presence of previous endodontic treatment (yes / no) to evaluate if these factors had a significant influence on the quality and potential degradation of indirect restorations with DME (Chi-square tests).

Results: A total of 197 indirect restorations in 120 patients could be included. Restorations or teeth presenting with secondary caries, fracture of the restoration / tooth, debonding of the indirect restoration, root decay or pulpal necrosis were considered as absolute failures (n=8) to an overall cumulative survival rate of 95.9% (SE 2.9%) after more than 10 years, with an average evaluation time of 57.7 months. Inlays and full onlays performed better in terms of survival compared to partial indirect restorations (p=0.04). The qualitative evaluation of all 189 remaining surviving indirect restorations were compared over time, type of material and endodontic treatment. Indirect restorations with DME showed significant more degradation when restorations were more than 3 years old in than indirect restorations younger of age (more: margin discoloration ($X2(2)=9.02$, $p=0.01$), fracture of restoration ($X2(2)=42.03$, $p=0.00$), fracture of tooth ($X2(2)=23.18$, $p=0.00$) and caries ($X2(2)=9.02$, $p=0.00$)). Periodontal health does not degenerate in time ($p>0.05$). Composite restorations present with more degradation in qualitative evaluation (more: fracture of restoration ($X2(2)=38.52$, $p=0.00$), fracture of tooth ($X2(2)=31.39$, $p=0.00$), wear restoration ($X2(2)=14.82$, $p=0.01$). More wear of the antagonist is observed in antagonists opposing ceramic restorations ($X2(2)=6.62$, $p=0.04$). The presence of endodontic treatment shows significant more fracture of restoration and tooth (($X2(2)=38.52$, $p=0.00$) and respectively ($X2(2)=20.67$, $p=0.00$)).

Conclusions: The long-term performance of indirect restorations with DME is very good and can be an effective approach to the restoration of teeth with deep subgingival preparations. In time more degradation occurs in indirect restorations with DME, especially in indirect composite restorations.

SINGLE IMPLANT SUPPORTED MANDIBULAR OVERDENTURE: 6 YEARS OF FUNCTIONAL, RADIOGRAPHIC AND PROSTHETIC DATA

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Keywords: overdenture

Purpose/Aim: Prescribing mandibular overdenture support with a single implant is more cost-effective, has potential surgical advantages, and shows clinical outcomes not significantly different from overdentures retained by two implants. This more conservative approach is popularly regarded as a viable treatment option for most edentulous patients. This study sought to verify whether the recruitment of a single implant to support a mandibular complete denture may improve thickness discrimination thresholds and masticatory performance period of 6 years. The study also reported radiographic peri-implant bone resorption, implant survival, and prosthetic maintenance data.

Materials and Methods: Fifteen edentulous patients (11 males and 4 females, age range 62-79 years, mean age 67 years) were selected from the consecutive patient group seeking complete denture treatment at the Dental School, University of Torino. Complete dentures were made following traditional protocols, followed by single implant (Biomet3ITM) placement and a delayed load protocol. Prosthetic connection took place three months post-surgically together with placement of Locator® attachments (Zest Dental Solutions, Carlsbad, CA 92010 USA). Recordings of the thickness discrimination thresholds and the masticatory performance were made 5 times in each patient: first with complete dentures in place before the insertion of the implants, then on the day of the prosthetic connection, one month, 1 year and 6 years after the connection. Radiographs were taken 1, 3, 6 months, 1, 2, 6 years after the prosthetic connection Patient were recalled once a year for the prosthetic and clinical implant control and were nonetheless visited during the year for all kind of prosthetic or implant needed intervention.

Results: Two patients were considered dropouts at the last recall evaluations, as they were deceased. An improvement in thickness discrimination and masticatory ability were noted. No implant was lost, radiographic findings did not highlight any significance of pathological bone resorption. Prosthetic maintenance data supported findings present in the literature.

Conclusions: In spite of the limits of this study, results support existing data indicating single implant supported mandibular overdenture as a viable treatment for the edentulous mandible in difficult geriatric populations.

A COMPUTERIZED TOMOGRAPHIC EVALUATION OF MAD AT TWO DIFFERENT JAW RELATION IN OSA PATIENTS

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Keywords: OBSTRUCTIVE SLEEP APNEA, MANDIBULAR ADVANCEMENT DEVICE, COMPUTED TOMOGRAPHY

Purpose/Aim: Obstructive sleep apnea (OSA) is characterized by repetitive episodes of complete or partial collapse of the upper airway during sleep, with a consequent cessation/reduction of the airflow. Snoring is a common symptom of this obstruction because during sleep, critical narrowing of the airway results in a condition in which inspiratory pressure exceeds the forces maintaining airway patency. Treatment for OSA can be continuous positive airway pressure (CPAP), surgery and oral appliances. While CPAP has been the treatment of choice, it needs sealed tubing and a power source connected device and use of a mask interface. Hence, more often patients develop intolerance. Surgery may also have serious side-effects like scarring in soft palate. Mandibular advancement device (MAD) has been An effective method in the management of snoring and OSA. Treatment efficacy may be assessed objectively by nocturnal polysomnography, imaging techniques and questionnaires. The purpose of the present study was to evaluate effects of MAD at two different horizontal positions of mandible through computed tomography and to compare anteroposterior and lateral diameters; cross sectional area of airway at specific anatomical levels using different anatomical landmarks in the airway at different amount of mandibular protrusion.

Materials and Methods: In a study done in the Department of Prosthodontics KGMU, MAD was fabricated with the mandible in an advanced position from 50% and after 1 month to 70% of the patient's maximum protrusive ability. Subjects were instructed to use the appliance every night. Pre and post CT scan were performed and analyzed after 4 to 6 weeks. Up to date no study has been conducted to compare advancement of mandible from 50% to 70% of protrusion of mandible by Computed tomography. Traditionally, upper respiratory airway space has been evaluated by the use of cephalometric radiographs; however, this method results in superimposition of all bilateral structures of the skull and only provides a 2-dimensional anteroposterior linear dimension.(this study was funded and supported by Council of Science and Technology- UP, Lucknow)

Results: In this study, we analyzed a series of images by computed tomography (CT) with use of MAD at 50% and 70% of the maximum mandibular protrusion and compared the results based on anteroposterior and lateral diameters and cross-sectional area of airway at specific anatomical levels using different anatomical landmarks in the airway at different levels of mandibular protrusion. The results were improved in patients with 70% of maximum protrusion but comfort was better in patients with 50% of maximum protrusion.

Conclusions: Although 70% of maximum prostrusion resulted in increased dimensions of airway but MAD with 50% of maximum prostrusion were equally effective.

PROGRESSIVE ORAL REHABILITATION AND ITS INFLUENCE IN NEUROCOGNITIVE ACTIVITY

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Keywords: implant, cognition

Purpose/Aim: Oral health is a major public health problem, especially in an ageing society. Toothloss, impairs oral function and quality of life, and recent data indicates a correlation with cognitive decline in animal and human studies. The application of dental implants has broadened prosthodontic treatment options, especially for edentulous patients. Numerous studies have reported the benefits of implant-retained and implant-supported prostheses on masticatory function, quality of life and psychosocial wellbeing. However, only a limited number of studies have reported on cognitive changes with implant rehabilitation in edentulous patients. The aim of the study is to assess changes in cognitive function and processing during progressive oral rehabilitation.

Materials and Methods: 10 edentulous patients (5F and 5 M) were included in this study. The progression of oral rehabilitation included: replacement of complete removable dental prostheses (complete RDPs) with mandibular 2-implant-retained RDP (IR-RPD), and mandibular 4-implant-supported fixed dental prostheses (IS-FDP). Neurocognitive assessment was performed to assess changes in executive function and cognitive ability, including learning, memory and spatial awareness. Cortical activity within hippocampus and prefrontal cortex areas was evaluated by functional magnetic resonance imaging (fMRI) acquisitions with functional tasks (jaw clenching, working memory and sustained attention, inhibition). The assessment was conducted at new complete RDPs (T0), 1-week and 6-week post insertion of mandibular IR-RDP (T1 and T2) and mandibular IS-FDP (T4 and T5), respectively.

Results: To date, all participants have completed assessments at T0. Two have completed assessments at all 5 time spots. Two have completed assessment up to T1 and two have completed assessment up to T2. Neurocognitive assessment revealed a trend of decline at T1 and then improvement to or beyond T0 level at T2. This was consistent with the data from fMRI assessments. Both jaw clenching tasks and cognitive fMRI activation tasks showed a decrease of cortical activity at T1, which then increased at T2.

Conclusions: Current data suggest neurocognitive changes might be associated with prosthodontic adaptation and cognitive changes following progressive oral rehabilitation.

ADVANCED JAW RECONSTRUCTION IN HEAD AND NECK TUMORS: A REVIEW OF THE DATA AND PROTOCOL

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Keywords: jaw reconstruction, digital surgical planning

Purpose/Aim: Over the past decade, there has been a shift in the Surgical and Prosthetic Design of the advanced Jaw Reconstruction Rehabilitation (JRR) used to treat head and neck tumors (HNT). Since 2011, iRSM made the commitment to use 3-D, digital and surgical design and simulation techniques to treat active disease in select HNT patients. This involves a digitally planned fibular free flap reconstruction (surgical design and simulation, SDS) with the primary installation of osseointegrated dental implants. The purpose of this research presentation is to first highlight the outcome data between the conventional (non-SDS) and advanced (SDS) technique (table 1), secondly to review the surgical driven design protocols have evolved and modified in the planning and delivery of the advanced jaw reconstruction to support the completion of oral rehabilitation in the JRR pathway and lastly to discuss trends in the data of factors that are affecting cortical bone vitality in this patient population.

Materials and Methods: A retrospective chart review was conducted on adult HNT patients who completed JRR treatment with a fibular free flap reconstruction with osseointegrated dental implants. The two treatment approaches include the advanced JRR, with 3D SDS and the primary installation of osseointegrated dental implants and conventional JRR, a non-digitally planned technique with delayed installation of dental implants. Patients may have undergone +/- chemoradiation. Data were collected on patients between January 2000 and August 2018 at the Institute for Reconstructive Sciences in Medicine (iRSM). The outcome measures included implant utilization, time to prosthetic connection, as well as predictive factors of outer cortex loss in the advanced jaw reconstruction patients.

Results: A review of the outcomes data reported a higher utilization of implants and shorter time to prosthetic rehabilitation in the advanced JRR group compared to the conventional JRR as highlighted in Table 1. Protocol modifications of the advanced JRR over the 9 years are presented in illustration 2. Predictive factors such as RT were associated with OCL in the advanced JRR (Fisher exact test $P< 0.001$). There was no OCL observed in the non-irradiated patients or in patients treated with the modified protocol as described in the table.

Conclusions: These retrospective and observational studies reviewed have captured outcome data that compare differences between the conventional and advanced techniques used in JRR. Current research is discussed to present the trends in the data to support protocols modifications to support the successful completion of advanced Jaw Reconstruction Rehabilitation (JRR). Follow-up data of the modified protocol of the advanced JRR patients is needed to capture long-term clinical outcomes.

DIGITAL PROSTHETIC SOLUTIONS FOR MANDIBULAR RECONSTRUCTION AFTER CANCER SURGERY: PRELIMINARY RESULTS OF ONGOING RESEARCH

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Keywords: Free fibula flap, CAD-CAM, oral implants

Purpose/Aim: After cancer ablative surgery of the mandible, the free fibula flap (FFF) may not be large enough to reach the original height of the native alveolar bone. As a consequence, dental implants may be positioned deeper than the mouth floor, resulting in an unaesthetic final prosthetic restoration and difficulty in hygienic maintenance. The aim of this study is to discuss a novel digital workflow-based approach for positioning the FFF to restore the vertical height of the mandible, while maintaining the natural gingival/crown ratio, and improving oral hygiene maintenance during rehabilitation. We will also present a hybrid fixation approach that allows for use of either a fixed or removable prosthesis, depending on the needs of the patient.

Materials and Methods: In this novel protocol, the design of the bone plate was modified to allow reproduction of a double-level anatomy: a more lateral basal bone inferior margin of the mandible and a more medial alveolar bone position. The customized plate was designed to support the FFF at the level of the alveolar bone, so that no pink resin in the prosthesis was required to fill the space between the crowns and gingiva. A cobalt/chrome framework was then prototyped via a hybrid manufacturing technique, and a novel method for fixing the prosthesis in place allowed for use of either a removable or fixed restoration.

Results: This new methodology resulted in a more natural gingival appearance, without the need for any additive pink resin to recover in the prosthesis the missing alveolar bone and mucosa. The digital workflow permitted application of occlusal, aesthetic, and functional data gathered since the pre-operative evaluation of the patient to the final design of the restoration. Moreover, the dual-purpose attachments used for fixing the prosthesis to the implants permitted use of it either as a removable or fixed prosthesis, depending on the needs of the patient. This resulted in easier oral hygienic maintenance and reduced the typical risk of reactive gingival hyperplasia around implants.

Conclusions: As a consequence of the new design of the customized bone plate, the novel methodology presented herein resulted in a more natural, aesthetic, and functional restoration of the mandible after ablative surgery, restoring the correct crown-implant ratio and the occlusion. In addition, the risk of reactive gingival hyperplasia was reduced by using the dual-option abutment to create a usage as either a removable or fixed restoration, according to the patient's ability to maintain proper oral hygiene.

ANALYSIS OF EFFECTS OF DIFFERENT SINTERING PROCEDURES ON BI-AXIAL FLEXURAL STRENGTH IN MONOBLOCK ZIRCONIA SYSTEMS

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Keywords: zirconia, sintering, flexural strength

Purpose/Aim: Monoblock zirconia ceramic systems, the high-tech products developed in recent years, are one of the mostly preferred material used in prosthetic restorations due to having high mechanical properties and translucency. Monoblock zirconia ceramics can be used as core material as well as their most important advantages can be defined as being available to make ceramic restorations as monoblock without any superstructure requirement. It was aimed to evaluate the effects of sintering procedures on the physical

properties of monoblock zirconia in sintered samples using different sintering procedures.

Materials and Methods: A total of Upcera (Shenzhen Upcera, China) and Zircon.X (President Dental, Germany) samples (n = 10) were prepared with 12 mm diameter and 1.6 mm thickness with computer-aided design and computer-aided manufacturing (CAD-CAM) technology from presintered monoblock zirconia ceramic systems. Sintered after coloration with A2 color solution. Around 1 – 6 Tegra sintering procedures which are recommended for sintering single crown, inlay, onlay and laminate restorations were applied. First program: It reaches a temperature of 100 ° C within 5 minutes, then reaches a temperature of 1500 ° C within 25 minutes and sintering at 1500 ° C for 30 minutes, then the temperature decrease is up to 300° C within 30 minutes. Other programs were applied according to this coding system. I). 100/5 1500/25 1500/30 300/30; II). 100/5 1500/25 1500/60 300/30; III). 100/5 1500/25 1500/90 300/30; IV). 100/5 1500/60 1500/ 60 300/30, V). 100/5 1500/60 1500/90 300/30 ve VI). 100/5 1500/60 1500/120 300/30. Biaxial flexural strength test was applied to all samples. The results were compared with 2-way ANOVA according to 95% confidence interval and multiple comparisons were made with Fisher's LSD Test (Post-hoc).

Results: The sintering procedures of 30, 60, 90 and 120 min significantly affected the biaxial flexural strength of the Upcera system ($p < .05$). The biaxial flexural strength of the Zircon.X (1000 MPa) ceramic system was lower than the Upcera (1200 MPa) system ($p < .05$). Time factor was effective on ceramic systems and biaxial flexural strength according to sintering times ($p < .05$).

Conclusions: Differences in sintering procedures affected both of zirconia ceramic systems. Biaxial flexural strength increased during 90 min sintering time. Upcera's bi-axial flexural strength was higher than Zircon.X.

ACCURACY OF AN INTRAORAL SCANNER IN TOOTH COLOR DETERMINATION. CLINICAL EVALUATION

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Keywords: Toothcolor1, intraoral scanner2, spectrophotometer3

Purpose/Aim: The aim of this clinical study was to evaluate the accuracy of the measurement of tooth shade obtained with an intraoral scanner in vivo. The null hypothesis was that T3 measurements would not differ from SS measurements with regard to color determination.

Materials and Methods: Shades of 120 maxillary anterior teeth were evaluated by using a SpectroShade spectrophotometer (SS) and a TRIOS 3 intraoral scanner (T3) on 20 participants. The matching of shade readings between the T3 and SS was used to estimate the accuracy of the T3. The percentage of readings when a difference between the shades obtained by both devices was visually perceptible (?E>3.7) was calculated. Each of the 120 teeth were measured 5 times to assess repeatability.

Results: The accuracy of the T3 was 53.3% when the color was recorded as a Vita 3D-Master (VM) shade and 27.5% for the Vita Classical (VC) shade guide when the SS was taken as a reference. A visually perceptible color difference was found in 25% (VM) and 50.8% (VC) of situations when the shade was determined with the SS and 48.3% (VM) and 78.3% (VC) with the T3. Repeatability was 92% (VM) and 93.5% (VC) for the SS, and 90.33% (VM) and 87.17% (VC) for the T3.

Conclusions: The findings of this study revealed that the tooth color determined by the T3 does not exactly match that obtained by the SS that additional methods of measuring tooth color are recommended. The accuracy of the T3 was higher when the color was recorded as VM values rather than VC values. The Vita 3D Master shade guide should be used with the TRIOS 3 intraoral scanner and supplemented with additional methods to determine the color.

FROM CLASSIC TO MODERN IN IMPLANT-PROSTHETIC REHABILITATION

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Keywords: digital, implant, prosthetics

Case Presentation: Background. The optimization of the implant-prosthetic therapy is requested to satisfy the esthetic and functional demands of the patients. Nowadays the classic diagnostic and treatment techniques are increasingly replaced by digital techniques. Materials and method. The implant-prosthetic treatment of 10 patients was performed by using three digital applications (Prodent, DDS, OnDemand 3D). Using these applications, it were performed: the analysis of the biological indices of the prosthetic field, the qualitative analysis of implant sites, the selection of the implants from database; the virtual positioning of implants in optimal positions for future optimal occlusal contacts of the prosthetic restoration. Results. The use of digital applications optimized the implants positioning, the design projection of the future prosthetic restoration and the evaluation of the biomechanical factors. Conclusion. The learning of the proper use of the digital techniques in the implant-prosthetic therapy and the integration of the digital techniques in the current dental practice must represent a primary goal in the modern dentistry

CLINICAL ASPECTS OF DIGITAL TECHNOLOGIES IN AN INTERDISCIPLINARY MULTIPLE-IMPLANT CASE

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Keywords: multiple implants, digital workflow, clinical aspects

Case Presentation:
Background: The introduction of digital technologies in dentistry aims to enhance the capability to examine, diagnose and treat a patient, as well as improve the accuracy of data acquisition, treatment planning and speed up the manufacturing process. In recent years many in vitro studies showed similar data on accuracy of intraoral scanning (IOS) and conventional impression-making procedures of full-arch multiple dental implants. In addition, some clinical studies and several case reports demonstrated favorable outcomes when adhering to the concept of full digital workflow, comprising a digital impression-making procedure, and digital manufacturing of a definitive prosthesis with or without fabricating a dental cast.

Case Report: An elderly male patient requested dental treatment with fixed dental prosthesis (FDP) for his edentulous maxilla and partially edentulous mandible. Following the 3D-implant planning based on superimposed prosthetic information, the "All-on-4" concept was applied for the upper and single implant restorations were planned for the lower jaw. Following implant osseointegration, further prosthetic workflow included: i. digital impression making (IOS) on multiple implants in both jaws; ii. 3D-printing of the dental casts and verification of implants position; iii. fabricating and digitizing provisional restorations and centric relation; iv. manufacturing a prototype, milling and individualizing final restorations. The final iFDPs were milled from monolithic zirconia and individualized with buccal veneering without including of the incisal edges. The final functional analysis of the definitive restoration was performed with Bruxchecker foil.

Discussion: The application of computer-aided technologies, especially for impression-making procedures, has gained significant interest because of a more time-efficient workflow, potential to correct the entire impression without the need to repeat the whole procedure and to avoid the unpleasant perception of a conventional impression. However, the clinical accuracy of digital impressions, as well as of 3D-printed casts in multiple-implant cases is not fully verified. This may lead to some interruptions in the treatment workflow and require manual adjustments.

Conclusion: Interdisciplinary treatment based on conventionally individualized digital workflow on multiple implants resulted in a highly precise esthetical and functional full-mouth reconstruction.

Clinical Implications: Based on scientific data, this case presentation provides systematic clinical information about an interdisciplinary treatment of a multiple-implant case. Moreover, the possibilities and limitations of digital technologies will be discussed in regard to esthetics, function and accuracy of the final prosthetic restoration. Finally, the treatment outcome represents a combination of classical conventional and innovative digital workflow in a full-mouth rehabilitation.

CHANGE IN THE VERTICAL DIMENSION TO CREATE NEW FUNCTIONAL PROSTHETIC SPAC

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The vertical dimension management is an interesting and debated chapter in the dentistry of the third millennium. We speak of increase,

but it is difficult to define the concept of mandibular repositioning. In fact the creation of a new che functional space must be reasoned three-dimensionally with an approach that takes into account the variation of the skeletal class where indicated and possible, The dynamic aspect of the mandibular movement as a projection of the individual anatomical of the subject is ultimately the aesthetic aspect as “function of the chewing organ”. The latest generation of monolithic ceramics and the great experience of our technicians implement and complete our prosthetic projectbuccal veneering without including of the incisal edges. The final functional analysis of the definitive restoration was performed with Bruxchecker foil.

INFLUENCE OF WEARING DISTAL EXTENSION REMOVABLE PARTIAL DENTAL PROSTHESES ON OCCLUSAL FORCE TO ANTERIOR TEETH

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Keywords: Removable dental prosthesis, occclusal force, distal extension missing

Purpose/Aim: After tooth loss, the load on the remaining teeth increases, often leading to further tooth loss. The purpose of this study was to compare the occlusal force on maxillary anterior teeth with and without removable partial dental prostheses in volunteer patients.

Materials and Methods: Eighty-three subjects (29 men and 54 women, average age 69.4 years) who received bilateral distal extension removable partial dental prostheses at Osaka University Dental Hospital and had been using the prosthesis for more than a month agreed to join this study. Maximal occlusal force was measured for three seconds using an occlusal force measuring sheet (Dental Prescale 50H, GC Tokyo, Japan). Measurements were taken three times and the occlusal force on every tooth was recorded. The occlusal force on the anterior teeth and the total occlusal force were compared with and without the prosthesis. Spearman’s rank correlation coefficient was used to test the correlation between the number of missing teeth and the occlusal force. The Wilcoxon signed-rank test was used to compare the forces with and without the prosthesis. This study was approved by the Ethics Committee of Osaka University Graduate School of Dentistry (H27-E7-1). We state that there are no competing interests related to this research.

Results: The total occlusal force was 33.4–974 N without the removable dental prosthesis and 73.1–1115 N with the prosthesis. The load on the maxillary anterior teeth was 0–587 N without the prosthesis and 0–422 N with the prosthesis. The load with the prosthesis was significantly smaller than the load without the prosthesis. Without the prosthesis, the total occlusal force was smaller; however, the occlusal force in the anterior teeth was greater when many teeth were missing. There were significant correlations between the number of missing teeth and the total occlusal force and the occlusal force in the anterior teeth. The load on the maxillary anterior teeth may have been lower because the occlusal force was distributed among the remaining teeth and the removable dental prosthesis.

Conclusions: Within the limitations of this study, it is concluded that when the edentulous distal extension becomes larger, the maxillary anterior teeth receive a greater load in the absence of a removable partial dental prosthesis. Wearing a removable partial dental prosthesis can reduce the load on maxillary anterior teeth, possibly assisting in avoiding subsequent tooth loss.

COMPARISON OF COLOR CHANGE ON COMPOSITES AFTER IMMERSION OF BEVERAGES WITH CIEDE2000 AND CIELAB FORMULAS

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Keywords: CIEDE2000, CIELAB, COLOR CHANGE

Purpose/Aim: The aim of this study is to compare the differences between the different beverages using the CIEDE2000 (?E00) and CIELAB (?Eab) formulas for the color change caused by the addition of antibacterial agents on composites.

Materials and Methods: Fourty-eight disc-shaped specimens of 8 mm in diameter and 2 mm in thickness were prepared for each group

(n = 12). Initial color measurement was made and each group was immersed in distilled water, coffee, tea for 1, 7 and 30 days. The change in color of composite was calculated using CIELAB (?Eab) and the CIEDE2000 (?E00) formulas. The color change was compared with ?Eab and ?E00 formulas. Data for the individual color parameters were submitted to one-way analysis of variance and Tukey's test for multiple comparisons ($p < 0.05$).

Results: At the end of the 1,7 and 30 days, no statistically significant difference was found between CIELAB and CIEDE2000 ($p > 0.05$).

Conclusions: The color changes were observed in all groups after all days. More detailed results have been achieved with the CIEDE2000 color formula. However, CIEDE2000 and CIELAB formulas showed similar color change results.

INFLUENCE OF MATRIX TRANSPARENCY ON INDIRECT RESIN COMPOSITE PERFORMANCE FOR INDIRECT MATRIX TECHNIQUE

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Keywords: Indirect resin composites, transparent silicone, dental material

Purpose/Aim: Indirect resin composites are used to fabricate dental restorations utilizing different methods. The indirect matrix technique is one fabricating method with simple, easier and less technique sensitivity with silicone matrix products claimed as transparent. The aim of this study is to investigate influence of matrix transparency on indirect resin composite performance.

Materials and Methods: Five silicone products claimed as transparent (EXACLEAR - GC (EC), Memosil2 - Kulzer (MM), ELITE TRANSPARENT - Zhermack (ET), Dr. silicon - BSA (DS) and Glass bite - DETAX (GB)) were examined. GC Gradia Plus Light Body (GP) was used as indirect resin composite product. Silicone matrix mold with 10 mm thickness was fabricated on 10 mm diameter and 2 mm thickness disk and measured transparency as Total light transmittance (T.T.) among silicone products. GP was then injected into mold and light-cured through transparent silicone mold. Surface hardness of light-cured specimens was measured and compared among silicone products. Results were statistically analyzed by one-way ANOVA ($p<0.05$).

Results: EC had significantly higher T.T. compared with other transparent silicone products. Surface hardness of light-cured specimen fabricated with EC had also significantly higher than one with other products.

Conclusions: Higher matrix transparency (T.T.) impacts original performance of indirect resin composite product and EC which has higher T.T. may be suitable matrix material for indirect matrix technique.

COMPARISON OF EXCESS CEMENT AT IMPLANT CROWNS USING THREE EXTRAORAL CEMENTATION TECHNIQUES

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Keywords: Cementation, Practice abutment, Implantology

Purpose/Aim: Extrusion of excess cement into the subgingival area at implant crowns is associated with detrimental inflammatory response and controlling this excess material remains a challenge. The purpose of this study is to perform a comparative analysis of three extraoral cementation techniques reported on in the literature, to reduce excess extruded cementation material at implant crowns.

Materials and Methods: Forty-four internal connection implant replicas were embedded in acrylic resin to form the experimental base model. Cementable abutments were torqued down onto the implants. Zirconia crowns were luted to each of the cementable abutments using one of four techniques; control (C), pattern resin analogue (PRA), bite registration material analogue (BRA) and putty index analogue (PIA). Extruded excess cement was retrieved from each luted crown to determine its weight.

Results: The mean residual weight of excess cement found in the PRA technique group was the least (0.0874mg), followed by the BRA technique group (1.6779mg). The PIA technique group showed the least reduction of excess extruded cement (7.6208mg). All techniques produced substantially less extruded cement than that of the control (85.1656mg). In a one-way analysis of variance (ANOVA), there were statistically significant differences ($P<0.001$) between all the test techniques. Pairwise comparisons also found that all three test techniques were statistically different from each other.

Conclusions: The pattern resin analogue technique produces the least amount of extruded excess cement during cementation, to limit detrimental impact on the peri-implant tissue health.

IMPLANTS IN SJÖGREN'S SYNDROME PATIENTS IN THE PREMOLAR AND MOLAR REGION: A MULTICENTER PROSPECTIVE STUDY

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Keywords: Sjögren's Syndrome, Implants, Quality Of Life

Purpose/Aim: Related to the reduced salivary secretion, patients with Sjögren's syndrome (SS) are prone to the development of progressive dental caries and oral infections. As a result, tooth loss is common. The performance of implants used for replacement may also be compromised. Therefore, our aim was to assess the clinical outcome of implant therapy in dentate SS-patients compared to dentate individuals without SS.

Materials and Methods: 37 implants (21 upper jaw; 11 lower jaw) were placed in 17 SS-patients and 26 implants (9 upper-jaw; 17 lower-jaw) in 17 non-SS patients with a need of replacement of missing premolars and molars. The implants were used to support a screw retained crown or bridge. Marginal bone-level changes, clinical performance, patient satisfaction and oral health related quality of life (OHRQoL) were assessed at 1(T1), 6(T6) and 18(T18) months after placement of the superstructure. Marginal bone level changes were measured on standardized x-rays. Clinical parameters included implant survival, overdenture survival, plaque-index (PI), bleeding-index (BI), gingival index (GI) and probing depth (PD). Patient satisfaction and OHRQoL were assessed with validated questionnaires.

Results: Implant survival was 100% at T18 in the SS group and 96.2% in the non-SS group. Median marginal bone loss at T18 differed significantly between the SS and non-SS patients: 0.58mm (IQR:0.3-0.9) and 1.05mm (IQR:0.65-1.45) respectively ($p=0.035$). Clinical performance was good with no significant differences between the groups for all outcome measures, except for BI at T1 (SS: Median=1.0, IQR=0.0-1.0; non-SS: Median=0.0, IQR=0.0-1.0; $p=0.02$) indicating more bleeding in SS patients. This difference disappeared at T6. Patient satisfaction and OHRQoL increased in both groups, but at T18 patient satisfaction was significantly higher in the non-SS group compared to the SS-group for the item "ability to chew hard food ($p=0.034$). The item "ability to chew tough food" was also significantly higher in the non-SS group up to T12 ($p=0.04$). Similarly, a greater improvement of OHRQoL was observed in the non-SS patients than in the SS patients at T18 (SS: Median=2.36, IQR=1.8-2.4; non-SS: Median=1.04, IQR=1.0-1.1; $p=0.02$).

Conclusions: From a clinical perspective, implants perform comparable in SS- and non-SS patients after 18 months. One month after placement of the superstructure more bleeding after probing is observed in SS patients suggesting a delayed wound healing. Satisfaction and OHRQoL, although also favorable in both groups, were higher in non-SS patients

RESEARCH ON FGP RECORDING ON 3D PRINTED DIAGNOSTIC PROSTHESIS FOR FUNCTIONAL OCCLUSAL MORPHOLOGY OF PROSTHESIS

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Purpose/Aim: In order to decrease the chance of occlusal adjustment during try-in the dental prosthesis and avoid the risk of occlusal interference after cementation of prosthesis, this study aims to establish the functional occlusal morphology of fixed prostheses by using functional generated path (FGP) technology on a three-dimensional-printed diagnostic prosthesis and compare the accuracy of occlusal surfaces among different way to fabricate crowns by digital model analysis.

Materials and Methods: A randomized, double-blind clinical trial was performed. Twenty two subjects who wants a first molar complete crowns were divided into three groups: group A – digital model was obtained by scanning on working stone cast and then a crown was casted with gold alloy (5 subjects); group B - digital model was obtained by scanning on working stone cast and then a zirconia crown was fabricated with CAD/CAM milling method (10 subjects); group C - digital model was obtained by scanning intraorally and then a zirconia crown was fabricated with CAD/CAM milling method (7 subjects). All the subjects had a complete crown with functional occlusal morphology formed by FGP technology as experiment group and another crown fabricated with usual technology as control group. The occlusal criteria including the occlusal contact area, the heights of occlusal high spot before and after the adjustment of crowns during prosthesis try-in were digitally analyzed, and the amounts of adjustment were calculated on digital models by using a reverse engineering software (Giomagic). Differences of values were compared with Paired t-test and one-way analysis of variance (ANOVA). $P<0.05$ was considered statistically significant.

Results: The dynamic functional occlusal morphology of crowns was obtained successfully with 3D printed diagnostic prosthesis and FGP technology. The time for prosthesis adjustment, the occlusal contact area, the heights of occlusal high spots, and amount of occlusal adjustment of experiment groups had statistically significant differences ($P<0.05$) with the control groups. However, the criteria among the three experiment groups had no statistically significant differences ($P>0.05$).

Conclusions: This method could leads to a crown with less adjustment, less occlusal high spot, wider occlusal contact area, and less risk of occlusal interferences after crown cementation compared with prosthesis obtained with uausl method while the different scan and fabricate methods having no influence to the functional occlusal morphology. This newly-developed technology penetrated digital technology in the entire process of the fixed prosthesis and occlusal evaluation, which provided a new idea for accurate occlusal registration.

DESIGN AND FABRICATE MAXILLOFACIAL OBTURATORS BY DIGITAL TECHNOLOGY BASED ON INTEGRATING MULTI-SOURCE DATA

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Keywords: Obturators, Digital technique, Multi-source data

Purpose/Aim: Design and fabricate maxillofacial obturators by digital technology based on integrating multi-source data.

Materials and Methods: Four maxillectomy patients were recruited in this study. Patients were asked to get both intraoral optical scanning and spiral CT at the same visit. Multi-source data were exported to Geomagic software. A complete digital maxilla model, which includes the defect of the maxilla, the residual dentition and palatal area, was established. The metal framework of the obturaor was designed by CAD software and fabricated by Selective Laser Melting. In addition, the whole maxilla composite cast was manufactured though 3D printing. After checking the fitness of the framework, the final obturator was fluently processed with the composite cast. Silicone rubber lining was used to judge the adaption of the digital maxilla obturator prosthesis. Subjective evaluation from maxillofacial specialist and quality of life of the patients was recorded.

Conclusions: All the four cases were successfully finished and a complete digital process of the integrative obturator prosthesis was established. Additional reline was still necessary for some cases. The adaption evaluation showed that the digitized obturators were well fit in the mouth and met the clinical requirements. Patients were satisfied with the prostheses.

FUNCTIONAL EVALUATION OF MAXILLECTOMY PATIENTS UNDERGOING PROSTHETIC REHABILITATION

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Keywords: Maxillectomy, Obturator, Speech

Purpose/Aim: Cancers of the mouth, tongue, oropharynx, nasopharynx, and larynx comprise approximately 5% of all cancers. Patients receiving treatment for such cancers are often left with severe functional problems after resection of maxillofacial tumors because the affected structures are required for speech, swallowing and mastication. The defects created by maxillectomy can be repaired by prosthetic obturation. The aim of obturator prosthesis is to obliterate the undesired communication between the oral and nasal cavities created by the tumor resection surgery, and to improve speech intelligibility, swallowing and mastication. However, it has been observed that among majority of patients the obturator was not able to restore the speech and swallowing function at pre surgical and pre trauma condition. Therefore, the present study was performed to evaluate the effect of prosthetic rehabilitation on the speech i.e. speech intelligibility and nasal resonance, swallowing ability of maxillectomy patients. The changes in tongue-palate contact (Palatography) in maxillectomy patients and the effect of an obturator with customized palatal contours on the speech intelligibility, nasal resonance and swallowing ability was also studied.

Materials and Methods: A before-and-after study design was selected which is a quasi-experimental design in which there is a pre-test and post-test, but no comparison group. 48 patients were recruited in the study and were rehabilitated by obturator prosthesis. The speech utterances were recorded twice- with and without the obturator in a silent room via a head-mounted omnidirectional microphone positioned at 12 cm from the subject's mouth. Speech intelligibility from the various test stimuli were assessed and rated using a 6-point scale according to Pegoraro-Krook. Speech/Nasal resonance was judged only by three Speech Language Pathologists by listening the

various speech stimuli, using a 13-point scale. Swallowing ability was examined with the 'water-drinking test'. In the next phase of the study palatography was done to evaluate the tongue-palate contact in all the subjects. Customisation of the palatal contours using tissue conditioner material was done. Autopolymerizing repair resin was used to customize the obturator to replace the tissue conditione. The subject was instructed to wear the modified obturator and speech tests, swallowing ability tests and speech recordings were made and assessed again in a similar manner as described previously.

Results: The comparisons of speech intelligibility, nasal resonance and swallowing scores as evaluated by both untrained listeners and speech language pathologists revealed a significant difference between the different experimental conditions ($p<0.0001$).

Conclusions: Based on the findings of the present study, we concluded that quality of life of patients after maxillectomy is often decreased. Problems arise especially regarding the speaking ability and swallowing function. The present study exhibited improvement in the speech and swallowing function, thereby improving the quality of life of such patients.

THE PATIENT GENERAL SATISFACTION AND ORAL HEALTH-RELATED QUALITY OF LIFE OF SINGLE IMPLANT OVERDENTURES

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Keywords: implant overdenture, general satisfaction, OHRQoL

Purpose/Aim: The aim of this study was to investigate whether the patient general satisfaction and oral health-related quality of life (OHRQoL) of single implant overdentures (IODs) would be superior to complete dentures (CDs).

Materials and Methods: This study was a randomized crossover trial to compare mandibular IODs and CDs in edentulous individuals. Eligibility criteria were as follows: edentulous mandible for at least 6 months at the time of implant placement, sufficient bone volume in the anterior region of the mandible. The sample size estimation was based on 100?mm VAS scores for the patient general satisfaction, which was 22 participants. New CDs were fabricated for all of the participants at the beginning of this study. One implant (SLA Ti BLT implant, 4.1?mm in diameter, 10?mm in length, Straumann) was inserted in the middle of the symphyseal region of each subject, and a healing abutment (RC conical healing abutment, Straumann) was connected to the implant. The upper face of the healing abutment was 0 to 2 mm overtop the gingival level. The mucosal surface of the complete denture around the implant was relieved for 3 months. After implant operation, the participants were randomly allocated into 2 groups: Group IC experienced IOD period, and group CI underwent CD period for the first 2 months and vice versa for the next 2 months. Ratings of satisfaction was measured using 100?mm VAS. The general VAS question was stated as "How satisfied are you with your prosthesis?" OHRQoL was measured using the Japanese version of the Oral Health Impact Profile for edentulous subjects (OHIP-EDENT-J) and the Japanese version of the General Oral Health Assessment Index (GOHAI). The assessments were performed at the end of CD period (the new CD), the end of IOD period (the IOD). The statistical analysis was performed using Wilcoxon signed-rank test (?=0.05). Recruitment and treatment protocol of the present study was approved by The Ethical Review Committee of the Faculty of Dentistry, the TMDU (Register No. 1162). This study was registered with the UMIN Center (UMIN000017883).

Results: Twenty-two participants were enrolled this clinical study. One subject in group IC dropped out in the 3-month healing period because of a premature implant failure, resulting in 21subjects. The median [interquartile range] of the patient general satisfaction, OHIP and GOHAI were 72 [23.5, 87], 44 [33.5, 49.5] and 25 [16, 34] in CDs, respectively. The IODs showed significantly higer score than CDs in the patient general satisfaction and GOHAI ($p<0.01$). The CDs showed significantly higher score than IODs in OHIP-EDENT-J ($p<0.01$).

Conclusions: IODs showed significantly higher patient general satisfaction and OHRQoL compared to CDs. Single-implant treatment would be a feasible modality for edentulous patients.

A DIET HIGH IN FAT AND FRUCTOSE NEGATIVELY AFFECTS OSSEOINTEGRATION AND BONE METABOLISM IN RATS

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Keywords: Osseointegration, Bone, Microcomputed Tomography

Purpose/Aim: To test the hypothesis that diet induced metabolic change adversely affects peri-implant bone microstructure including implant osseointegration and is associated with altered osteoblast formation and function.

Materials and Methods: Thirty female Sprague Dawley rats were divided into three groups of (n=10), control group (normal chow), and 2 intervention groups on a high-fat (60%) high-fructose (20%) diet. Titanium implants were placed in the proximal tibia in all groups either 4 weeks before (dHFHF group) or, 6 weeks after commencing the diet (HFHF group) and, observed for an 8 week healing period (in human terms this corresponded to a 5 year period). Metabolic changes were measured by insulin tolerance and oral glucose tolerance tests along with weekly fasting blood glucose levels (fBGLs). Structural and functional features of the peri-implant bone, including bone-to-implant contact (BIC), were analyzed post-euthanasia using microcomputed tomography, and dynamic histomorphometry. Expression of the master osteoblast transcription factor, runt related transcription factor (Runx2) was measured ex vivo using RNA extracted from the right humerus.

Results: The fBGLs were unchanged across all groups. Reduced sensitivity to insulin was noted in the dHFHF group at the final time point but not in the HFHF group. There were no changes to glucose tolerance in either of the intervention groups. Peri-implant trabecular bone volume was significantly reduced in the HFHF group compared to the control group ($p = 0.02$) and percentage BIC was significantly reduced in both the HFHF (25.42 ± 3.61) and dHFHF (28.56 ± 4.07) groups compared to control group (43.26 ± 3.58, $p < 0.05$). Osteoblast activity and Runx2 expression were significantly reduced in both intervention groups ($p < 0.05$).

Conclusions: The high fat high fructose diet compromised osseointegration regardless of whether the implant was placed before or after the commencement of the diet, indicating that changes in bone cell structure and function affected both the initiation and maintenance of osseointegration. These changes occurred despite the absence of changes to blood glucose levels and insulin and glucose tolerance, suggesting that the changes were independent of diet related metabolic changes to glucose metabolism. It is possible however that diet induced changes in the local bone marrow environment resulted in altered cytokine expression that in turn affected osteoblast differentiation and growth.

POSSIBLY THE LONG-AWAITED, MINIMALLY-INVASIVE, ORAL DECAY-ARRESTING TREATMENT FOR SJÖGREN'S SYNDROME PATIENTS

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Keywords: Sjögren's Syndrome, hyposalivation, SDF

Purpose/Aim: Sjögren's Syndrome (SS) is an auto-immune disorder with numerous oral manifestations: dry mouth, rampant dental decay, and frequent deterioration of dental restorations. Despite repeated applications of high fluoride-containing products, the decay often persists. Recent evidence has indicated that silver diamine fluoride (SDF) is 89% more effective in controlling/arresting caries than other treatments (1, 2). Objective/Hypothesis: To investigate the effects of SDF application in patients with SS.

Materials and Methods: Twenty-five participants previously diagnosed with primary SS (pSS), were recruited and given written/verbal SDF information. After obtaining consent, SDF was applied to posterior teeth in contralateral quadrants. Two to six weeks later, SDF was applied to posterior teeth in the remaining two quadrants. Teeth were analyzed intra-orally for their hardness and lack of sensitivity. Re-examination occurred six months later with SDF re-application. Cavitated lesions arrested by SDF were restored atraumatically with composite resin or glass ionomer cement. Satisfaction questionnaires were completed.

Results: SDF stained only areas of enamel and/or dentin softness or at borders of previously placed restorations. Patients reported decreased sensitivity and increased self-esteem, self-confidence, and satisfaction with restored teeth.

Conclusions: The use of SDF in SS patients was shown to have arrested decay at the 6-month follow-up examination appointment. Aesthetic restorations were placed atraumatically with minimal invasion. Significance/Impact: The clinical use of SDF in patients with

SS was shown to reduce their oral decay that has previously proven to be elusive. Once treated, a minimally invasive bonding technique with either GI cement or composite resin can provide a durable, inexpensive, yet aesthetic option for the SS patient.
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ON METHODOLOGY: HOW TO BUILD A SEARCH STRATEGY

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Purpose/Aim: Topic: Science and Art in Advanced Prosthodontics. Background: Search strategies are designed to sift through millions of records contained in an electronic bibliographic database, in an ordered and meticulous manner. Aim: This paper aims to explore the how search strategies can be constructed to allow relevant articles indexed in bibliographic databases to be identified.

Materials and Methods: The reason why information is being sought, the database being searched, the search engine to be used and the type of information being sought (such as that outlined in a PICO) are criteria used to dictate which index terms, text words and Boolean terms are chosen to construct search strategies. Precise, optimised and sensitive search strategies that were constructed from data from 14,000 articles to find articles that reported survival outcomes in the dental literature are used to illustrate search strategy development.

Results: Search strategies should include appropriate index terms, text words and Boolean terms. Index terms are hierarchical and can be exploded or truncated to expand or limit search yields. They are allocated by hand to articles in databases based on an indexers perception of the article content and are specific to each database. Inaccurate allocation by indexers will impact on search yields. Text words are those that appear in article titles, abstracts and bibliographic records. They are words written by authors to describe their articles, are constrained by word limits and might not contain all important descriptors of the research content. Omission of important words by authors will impact on search yields. Boolean terms combine search terms inclusively, exclusively, or with proximity.

Conclusions: The search strategy is a set of instructions, which needs to be written in different "languages" for different search engines and databases. Knowing how to understand those languages helps when choosing words to use; indexing terms to use; and the grammar to hold it all together. As the instructions are read, building blocks are sought, and the design starts to take shape. Clinical Implications: Careful construction of search strategies will improve accurate article yield for both researchers when completing sensitive searching and clinicians when seeking specific evidence.

FABRICATION AND APPLICATION OF A 3D-PRINTED POLY(E-CAPROLACTONE) CAGE SCAFFOLD FOR BONE REGENERATION

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Keywords: Bone regeneration, Scaffold, 3D printing

Purpose/Aim: Bio-Oss is an osteogenic material most commonly used in the repairing of bone defects, however it's hard to be constructed into a specific shape and held at the desired place. Polycaprolactone (PCL) is a promising material for bone tissue engineering application approved by DFA owing to its great compatibility and unique machinability. In this study, we aim to combine the osteogenesis and plasticity advantages of these two materials and carry out a surface modification method of PCL.

Materials and Methods: A customized hollow-structured PCL scaffold was fabricated by DFM technique, used as a cage to load Bio-Oss and form a composite scaffolds. The PCL scaffold was surface modified by NaOH, as a traditional method to improve the hydrophilcity of this material, then the effect of this treatment on cytobiology was explored by in virto assays. Meanwhile, the osteogenic differentiation potency of this composite scaffold was also investigated in vivo.

Results: The PCL material adopted in this study did not show an obvious cytotoxicity, and NaOH treatment could improve the hydrophilcity and surface roughness of the PCL scaffold, thus enhanced the adhesion and proliferation of hBMMSCs on it. While the mechanical property of this scaffold did not show a significant change after treatment. Moreover, the osteogenic differentiation potency of hBMMSCs was increased significantly by culturing on the treated PCL scaffold. As to the in vivo experiment, the cage-shaped PCL scaffold was loaded with Bio-Oss and hBMMSCs, the PCL scaffold could hold the Bio-Oss in a desired shape without evident deformation after harvested, and new bone regeneration was detected by the histological analysis, while the treated group showed a better performance.

Conclusions: The utilization of the customized 3D printing PCL-Bio-Oss composite scaffold would provide an application potential as a Bone Tissue Engineering scaffold by enhancing the osteogenic differentiation of hBMMSCs.

BRINGING CLARITY TO ASTROGLIAL MORPHOLOGICAL PLASTICITY: ENDODONTICS VS. EXTRACTION EFFECTS

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Keywords: Astroglia, CLARITY

Purpose/Aim: Layer 5 of the orofacial somatosensory (oS1) and motor (oM1) cortices is the main output layer projecting to brainstem motor neurons that project to and activate orofacial muscles. Layer 5 pyramidal output neurons have apical dendrite projections to superficial layer 1. We have shown that intraoral injury, including tooth extraction and acute pulpal stimulation produce functional neuroplasticity that can be reversed by topical application to the oM1 surface of an astroglial-enzyme inhibitor. Astroglial cells display an intimate and dynamic structural-functional relationship with neurons. Thus, our AIM was to utilise the novel CLARITY immunohistochemistry technique to characterise layer 1 astroglial cells and test if tooth extraction vs. endodontic treatment produces changes in the morphological features of astroglial cells within oS1 and oM1

Materials and Methods: Male Sprague-Dawley rats were randomly allocated into 4 groups (n= 5/group). The Endodontic and Extraction groups received, respectively, pulpectomy or extraction of three right maxillary molar teeth. Rats were perfused on postoperative day 7, brains were extracted and the CLARITY technique was used to render the brain optically transparent (coronal sections 2 mm thick), followed by immunolabelling with markers for astroglia (GFAP) and neurons (NeuN). Zeiss Lightsheet microscope (x20) was used to acquire 3D-Z-stack images (1 x 1 x 1 mm3) of oM1 and oS1.

Results: -Significant differences in the morphological features of astroglial were observed between oS1 layer 1 and layer 2. Layer 1 was characterised by a dense network of GFAP-labelled astroglial processes, while layer 2 was characterised by sparse GFAP-labelled processes.
- Tooth extraction only had a significant effect on the morphology of astroglial cells and the number of neurons within the oS1.
- Pulpectomy, had a significant effect on the mean diameter of astroglial processes within the oS1. The diameter of the astroglial processes after pulpectomy was significantly larger than that of the Naïve group.
- Neither tooth extraction nor tooth pulpectomy had a significant effect on the straightness of the astroglial processes.
- Following tooth extraction the volume, surface area, length and mean diameter of astroglial processes was significantly larger in oS1 than in oM1.

Conclusions: - Our optimised CLARITY technique along with our automatic software analysis protocol provide a novel tool to characterise astroglial morphology and plasticity in health and following injury or in disease:
- Along with our previously published electrophysiological studies, astroglia are involved and may play critical roles in oM1/oS1 neuroplasticity induced by dental injury, and may be a potential therapeutic target to treat or prevent sensory impairment induced by dental injury
- The novel findings may also provide a neurobiological basis to support the preservation of the endodontically involved teeth over their extraction

CASE PRESENTATION: TREATMENT OF A 64-YEAR-OLD PATIENT WITH A SEVERE DEEP BITE USING A COMBINATION OF RESTORATIVE DENTISTRY DURING ORTHODONTICS. WHAT IF ORTHOGNATIC SURGERY IS NOT AN OPTION?

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Keywords: deep bite, optimal invasive dentistry, restorative orthodontics

Case Presentation: Purpose/Aim: The aim of this case presentation is to show, how a severe deep bite is treated when orthognathic surgery is not an option.

Summary: Adult patient is having problems with his former dentist, complaining of broken teeth, pain and insecure about his smile. He wishes is normal teeth, no pain and a nice smile. At first sight he has a severe deep bite, a missing 22, broken molars and a restored dentition. Before treating this patient, he must be convinced of the etiology of al his problems! They problems are caused by an Angle class II and a severe deep bite and to treat this. The ideal treatment option is orthognathic surgery combined with orthodontics and restorative dentistry. What are the alternatives if the patient doesn't want this treatment?

Conclusion: During this lecture you will see an alternative treatment avoiding orthognathic surgery by composite build up before and during orthodontics. After the orthodontics occlusion and articulation is restored by use of Emax porcelain.

PERI-IMPLANT DISEASE: CLINICAL EVIDENCE AND FUTURE PERSPECTIVES

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Keywords: dental implants, peri-implantitis, miRNA

Purpose/Aim: The definition and etiology of peri-implant disease are controversial. In particular, a clear link between plaque accumulation and bone loss has yet to be demonstrated. The aim of the two studies described in this oral presentation was to shed light on the possible etiological effect of plaque accumulation on peri-implant disease.

Materials and Methods: The first study had a cross-sectional design. A sample of 72 patients (total: 331 titanium implants) treated with fixed full-arch immediate loading rehabilitations was included (mean follow-up period: 5.8 year). Bleeding on probing (BOP), Plaque Index (PI) and peri-implant bone loss were recorded. Correlation coefficients between the measured variables were calculated. The second study was a prospective clinical trial. A sample of 10 patients was treated with partial delayed loading prostheses supported by dental implants. miRNA extracted from peri-implant crevicular fluid and from peri-implant soft tissues were analysed through microarray technology and correlated with clinical parametres (BOP, periodontal depth –PD, bone loss) as recorded at the 1 and 5-year follow-up appointments.

Results: In the first study no correlation was found between PI and bone resorption (P=.08). Very weak correlations were found between BOP and bone loss (?=0.18; P=.001) and between PI and BOP (?=0.13; P=.019). The second clinical trial identified specific miRNA expression profiles predictive of specific clinical outcomes. In particular, some specific miRNA signatures appeared to be "protective" from bone resorption despite the presence of plaque accumulation.

Conclusions: The results suggest that plaque accumulation is correlated with peri-implant mucositis. However, plaque accumulation alone does not appear to be correlated with bone resorption. miRNA microarray analysis showed that BOP and bone loss are more related to patients' gene expression profile than to plaque accumulation. miRNA may be predictors of dental implants clinical outcomes and may be used as biomarkers for diagnostic and prognostic purposes in the field of implant dentistry.

ACCURACY OF OPTICAL IMPRESSIONS IN THREE DIFFERENT CLINICAL SITUATIONS

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Keywords: Digital, impression, Accuracy

Purpose/Aim: Intra-oral optical impression is routinely used in dental offices yet contradictory information exists on their limitation and the difference between different technologies. The aim of this study was to compare the accuracy of different digital impressions systems under 3 different clinical situations: full arch impression, anterior partial edentulism, and posterior partial edentulism.

Materials and Methods: The accuracy of five digital impression systems (CEREC Bluecam, 3M™ True Definition, Cerec Omnicam, Planmeca PlanScan, 3Shape Trios 3) was evaluated in terms of precision and trueness (ISO 5725) for each of the 3 clinical situations. Trueness is representing how close the impression is to the real geometry and precision is describing reproducibility. For each clinical situation, we created a model using a standard study model (Frasaco ANA-4 V CER, Germany). The 3 models were scanned 10 times with each digital impression system. Scanned models were saved in the standard tessellation language (STL) format and were analyzed with a dedicated software (Geomagic Control 3D Systems GmbH) using a best-fit iteration method. Differences were expressed as Root mean Square (RMS) in ?m. A reference laboratory scanner (IScan D104i) was used as standard for trueness evaluation. For precision, the 10 scans were compared two by two.

Results: All the digital impression systems produced results with outliers, some more frequently than others, and the distribution of the data was not Gaussian. The median values ranged from 374 to 97 ?m for trueness and from 191 to 39 ?m for precision. In all, the full arch impression was significantly less accurate than the 2 partial edentulism situation. For posterior partial edentulism, 3Shape Trios 3 was the most accurate. For the other situations precision and trueness provided different ranking for the 5 digital impression systems.

Conclusions: The 5 digital impression systems performed with unequal accuracy and only the most accurate cameras should be used for full-arch impression when high level of accuracy is required.

MANDIBULAR AMELOBLASTOMAS: A COMPARISON OF REHABILITATION TECHNIQUES AND THEIR FUNCTIONAL OUTCOMES

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Case Presentation: Background

Ameloblastomas account for 1% of all tumours in the head and neck regions and 11% of all odontogenic tumours. Neville et al. (2009) reported that 80-85% of ameloblastomas occur in the mandible. Although, they are slow growing and benign, they can be locally invasive and cause jaw expansion and facial asymmetry as they expand.

The surgical management usually involves excision with a wide a margin of normal tissue also removed. The functional rehabilitation, however, can vary. Factors such as funding and surgical preference are a few confounding variables that may influence protocols utilised with the functional management of these patients.

There have been many surgical rehabilitation techniques reported to rehabilitate these patient's osseous architecture. However, the literature is scant with regards to the prosthetic and functional outcomes after the surgical rehabilitation.

Case report: The various techniques that have been used to surgical rehabilitate these patients include: • particulate autogenous grafts from the anterior and posterior iliac crests; a sandwich technique employing a split costochondral graft technique with particulate autogenous from grafts the posterior iliac crest • a vascularised free fibular flap• distraction osteogenesis. The presented case series will compare the various techniques used to functionally rehabilitate these patients. The factors that will be assessed include the available bone volume, the restoration of facial symmetry, the marginal bone levels around the implants placed, the prosthetic design, material choice, maintenance and complications of these rehabilitation's.

Conclusion: The are many confounding factors that have influenced the presented outcomes. This speaks to the need for a patient-centered treatment and highlights the importance of an interdisciplinary treatment approach of these patients.

Clinical implications: An objective evidence-based protocol can be developed from these findings which should further be assessed in a multi-centre randomized clinical trial. The cost benefit analysis of each technique could be assessed and would assist in motivating treatment protocols to funders and hospitals. This would imply that there would be greater access to care for these patients within the current budgetary limitations in South Africa.

THERAPEUTIC EFFECTS OF SURGICAL DEBRIDEMENT WITH

TITANIUM BRUSHES AND AUTOGENOUS BONE GRAFT ON SEVERE PERI-IMPLANTITIS

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Keywords: peri-implantitis, titanium brushes, autogenous bone graft

Purpose/Aim: Peri-implantitis have become one of the most frequent biological complication in implant therapy. A large number of reports have been published, concerning peri-implantitis and its treatment in recent years. However, most of those are related to symptomatic treatment, and no curable method has been established yet. The purpose of this study is to evaluate the therapeutic effects of combination of mechanical debridement and autogenous bone graft, and to establish the treatment protocol to achieve the perfect healing of peri-implantitis as well.

Materials and Methods: Five patients who had severe peri-implantitis were treated by one oral implantologist. Surgical debridement with titanium micro brushes and simultaneous autogenous bone graft were performed. Before the surgical treatment, abutment and prosthesis were removed. Contaminated soft tissue around the implant was removed, and the roughened surface of the implant was mechanically curetted with a titanium micro brush. Subsequently, autologous bone taken from the mandibular branch was transplanted to bone defect and a collagen membrane was applied to the lesion. All the prostheses were placed after six months healing period and followed every three months. X-ray photos were taken to evaluate the results of the treatment described above. The depths of bone defect and healing site were measured on X-ray images and statistically analyzed.

Results: In all the cases, soft tissue healing was pretty good. There are no unfavorable findings, including the post-operative infection and discomforts during the healing period. So far, patients have shown good prognosis without pain, swelling, or bone re-resorption. X-ray photos clearly revealed the recovery of the peri-implant bone loss. Average ratio of bone recovery was approximately 90%, compared to the initial marginal bone height.

Conclusions: The titanium micro wire brush could reach to microscopic structure like micro threads on the implant body, indicating the usefulness of mechanical cleaning. As a result, exposed titanium fresh surface enables the re-osseointegration. Those findings suggest that our treatment strategy, applying combination of titanium wire brush debridement and autogenous bone graft, could cure the peri-implantitis.

CLINIC OUTCOMES OF ZIRCONIA CROWNS AND FIXED DENTAL PROSTHESES WITH DIFFERENT MARGINAL PREPARATION DESIGNS

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Keywords: zirconia, clinical study, margin design

Purpose/Aim: This clinical study was to evaluate the survival and success of zirconia crowns and fixed dental prosthesis (FDP) with different preparation margin designs.

Materials and Methods: At university prosthodontics clinic, 51 patients (30 female, 21 male) received 73 zirconia crowns (n=36) and FDPs (n=37). The patient were randomly assigned to different margin designs: feather edge (F), chamfer (C) and shoulder (S). Technical outcomes were assessed using modified United States Public Health Service (USPHS) criteria and periodontal parameters included probing pocket depth (PPD), plaque index (PI), bleeding on probing (BOP) and gingival index (GI) up to one year. Data were analyzed using Kolmogrov-Smirnov, Kruskal-Wallis and Pearson Chi-Square test at a significance level of 0.05.

Results: No framework or catastrophic fracture of the restorations was recorded. Only one molar crown was debonded possibly due to premature lateral contact. When compared to marginal designs, for “marginal adaptation” and “marginal discoloration” scores, Groups S and C showed significantly higher ALPHA values compared to F group ($p<0.05$). The crowns showed significantly higher ALPHA values than FDPs for “marginal adaptation” and “marginal discoloration” scores ($p<0.05$). Biologic complications were observed in all three marginal designs but S and C groups showed better scores than F group ($p<0.05$). Also, the crown group demonstrated significantly better periodontal scores than those of FDPs ($p<0.05$).

Conclusions: Zirconia crowns and FDPs survived well in this short term crossectional study where bleeding on probing was the most common observation. Thick connector areas made according to material demands resulted in insufficient embrasure area inflammation in the approximal gingival area.

SPLINTED VS NON-SPLINTED IMPLANT ATTACHMENTS ON MAXILLARY FOUR-IMPLANT OVERDENTURES: A RANDOMIZED CONTROLLED TRIAL

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Keywords: dental implant, maxilla, overdenture

Purpose/Aim: To compare the clinical and patient based treatment outcomes of maxillary four-implant supported overdentures with either splinted (bar) attachments or non-splinted (ball) attachments.

Materials and Methods: Forty participants who were dissatisfied with their existing conventional maxillary complete denture were included in the randomized controlled trial. Six months after implant placement, the definitive prosthesis was inserted. Implant success, clinical parameters (PI, GI, BOP, and MBL), prosthodontics maintenance and complications, and patient satisfaction were assessed. Outcomes were recorded at each recall visit (baseline, at denture delivery, 3 months, and 12 months after intervention), and statistical analysis was performed.

Results: Thirty-two of the forty patients completed the 1-year follow-up and had their treatment outcomes evaluated. The mean marginal bone loss after one year of loading was 0.34 ± 0.88 mm and there were no significant differences between the two groups. PI, GI, and BOP were significantly higher in the bar group ($p<.001$), and the implant success rate of the bar group was significantly lower than the ball group ($p=.028$). The most frequent prosthodontics maintenance and complication issue was the need to change the bar clip or O-ring as a result of retention loss. Patient satisfaction did not differ between the two groups ($p>.05$).

Conclusions: Although the ball group was found to be more beneficial for maintaining peri-implant tissue health, the maxillary 4-implant overdenture was a preferable treatment option for completely edentulous maxillary patients regardless of the attachment system.

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ORAL HEALTH-RELATED QUALITY OF LIFE IN PATIENTS TREATED WITH “ALL-ON-FOUR” OR REMOVABLE IMPLANT RETAINED RESTORATIONS

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Keywords: implant, all-on-four, quality-of-life

Purpose/Aim: The all-on-four treatment concept offers to treat the edentulous jaw with a fixed restoration. Conventional implant-based prosthodontic concepts use bars, locators or ball attachments to give retention to removable restorations. The study investigates whether there is a difference between patients treated with these two types of prosthodontic therapy in terms of oral health related quality of life (OHRQoL) and patient satisfaction.

Materials and Methods: Sixty-three consecutive patients were treated with implant-supported prosthetic restorations. Twenty-eight patients received removable restorations retained either by bar, locator or ball attachment. In thirty-five cases the all-on-four concept was applied. The 19-item OHIP-EDENT profile was used to measure OHRQoL after a usage period of at least 6 months. Additionally a denture satisfaction survey was performed.

Results: OHRQoL rating was high in both study groups. Patients with prefabricated retaining elements tend to report functional

impairment more frequently than patients who received all-on-four restorations or bar retained dentures. This was particular pronounced in cases with fixed opposing dentition. Despite higher expenses the relation between the expenditure and the treatment result was rated best in the all-on-four group.

Conclusions: The results of the study show that the all-on-four concept represents a reasonable approach for the prosthetic rehabilitation of the edentulous jaw in terms of OHRQoL, patient satisfaction and acceptance of treatment costs.

FULL-ARCH MANAGEMENT WITH MINIMUM NUMBER OF IMMEDIATELY LOADED IMPLANTS: 10-YEAR FOLLOW-UP

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Purpose/Aim: The aim of the study was to compare clinical outcomes of immediate vs delayed implant loading in edentulous maxillae with full-arch fixed prostheses.

Materials and Methods: Two patient groups were identified for this study: (1) the test group (TG), which included 34 patients (19 women, 15 men; mean age 56.7 years) treated with the Columbus Bridge Protocol with 4 to 6 postextractive implants loaded within 24 hours (163 implants total); and (2) the control group (CG), which included 15 patients (6 women, 9 men; mean age 59.96 years) treated with a traditional two-stage delayed loading rehabilitation using 6 to 9 implants inserted in healed sites (97 implants total). All patients were rehabilitated with full-arch fixed prostheses in the maxilla.

Results: At the 10-year follow-up, no difference in the implant cumulative survival rate between the TG (93.25%) and CG (94.85%) was found. Mean bone loss was significantly lower in the TG (mean: 2.11 mm) compared to the CG (mean: 2.65 mm). All original prostheses were maintained and functioning satisfactorily.

Conclusions: Maxillary full-arch immediate loading represents a valid alternative to the traditional delayed loading rehabilitation.

ESTHETIC AND BIOMECHANICAL REQUIREMENTS IN FULL-ARCH IMMEDIATE LOADING REHABILITATIONS

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Keywords: Esthetics, Biomechanics, Immediate Loading

Purpose/Aim: In implant prosthodontics, frameworks are used to improve the prosthesis rigidity and stiffness, reducing possible complications such as prosthesis fractures while rigidly splinting the implants together. Compared to full-acrylic prostheses, stiff framework materials are supposed to distribute the stress more evenly to the abutments and implants. This is particularly important in

full-arch immediate loading rehabilitations where implants are loaded when they are not osseointegrated yet. Moreover, thanks to a rigid framework a more aesthetic prosthesis can be realized, especially when the prosthetic space is limited. The final result is an immediate prosthesis showing a more natural appearance without pink soft tissue reconstruction. Frameworks made of carbon fibre-reinforced composites (CFRC) seem to be a viable alternative to traditional metal frameworks in implant prosthodontics. CFRC provide stiffness, rigidity, optimal biocompatibility and esthetic final result. The aim of the present prospective study was to compare carbon fibre frameworks versus metal frameworks used to rigidly splint implants in full-arch immediate loading rehabilitations.

Materials and Methods: Forty-two patients (test group) were rehabilitated with full-arch immediate loading rehabilitations of the upper jaw (total: 170 implants) following the Columbus Bridge Protocol with four to six implants with distal tilted implants. All patients were treated with resin screw-retained full-arch prostheses endowed with carbon fibre frameworks. The mean follow-up was 22 months (range: 18-24). Differences in the absolute change of bone resorption over time between the two implant sides (mesial and distal) were assessed performing a Mann-Whitney U-test. The outcomes were statistically compared with those of patients rehabilitated following the same protocol but using metal frameworks (control group: 34 patients with 163 implants - data reported in Tealdo, Menini, Bevilacqua, Pera, Pesce, Signori, Pera, Int J Prosthodont, 27, 2014, 207).

Results: Ten implants failed in the control group (6·1%); none failed in the test group (P = 0·002). A statistically significant difference in the absolute change of bone resorption around the implants was found between the two groups (P = 0·004), with greater mean peri-implant bone resorption in the control group (1 mm) compared to the test group (0·8 mm).

Conclusions: Carbon fibre frameworks may be considered as a viable alternative to the metal ones and showed less marginal bone loss around implants and a greater implant survival rate during the observation period.

COMPLETE DIGITAL WORKFLOW AND IMMEDIATE FUNCTIONAL LOADING OF IMPLANT-SUPPORTED MONOLITHIC GLASS

CERAMIC CROWNS

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Keywords: digital dentistry, implant dentistry, immediate load

Purpose/Aim: The purpose of this study was to evaluate surgical and prosthetic aspects of immediate implant loading with glass ceramic screw-retained single crowns that could be associated with biologic and prosthetic outcomes.

Materials and Methods: Nineteen subjects, who required single tooth implant supported crown in the posterior region of the mandible received one or more implant (patients with bad or parafunctional habits were excluded). In total 22 implants were placed. Primary stability measured and recorded in Ncm and ISQ values. Cerec® (Densply Sirona) implant scan post and scanbody was attached to the implant. Omnicam® (Densply Sirona) intraoral scanner (IOS) (CEREC AC software 4.3) was used to take the digital impressions and bite registrations. Within 24hours functional glass ceramic (N!CE, Straumann) crowns were delivered (Fig. 1 and Fig. 2). For every crown occlusal and interproximal contacts were adjusted and recorded. Quality of contact points were measured with shimstock occlusal foil (Hanel, Coltene). Restorations were followed-up for 1, 3, 6 months.

Results: 1 implant failed and was removed after 4 weeks. The rest implants and crowns were in function with no technical or biological complications after 6 months of use (survival rate of our study was 95,5%). Statistically significant effect on MBL was not found considering factors such as implant size, time after extraction, bone type, soft tissue thickness, and primary stability measured in Ncm and ISQ values. Mean MBL mesially was 0.3mm (SD 0.42) and distally – 0.4mm (SD 0.66). These findings are similar to those in other studies reporting MBL on delayed or immediate loading. One distal and one mesial proximal contacts were missing during 6 months check-up, similarly as during insertion of the crowns - 1 and 2, accordingly.

Conclusions: Fully digital workflow without 3D printed model could be successfully employed for immediate functional loading with a single-unit implant-supported crowns fabricated from glass ceramics. When patients are carefully selected, it can provide clinically acceptable biologic and prosthetic outcomes in a follow-up period of 6 months. The protocol should be further evaluated with longer observational periods.

COMPRESSION STRAINS AND DISPLACEMENTS OF PARTICULARLY

DESIGNED COPINGS ON REMAINING TEETH FOR OVERDENTURE SUPPORT

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Keywords: copings, overdenture, partially edentulous mandible

Purpose/Aim: Background: The stresses generated to the supporting tissues during occlusal loading significantly influence design of copings and clinical planning process in therapy by overdentures. Objective: The aim of this study was to compare the distributions of strain and displacements on two different designs of copings of the partially edentulous mandible.

Materials and Methods: The method for full field measurement of strain and displacements was ARAMIS three-dimensional image correlation system of two digital cameras that provide a synchronized stereo view of the specimen. The method of finite element analysis (FIT) was than conjointly used for the final analysis and providing of numerical values and data-sets. The experimental models were a partially edentulous mandibles fabricated by standard grey dental model resin (Formlabs) – the 1st one with conventional oval design of the copings and the 2nd one with experimental design of circumferential milled copings.

Results: The most intensive deformations were under working force of the maximum intensity of 800 N. Displacement values of conventional oval copings ranged from -0.45 to +7.07 mm and for experimental copings from -0.01 to +0.54 mm. Strains and misses strains have shown that the maximum applied force (800 N) resulted in deformations at the final stage for conventional oval copings on supporting surfaces of remaining incisor 3.392%, canine 0,515% and premolar 3.391%, but for experimental milled copings of remained incisor 0.126%, canine 0.102% and premolar 0.125%.

Conclusions: Intensive displacements and strains of tooth (enamel-dentinal tissue) were observed below the conventionally designed copings. Strains within the remaining teeth roots were influenced by vertical displacement of the caps with particular sentence at the joint site of the cap and the remaining tooth substance.

THE GOOD, THE BAD AND THE UGLY OF CORPORATE DENTISTRY

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Keywords: Corporate, dentistry

Purpose/Aim: The last 15 years has seen a drive to consolidate dental practices with studies predicting that corporate finance owned groups will dominate the provision of patient care in the next 20 years. This presentation highlights the drivers of consolidation, together with the effects of corporate ownership upon dental profession.

Materials and Methods: The last 15 years has seen a drive to consolidate dental practices with studies predicting that corporate finance owned groups will dominate the provision of patient care in the next 20 years. This presentation highlights the drivers of consolidation, together with the effects of corporate ownership upon dental profession.

Results: Objectives
• Understand the opportunities and drivers of consolidation in dentistry.
• Explain the behavior and growth of dental corporates.
• Highlight the fundamental change that corporates bring to the profession of dentistry.

Conclusions: New ownership models must be developed to compete with these groups and allow dentists to maintain control of patient care and their profession.

RETROSPECTIVE EVALUATION OF EXTENDED HEAT-PRESSED

CERAMIC VENEERS AFTER A MEAN OBSERVATIONAL PERIOD OF 10 YEARS

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Keywords: extended ceramic veneer, survival, success

Purpose/Aim: The aim of this study was to perform a retrospective evaluation of the clinical performance of heat-pressed extended ceramic veneers placed in a private practice on mandibular and maxillary teeth with various degrees of exposed dentin after a mean observational period of 10 years. The null hypothesis is that the clinical survival and success of the veneers are independent of 1) the jaw position of the ceramic veneers and 2) the amount of exposed dentin.

Materials and Methods: The teeth examined in this study were restored with extended anterior veneer restorations in the maxillary and mandibular regions (teeth numbers 13-23 and 33-43) between July 1, 2002, and June 30, 2008. The study protocol was evaluated by the Ethics Committee of the Medical Faculty of Georg-August-University Goettingen, Germany, and approved on February 17, 2009 (application no. 16/1/09). Thirty-one patients (20 females/11 males) underwent restoration with adhesively luted extended veneers that were fabricated using heat-pressed glass-ceramic (Cergo, Dentsply Sirona). A single dentist restored 101 teeth (maxilla, n = 65; mandible, n = 36). Adhesive cementation was performed using an etch-and-rinse adhesive and a dual-curing composite cement (Variolink, Ivoclar Vivadent/Calibra, Dentsply Sirona).

Results: After 10 years, the Kaplan-Meier survival rate (in situ criterion) was 91.8% (95% confidence interval [95% CI]: 0.87; 0.97). The observed failures were caused by ceramic fractures for 8 restorations and biological failure for 1 restoration. 1 restoration was removed due to a change in the prosthetic treatment plan. 77 of the 101 restorations were still in service and did not require any clinical intervention (10-year success rate: 78.6% (95% CI: 0.70; 0.88). Interventions were necessary in 14 cases (9 recementations, 2 endodontic treatments, 2 composite fillings (caries), and 1 polishing of minor fractures). The clinical performance was not influenced by the veneer position (maxilla/mandible, survival p = 0.578/success p = 0.056). The veneers that covered large areas of exposed dentin (>50%) exhibited a significantly increased risk (hazard ratio 2.98, p = 0.019) for requiring a clinical intervention (10-year success rate: 68,0% (95% CI: 0.52; 0.84); however, no effect on the survival rate was observed for these veneers (p = 0.761).

Conclusions: After a mean period of 10 years of clinical service, extended anterior veneer restorations made of a pressable ceramic demonstrated a survival rate of 91.8%. The primary cause of failure was fracture of the ceramic material. Technical and biological complications were significantly associated with a larger amount of exposed dentin (over 50% of the preparation surface). Based on this study, ceramic veneers in the mandible are likely to be as successful as veneer restorations placed on maxillary anterior teeth. Further clinical evaluations with all-ceramic materials with improved mechanical properties are needed for a more detailed clinical evaluation of extended ceramic veneers.

CEMENT GAP – HOW ROUGHNESS AND CEMENT MATERIAL AFFECT BIOFILM FORMATION AND FIBROBLAST BEHAVIOR

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Keywords: cement, fibroblasts, biofilm

Purpose/Aim: Removing excess cement after fixing a prosthodontic restoration is challenging for dentists. If not performed adequately, biofilm accumulates at the cement surface potentially causing tissue inflammation. Gingival fibroblasts seal the connection between the oral cavity and the bone and ideally adhere to the cement surface. The objective of the present study was to analyze how the roughness and composition of resin composite cements affects biofilm formation and fibroblast behavior.

Materials and Methods: Discs of three adhesive (Panavia V5 [PV5], Multilink Automix [MLA], RelyX Ultimate [RUL]) and three self-adhesive (Panavia SA plus [PSA], SpeedCem plus [SCP], RelyX Unicem [RUN]) resin composite cements were prepared with three different roughnesses using silica paper grit P180, 400 or 2500. The specimens were characterized by measuring the Ra value, energy-dispersive X-ray spectroscopic mapping and scanning electron microscopy. WST-1 assay was performed to investigate viability of human gingival fibroblasts (HGF-1) after 24h of incubation on cement specimens. Cell morphology was examined with scanning electron microscopy. The biofilm formation of Streptococcus mutans after 24h on the resin composite cements was quantified by crystal violet staining. Bacterial presence on the cement surfaces was additionally recorded with fluorescence microscopy.

Results: Roughness of the specimens did not differ significantly between the resin composite cements and mean Ra values for the three pretreatments were 180: Ra=1.62±0.34µm; 400: Ra=0.79±0.20µm; 2500: Ra=0.17±0.08µm. The cement material and the specimen roughness influenced the viability of HGF-1 significantly ($p<0.001$). Cell viability was significantly highest for PSA?RUN=MLA?SCP=PV5>RUL and 2500=400>180 ($p<0.05$). Cell morphology did not vary between the materials but was affected by the surface roughness. On smoother surfaces, cell spread flat and formation of filopodia was enhanced. Significantly highest biofilm formation was found on cement SCP. Cements containing copper (MLA, PV5, PSA) displayed anti-adhesive properties towards S. mutans.

Conclusions: The composition of resin composite cements significantly affects cell viability of HGF-1 and biofilm formation. A well-polished cement surface accelerates cell spreading while preventing extensive biofilm formation.

IN-VIVO AND IN-VITRO ACCURACY OF FULL-ARCH DIGITAL IMPLANT IMPRESSIONS

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Keywords: Full-arch implant impression, intraoral scanner

Purpose/Aim: An acceptable accuracy of digital impressions for single or multiple-unit implant-supported restorations has been reported (Marghalani et al. 2018). The accuracy of full-arch digital implant impressions has been evaluated as well, however, exclusively in in-vitro situations (Rutk?nas et al. 2017). In a clinical setting, many factors could affect the accuracy of optical impressions (Flügge et al. 2013). Full-arch digital implant impressions (DII) should be investigated in a clinical environment. The aim of the two-leg clinical study was to:
Compare the accuracy of full-arch DII, when scanning intraorally (in-vivo) and extraorally (in-vitro).
Compare the accuracy of conventional and digital full-arch impressions clinically.

Materials and Methods: Nine edentulous participants were involved in the first leg of the study. For each patient, implant-supported metal bar with embedded 4 scan bodies was fabricated (Fig. 1). The construction was scanned with Trios3 (3Shape) device intraorally (IOS group) and extraorally on the model (MIOS group). The model situation was also scanned with D800 laboratory scanner and served as a reference (RS group). Each situation was scanned 8 times. Obtained STL files were used for the evaluation of distance and angle between scan bodies (Fig. 2), as well as for the surface analysis. A separate group of 6 edentulous patients with 4 implants was involved in the second leg of the study. For each patient, a conventional and digital impression was taken (Fig. 3). Splinted impression copings and a control model served as a reference. 3D positions of the scan bodies between both groups were compared.

Results: Results of repeatability measurements in all groups are presented in Fig. 3 as boxplots and in Table 1 as statistical measures. RS data (D800) showed the least deviation, followed by the MIOS and IOS groups. Results from the second leg of the study showed, that in a clinical setting digitally and conventionally registered implant positions differed statistically significantly ($p<0,05$). Considering digital workflow, bite registration step was a limiting factor.

Conclusions: In-vivo scanning with Trios3 have lower precision in surface scanning but statistically has the same trueness as extraoral (in-vitro) scanning. It should be considered that clinically, digital implant impression could be less precise than it is reported in the in-vitro studies.

CHAIRSIDE CAD/CAM TECHNOLOGY FOR REHABILITATION OF WORN DENTITION

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Keywords: Full Mouth Rehabilitation, CAD-CAM Technology

Purpose/Aim: The purpose of this study was to describe the rehabilitation of worn dentition by using a digital workflow on a non-hinge simulated patient.

Materials and Methods: A dentiform was used to illustrate this study. The occlusal and incisal surfaces of the artificial teeth were flattened with a cast trimmer to simulate worn dentition with loss of OVD. The dentiform jaws were mounted in a phantom head with a non-hinge articulation, but with ball-shaped condyles and anatomically shaped glenoid fossae. These permit the simulation of human masticatory functions within 3-dimensional curved condylar paths. Analogue diagnostic models were mounted on a semi-adjustable articulator. Then, diagnostic wax-up was built up in two steps. At the first step, anterior teeth were built up following esthetic proportion and in an increased OVD. Then, the models were duplicated and cross-mounted. At the second step, posterior maxillary teeth were built up for a proper occlusal plane; this was followed by mandibular wax-up. Teeth were prepared in 3 steps: 1) maxillary and mandibular anterior teeth; 2) maxillary posterior teeth; 3) mandibular posterior teeth. After tooth preparation in each step, diagnostic wax-up was scanned using an intraoral scanner as pre-operation scan and preparations were scanned prepared teeth. At each step, a design software was used to design the restorations following the pre-operation scans. Interim restorations were milled using a 3-axis milling machine and inserted after each step. Occlusion was adjusted as it was needed. Similar procedures were performed to scan, design and mill definitive restorations from lithium disilicate following the esthetics, form and occlusion of interim restorations. All the restorations were designed with defined internal parameters in the design software for a clinically acceptable internal and marginal adaptation of definitive restoration.

Results: During insertion of interim restoration, a minimum adjustment was required for esthetics and occlusion. No internal, interproximal, esthetic, or occlusal adjustment was needed while inserting definitive restorations. Marginal adaptation and resistant to rotation were clinically acceptable.

Conclusions: Strategic chairside CAD-CAM technology may be used for rehabilitation of worn dentition.

NUTRITIONAL STATUS AND LIFE QUALITY IN MANDIBULAR MINI-IMPLANTS RETAINED OVERDENTURES WEARERS: A PILOT STUDY

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Purpose/Aim: A mandibular implant overdenture (OVD) has been considered the first treatment choice for completely edentulous patients. Nevertheless the advantages of adopting mini-implants for retention of overdentures include decreased costs, clinical time and minimally invasive surgical procedure. Since the use of implants to retain prostheses has been shown to significantly improve masticatory performance, the question remains as to whether the choice of mini-implants OVD will influence the nutritional status and the quality of life. The aim of this single-center pilot study was to evaluate any potential changes in the nutritional status and in the quality of life in edentulous patients after replacing their conventional denture with mandibular mini-implants retained overdentures.

Materials and Methods: Thirteen completely edentulous patients (mean age: 67 +/- 9) were enrolled to convert their mandibular conventional dentures in OVD retained by two immediate loaded mini-implants. Mini Nutritional Assessment (MNA) test was performed for nutritional screening and global evaluation. Based on the MNA score, patients were attributed in three categories: adequate nutritional status (MNA ? 24); protein-calorie malnutrition (MNA < 17); risk of malnutrition (17< MNA < 23.5). Italian Oral Health Impact Profile (IOHIP-14), a short validated questionnaire designed to measure self-reported functional limitation, discomfort and disability attributed to oral conditions, was used to evaluate the quality of life. Response to the questions are based on a scale which ranged from 0 “never” to 4 “very often”. Hematological parameters (e.g. glycemia, serum total protein, serum albumin, total cholesterol, iron, folate and vitamin B-12) were also collected. All the individual results were gathered before the implants placement (t0), and twelve months after the conversion of the conventional denture in mandibular OVD (t12). The statistical analysis was performed with Wilcoxon signed rank test.

Results: Both MNA score and hematological parameters showed no statistical differences. MNA score median was 26 (IqR: 24,50-27,00) at t0; at t12 MNA score median was 26,5 (IqR: 25,00-27,50). Hematological parameters shown serum total protein, serum albumin, iron, folate and vitamin B-12 values in a normal range; glycemia and cholesterol were over the average of healthy. IOHIP-14 score statistically decrease from median 21 (14,00-24,00) at t0 to median 1 (1,00-5,00) at t12.

Conclusions: Despite limitations of a pilot study, the consistent variation of IOHIP-14 score demonstrated a significant quality of life improvement in patients with a mandibular mini-implants retained OVD. MNA score and hematological parameters showed no remarkable improvement, probably because of the sample size. A larger number of patients would be desirable to confirm our findings. Indeed according to American Dietetic Association the dental professionals play an important role in screening elders that could be at risk of malnutrition, possibly referring them to nutritionists, whenever appropriate.

CENTRIC RELATION - CALL FOR REASSESSMENT OF THE CLINICAL UTILITY

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Keywords: Centric relation, condyle position, maxillo-mandibular relationship

Purpose/Aim: Reproduction of the three-dimensional relationship between the maxilla and the mandible is essential in prosthetic dentistry. In the past century the Centric Relation (CR) position has been the most putative and acknowledged concept. The term CR brought with it a great number of theories, terms and dogmas. Overall, in the history of modern prosthetic practice, there has been some controversy among clinicians regarding the CR concept. The purpose of this article is to review critically the available literature, reevaluate CR as a clinical landmark in daily practice and to propose alternatives for inter-occlusal jaw registration.

Materials and Methods: The present article describes and reviews the available scientific evidence for the usage of CR position, while questioning its selection for inter-maxillary registration.

Results: From the evidence presented in the literature from the last 100 years, there is no real scientific evidence for the use of centric relation as a maxillo–mandibular relation. Patient and practitioner perspectives are discussed from a practical point of view and a paradigm shift is suggested. A patient driven relation (PDR) is described as an alternative approach.

Conclusions: CR has no advantage over the MIP (maximal intercuspal position) or habitual position when relating the maxilla to the mandible. Alternatives for inter-occlusal jaw registration in CR are proposed. We therefore suggest the term patient driven relation PDR, as the concept of use in cases where a new maxilla – mandibular relation is needed.

RANDOMIZED CONTROLLED TRIAL TO ASSESS THE NUTRITIONAL STATUS AFTER COMPLETE DENTURE AND WITH/WITHOUT FOOD SUPPLEMENTS

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Keywords: Complete denture, food supplement, nutrition

Purpose/Aim: To evaluate the role of complete denture's in improvement of nutritional status and masticatory efficiency in elderly women as well as role of dietary supplements on nutritional status.

Materials and Methods: This randomized controlled trial was conducted from 2012 to 2016 in tertiary care institution and patients were recruited after taking written consent form. This study included 126 cases (complete edentulous) and 63 control (complete dentition) participants. Inclusion criteria were female from 45-65 yrs, class I complete edentulous (2-6 months) with no history of dental wearing for case group and class I complete dentition occlusion for control group. Exclusion criteria were any metabolic disease/malignancy, osteoporosis, taking any food supplement. Various biochemical (hemoglobin, calcium, albumin, vitamin D), masticatory efficiency & radiological investigations were conducted. Case group divided into equal size group into with and without food supplement after rehabilitation with complete denture. All the investigations would be repeated 3 and 6 months after fabrication of the denture and dietary supplementation. Level of significance was set as 0.05 and SPSS version 21 was used to analyse the study.

Results: A statistically significant difference was found in biochemical parameters after rehabilitation with complete denture before and after complete denture fabrication. ($P<.05$) Statistically no difference was noted between complete denture wearer with or without taking nutritional supplements on biochemical parameters, masticatory efficiency.

Conclusions: This study find that complete denture itself enhance masticatory efficiency which may increase patient choices of food taken. So this study do not find food supplement to added benefit after rehabilitation with complete denture.

ASSOCIATION OF PAIN-RELATED DISABILITY WITH PSYCHOSOCIAL FACTORS IN TMD PATIENTS, BASED ON DC/TMD CRITERIA

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Keywords: temporomandibular disorders, psychosocial factors, DC/TMD

Purpose/Aim: Diagnostic Criteria for TMD (DC/TMD) are recently developed, validated and evidence-based criteria for diagnostics of temporomandibular disorders (TMD). Based on previous studies, pain-related intensity/disability, assessed using GCPS (Graded Chronic Pain Scale 2.0), may be used as a simple screening instrument to identify patients with different, clinically relevant psychosocial profiles. The aim of this study was to evaluate the association of psychosocial factors, i.e. depressive and non-specific physical symptoms (somatic symptom severity), and anxiety with pain-related intensity/disability, using the Finnish version of DC/TMD (DC/TMD-FIN) Axis II instruments.

Materials and Methods: This pilot study was performed as part of a field test of the DC/TMD-FIN. Altogether 74 TMD patients (mean age 43.6 years, range 17.0-80.2 years) from four Finnish university hospitals (Helsinki, Turku, Kuopio and Oulu) answered the

following questionnaires included in the DC/TMD-FIN: Patient Health Questionnaire (PHQ)-9, PHQ-15, GAD (Generalized Anxiety Disorder)-7 and GCPS2.0. Based on the GCPS 2.0, the subjects were classified in three subgroups ("mild": grades I/II with no disability points, "moderate": grade II with 1-2 disability points, and "severe": grades III&IV with 3-6 disability points). Sums scores for the PHQ-9, PHQ-15 and GAD-7 were calculated, and their associations with GCPS subgroups were evaluated using Kruskal Wallis test and Mann-Whitney U test.

Results: Based on the GCPS 2.0, patients were distributed into following subgroups: mild (55%), moderate (13%), and severe (32%). The GCPS subgroups differed according to GAD-7 scores (p=0.049). Based on pair-wise comparisons, GCPS subgroups 1 and 3 differed significantly in scores of GAD-7 (p=0.034), PHQ-9 (p=0.035) and PHQ-15 (p=0.030), showing higher scores in the subgroup 3.

Conclusions: The present pilot study showed that GCPS 2.0-FIN included in the DC/TMD-FIN discriminates TMD patients into clinically relevant psychosocial profiles. Besides other instruments, GCPS 2.0-FIN may be applicable in planning of individualized treatments for TMD. Additional studies with larger samples are, however, needed to confirm the results.

FULL MOUTH REHABILITATION IN A CASE OF TOOTH WEAR: FOCUS ON CLINICAL CHOICES AND TREATMENT SEQUENCES

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A clinical case of a full mouth rehabilitation on teeth and implants will be described in all the clinical and technical sequences. The clinical steps have been managed following a consolidated clinical protocol. Special attention will be given to the concepts on which the treatment planning is based and to the risk assessment.

IMPACT OF COMMON BEVERAGES AND AGING ON COLOR STABILITY AND TRANSLUCENCY OF HIGHLY TRANSLUCENT ZIRCONIA

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Keywords: monolithic zirconia, color, translucency

Purpose/Aim: The stability of color and translucency of an esthetic restoration are important factors for long-term success. Although the impact of common beverages was investigated for various all ceramic systems, it has not been investigated for high translucency monolithic zirconia. The purpose of this in vitro study was to investigate color and translucency variations of highly translucent zirconia ceramics after artificial aging and immersion in commonly consumed beverages (tea, coffee and wine).

Materials and Methods: A total of 60 specimens (1×10×10 mm) were milled from high translucent monolithic zirconia (BruxZir® Anterior Blank 250, 12mm) according to manufacturer's instructions. The specimens were divided into 4 subgroups (n=15): 1.artificial aging (BA), 2.coffee (BC), 3.black tea (BT), and 4.red wine (BW). Artificial aging was performed for 20 and 100 minutes, at a temperature of 134 ºC and a pressure of 2 bars, simulating 1 and 5 years of clinical use, respectively. The specimens were soaked in the staining solutions for up to 18 and 90 hours, simulating 1 and 5 years of clinical use, respectively. Color parameters L*, a*, and b* were assessed over a black and a white background with an ultraviolet-visible spectroscopy recording spectrophotometer. Translucency parameter (TP), Contrast ratio (CR), Color difference (??00) were calculated using mathematic equations TP=[(Lb* - Lw*)^2 + (ab* - aw*)^2 + (bb* - bw*)^2]^1/2, CR=L*b/L*w, ??00=[(?L'/KLSL)^2+(?C'/KCSC)^2+(?H'/KHSH)^2+RT(?C'/KCSC)(?H'/KHSH)]^(1/2). The acceptability level for ??00 was set at 1.8. One way ANOVA with Bonferroni pair-wise comparison tests was used to explore statistical significant differences (a=.05) among groups regarding TP (?TPab), CR (?CRab), and ??00.

Results: The lowest ??00 was recorded for the aged group which was increased after a 5-year aging simulation. The ??00 of specimens immersed in tea, coffee and wine ranged between 1.27 to 1.72 after 1 year and remained almost unchanged after 5 years of aging. All ??00 differences were above the 0.8 value, which is the perceptibility threshold (PT). The ??00 of all groups was below 1.8, which is the acceptability threshold (AT). A progressive increase in CR and decrease in TP was observed only for tea and coffee (Figure 1). None of the groups exhibited ?CRab or ?TPab values above the PT of ?CRab=0.07 and ?TPab=2 respectively. However, the specimens in the coffee group presented the highest ?TPab values, which ranged between 1.6, after 1 year and 1.9 after 5 years.

Conclusions: All groups demonstrated slight color changes that are expected not to be clinically distinguishable from both patients and practitioners. The translucency was affected by the tested treatments even after 1 year, however it is not expected to be noticeable. Immersion in coffee produced the highest translucency differences, in close proximity to the observable thresholds.

ASSESSMENT FOR FLEXURAL STRENGTH AND SURFACE HARDNESS OF CAD/CAM POLYMERS (PMMA/PEEK) AND HEAT-CURED PMMA

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Keywords: CAD/CAM, PEEK, denture base materials

Purpose/Aim: The purpose of this in vitro study was to evaluate flexural strength and surface microhardness, and elasticity modulus of two different CAD/CAM denture base resins (PMMA and PEEK) and a conventional heat polymerized PMMA.

Materials and Methods: In this study, two different base polymers milled with CAD/CAM (Yamahachi PMMA Disk and Juvora Dental Disk PEEK) and heat polymerized acrylic resin (Meliodent PMMA) were used. 20 specimens for each of the tests method, a total of 120 specimens were prepared. Half of the test specimens were stored in distilled water. The other half of them were thermocycled between 5°C and 55°C with 30-s dwell times for 5,000 cycles. After the thermocycle; flexural strength, surface hardness, and elasticity modulus of all test specimens were evaluated.

Results: The mean flexural strength of the test specimens values ranged from 81.60±36.53 MPa to 226.26±5.34 MPa. PEEK group produced by CAD/ CAM showed the highest mean flexural strength (stored in distilled water: 220.56 MPa and submitted to thermal cycling: 226.26 MPa). The conventional heat polymerized group showed the lowest mean flexural strength (81.60 MPa) and elasticity modulus (4497.14 MPa). In all test groups, no statistically significant differences were observed in flexural strength ($p=0.261$) and elasticity modulus ($p=0.779$) between the thermocycled and non-thermocycled. The surface hardness of CAD/CAM PEEK (30.62 VHN) and PMMA (26.13 VHN) groups were higher values compared to heat-polymerized PMMA (21.88 VHN). In the PMMA group produced by CAD/CAM, surface hardness values were significantly higher in thermocycle applied test specimens compared to specimens kept in distilled water ($p<0.001$).

Conclusions: The PMMA and PEEK test groups produced by CAD / CAM showed improved mechanical properties compared to heat-polymerized test specimens.

FIVE-YEAR VOLUMETRIC EVALUATION OF PERIODONTALLY COMPROMISED SITES RESTORED BY IMMEDIATE IMPLANT RESTORATIONS

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Keywords: immedeateimplant, labialplate

Purpose/Aim: Immediate postextraction implant placement following the one-stage flapless surgical approach, combined with

immediate provisionalization, has been successfully clinically applied. Favorable biologic and esthetic outcomes have been reported in the dental literature, mainly concerning intact and healthy sockets. The osseointegration achieved with this approach is combined with adequate preservation of the preoperative soft tissue morphology that is maintained postoperatively around the single-implant restorations. This approach also has been used successfully for implants placed immediately into the extraction sockets of periodontally compromised teeth, immediately transforming the compromised periodontal tissues into healthy periimplant tissues. The aim of the present cases series study was the volumetric tomographic evaluation of the relationship between the crestal radiopaque plate surrounding the implant and the maintained over- lying soft tissue profile 5 years postoperative in periodontally compromised sites, restored by the method described above.

Materials and Methods: The distance of the labial hard and soft tissue margins from the implant shoulder in 24 periodontally compromised sites that were restored by immediate implant restorations combined with Inorganic filler to fully seal the void part of the socket, was retrospectively evaluated by radiographic retrospective measurements. Volumetric analysis was performed 5 years postoperatively using cone beam computed tomography with limited field of view. Three-dimensional (3D) digital imaging was accomplished by CBCT with a limited field of view, after the labial surface of the clinical crown of the restoration and the surrounding soft tissues were covered with radiopaque foil in order to also project the soft tissue profile. The digital radiographic imaging simultaneously produced sagittal (cross-sectional), horizontal (axial), and coronal (longitudinal) scans. The sagittal scans were digitally 3D oriented parallel to the long central axis of the implant and perpendicular to the tangent of the arch curve. Thus, the absolute distances of the soft and hard tissue coronal margins from the implant-abutment interface were precisely measured.

Results: In all cases, a labial radiopaque plate was present 5 years postoperatively with a total mean height of 3.1 ± 0.6 mm above the implant-abutment interface. This height was significantly lower compared with the mean soft tissue height above the implant shoulder (5.2 ± 1.1 mm) ($P < .001$), supporting it in distance (2.2 ± 0.5 mm).

Conclusions: These findings showed that preservation of the original soft tissue morphology of periodontally hopeless teeth treated by the flapless one-stage immediate implant placement and provisionalization is feasible. In cases where the preoperative marginal height is esthetically acceptable, this clinical approach should be considered a valid alternative restorative treatment leading to predictably acceptable long-term biologic and esthetic results. The minimal overall surgical intervention should also be considered positive.

CLINICAL EVALUATION OF PARTIAL GLASS-CERAMIC POSTERIOR RESTORATIONS LUTED USING PHOTO-POLYMERIZED RESIN

COMPOSITE AND IDS

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Keywords: adhesion, posterior, immediate dentin sealing

Purpose/Aim: To evaluate the clinical performance of partial glass-ceramic (IPS e.max Press) posterior restorations.

Materials and Methods: A total of 765 restorations in 158 patients were placed between 2008 and 2018 and evaluated during regular dental care visits between 2015 and 2018. The restorations were luted with a conventional photo-polymerized resin composite (HFO) in conjunction with an Immediate Dentin Sealing procedure (IDS). Intra-oral photographs and radiographs were made and evaluated using USPHS criteria.

Results: The mean observation time was 53.3 months (range: 3-113 months). Three absolute failures occurred (tooth fractures, n=2; apical re-infection, n=1) all leading to the loss of the restored tooth. Repairable and salvageable failures occurred in 9 teeth (endodontic complications, n=7; secondary caries, n=1; debonding, n=1). The survival and success rates according to Kaplan-Meier after 5 years cumulated to 99.6% and 98.6% respectively. Location (premolar/ molar and mandibula/maxilla), pre-restorative endodontic status (vital/devitalised) and extension of the indirect ceramic restoration (number of sides and cusps involved) did not significantly affect the cumulative success rate (log rank test, $p>0.05$). The condition of the vast majority of the restorations remained unaffected for 5 years.

Conclusions: Partial glass-ceramic posterior restorations luted by means of a conventional photo-polymerized resin composite in conjunction with the use of an IDS procedure have an excellent medium-term prognosis.

A FULL-DIGITAL WORKFLOW FOR NANOCERAMIC ENDOCROWNS: A 1-YEAR PROSPECTIVE STUDY

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Keywords: endocrown, monolithic, full-digital-workflow

Purpose/Aim: Devitalized teeth are often challenging to restore due to the lack of coronal support and retention. New CAD/CAM materials and intra-oral scanning devices offer new possibilities to restore non-vital teeth in a simple and minimally invasive manner. The aim of this study was to evaluate the success of monolithic endocrowns using a digital workflow.

Materials and Methods: Patients requiring restoration of a devitalised molar or premolar were included in the study. The preparation was scanned using an intra-oral scanner (Cerec Bluecam) and a monolithic restoration was made from a nanoparticle resin-based hybrid composite (Lava Ultimate and GC Cerasmart) or a polymer infiltrated ceramic (Vita Enamic). At time of placement, after 6 and 12 months, radiographs, clinical pictures and a digital impression were taken. Also, the quality of the restoration and patient satisfaction were assessed.

Results: No complications occurred in the Vita Enamic group (#10). In the GC Cerasmart group (#9), 2 chippings and 1 debonding occurred. In the Lava Ultimate group (#10), 1 chipping and 2 fractures occurred. USPSC scores were high, except for the colour match. Patient satisfaction increased after 6 months and did not change thereafter.

Conclusions: The endocrown is a minimally invasive and predictable treatment for the endodontically treated tooth, which can be easily performed using a chairside scan- and milling system. Although no significant differences were found, ceramic based hybrid material (VE) seems to have a higher survival rate than composite based hybrid materials (LU and CE) as endocrown restoration.

CURING MODES AFFECT THE DEGREE OF CONVERSION AND MECHANICAL PARAMETERS OF DUAL-CURED LUTING AGENTS

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Keywords: dual-cured luting agents, curing modes, paramters

Purpose/Aim: To investigate the effects of different curing modes, including tack cure, on the degree of conversion (DC) and mechanical parameters of dual-cured luting agents for all-ceramic restorations.

Materials and Methods: Immediate light curing, intermittent light curing (2-s tack cure and a 1-min interval before the main cure), delayed light cuing (2-min delay) and chemical or no light curing were used to cure two dual-cured luting agents, RelyX Unicem and PermaCem 2.0, through a 1.5-mm thick lithium disilicate ceramic slide. DC (n = 3), micro-hardness (n = 5), shrinkage strain (n = 4) and shrinkage stress (n = 3) were measured under the aforementioned curing modes. The data were analyzed using two-way ANOVA and post-hoc Tukey HSD test, with the level of significance set at ? = 0.05.

Results: For both luting agents, all the light-curing modes produced similar final DC, but using chemical cure only could significantly reduce the DC. The mechanical parameters followed a similar pattern. There were positive but nonlinear correlations between DC and the other mechanical parameters, with the increase in these parameters with DC being slower initially.

Conclusions: Provided adequate light curing is applied to a dual-cured luting agent, delaying the light curing or using a tack cure first to facilitate seating of a restoration may not have a significant impact on the luting agent's final degree of conversion. However, using chemical cure only may result in inadequate cure of the luting agent and is recommended only for highly opaque restorations.

IS COLOR MASKING POSSIBLE WITH THE COMBINATION OF POLYMERIC HYBRID MATERIAL AND RESIN CEMENT SHADE?

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Keywords: color masking, polymeric CAD/CAM materials, resin cement

Purpose/Aim: Esthetic rehabilitation of discolored anterior teeth is always a great challenge for the restorative team and requires intensive planning. Esthetic polymer based CAD/CAM hybrid materials are translucent and are therefore affected by their thickness as well as the color of the underlying substructure. However, it may be possible to achieve the desired final restoration color with the correct combination of material type, thickness and proper cement selection. The purpose of this in-vitro study was to evaluate the color masking ability of polymer based CAD/CAM hybrid materials.

Materials and Methods: A polymer infiltrated ceramic network material (Vita Enamic, VE) and a resin matrix ceramic (Cerasmart, CS) were selected for this study. The specimens (N = 112) were prepared into square-shaped (12 × 12 mm2) with different thicknesses (1 mm and 1.5 mm) in A1/1M1 LT shades. Heat-cured acrylic resin discs (ø=12 mm, h=2 mm) were prepared as tooth-colored substrate structures in A4 shade. The resin cement used was (Panavia V5) in translucent and white shades. Hybrid materials were cemented to substrate structures with two different cement film thickness (100µ and 300µ). The masking ability of hybrid materials were calculated based on CIE L*a*b* color coordinates measured with a spectrophotometer (Konica Minolta CR-321). The masking ability was calculated by CIEDE2000 (2;1;1) color difference formula (?E00) for each cemented specimen on a substrate measured over on a black background. The data were analyzed with ANOVA and the Tukey HSD test (p=0.05).

Results: According to the statistical analysis the following factors had higher masking ability: VE ($p<0.001$; $F=137.907$); 1.5 mm

specimen thickness (p<0.001; F=342.16); white cement color (p<0.001; F=40.360) and 300µ film thickness (p?0.001; F=11.16). Additionally, statistically significant differences were found in tested groups (p<0.001; F=42.317). CS specimens in 1 mm thickness cemented with translucent cement with 100µ film thickness gave the lowest ?E00 indicating that the lowest masking ability. VE-1.5 mm specimens cemented with white cement in both 100µ and 300µ film thickness exhibited the highest masking capacity. Other groups demonstrated comparable results.

Conclusions: Type, thickness of hybrid materials and cement color and cement film thickness significantly influenced the resulting optical color. Increasing material thickness and choosing white shaded cement may minimize the influence of the substrate color. These properties should be combined to achieve the best esthetic outcomes in the clinical practice.

EFFECT OF HOME BLEACHING ON THE SURFACE ROUGHNESS OF CAD-CAM MATERIALS WITH DIFFERENT SURFACE TREATMENTS

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Keywords: bleaching, CAD-CAM, surface roughness

Purpose/Aim: To evaluate the effect of bleaching procedures on the surface roughness (SR) of CAD-CAM blocks in different microstructures after thermal cycling.

Materials and Methods: Five different types of CAD-CAM blocks, including a lithium disilicate ceramic (IPS e.max CAD [EM]; Ivoclar Vivadent AG), a feldspathic ceramic (Vitablocks Mark II [M]; Vita Zahnfabrik), a zirconia-reinforced lithium silicate ceramic (Vita Suprinity [S]; Vita Zahnfabrik), a resin nanoceramic (Lava Ultimate CAD-CAM Restorative [L]; 3M ESPE) and a dual-network ceramic (Vita Enamic [E]; Vita Zahnfabrik) were used for SR. Eighty specimens were fabricated from CAD-CAM blocks (12x14x1 mm) and after mechanical polishing (p) or glaze finishing (g), the specimens (Lp, Ep, EMp, Mp, Sp, Mg, Sg, EMg) were divided into subgroups (n=10). Ra values were recorded using a contact profilometer. Three measurements were performed: the baseline and after thermal aging and after bleaching. After the baseline measurements, the specimens were subjected to the thermal aging process using thermo-cycling device between 5 °C and 55 °C for 10,000 cycles with a dwell time of 30 seconds. After then, all specimens were treated with carbamide peroxide bleaching gel for 6 hours per day for 8 consecutive days. The bleaching gel was applied to completely cover the specimens' surface and they were kept in an incubator at 37 °C during the bleaching process. The data were evaluated by using Repeated-Measures ANOVA and multiple-comparison test with Bonferroni corrections (?=.05).

Results: According to descriptive statistics, mean Ra values of Sp (0.22), Mg (0.6) and Sg (0.8) groups are higher than Ra threshold (=0.2 µm) value for bacterial adhesion and accumulation of dental plaque. Thermal cycling and bleaching procedures resulted in statistically higher surface roughness for Sg and Mg groups (P<.05). Pairwise comparisons test showed no significant differences among the all material groups after thermal cycling and bleaching procedures (P>.05).

Conclusions: Mean Ra values for each group were slightly increased after thermal cycling and bleaching but showed no significant differences. Sp, Sg ve Mg materials should be considered in terms of bacterial adhesion and accumulation of dental plaque.

ESTHETIC UPGRADE OF AN EXISTING IMPLANT-SUPPORTED SINGLE CROWN IN THE ESTHETIC ZONE

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Keywords: lithium disilicate, implant supported restoration, esthetic zone

Case Presentation: Background
During the process of facial growth, both jaws are growing in three dimension thus the teeth change their position in space. Dental implants, on the other hand, do not move in the direction of growth. Placing dental implants during the growth process is fully active, especially, in the esthetic zone, can solve a momentary problem, but may lead to a bigger problem in the esthetic appearance of the patient at the end of the growth process. In this presentation a technique for upgrading an existing implant supported single crown in the esthetic zone.

Case Report: A 19 years old female presented with a congenitally missing right upper lateral incisor (tooth #12). At the age of 14, a one-piece implant was placed between the central and the canine and a PFM crown was permanently cemented. Since the age of 14, the patient maxillary growth continued horizontally and vertically, resulting in a submerged implant-supported crown therefore the patient's esthetics is impaired. the patient wishes to have a nicer smile also due to an excessive 'gummy smile'. In order to fulfill the patient's wishes, the final crown should be extended gingivally, incisally and buccally. The patient wishes to improve the shape and esthetics of her lateral incisor crown, but insists not to replace the existing implant and prefers not to go through any surgical procedure. The patient agreed to an unusual, but a consrevative treatment plan – a glass-ceramic onlay-crown that will be cemented over the ceramic surfaces of the implant-supported existing crown. The implant-supported crown was prepared with a fine diamond bur in order to eliminate undercuts. A conventional two-stage impression, polyvinyl siloxane putty-wash was made. The lab technician prepared a lithium disilicate coping (IPS e.max Press, Ivoclar vivadent AG) as the first layer and feldspatic ceramic (IPS e.max Ceram, Ivoclar vivadent AG) as the second layer, for the esthetic characterization of the restoration. The restoration was prepared with a 5% hydrofluoric acid for 90 sec, then silanated for 60 seconds. The surface of the existing crown got the same treatment while using a 9% hydrofluoric acid. The restoration was cemented with a translucent, dual cure adhesive resin cement.

Discussion: The advantages of the presented technique compared with a new implant supported crown include lower price, conservative treatment and no surgical intervention. A surgical treatment, extracting and replacing the implant and the crown, is always an option. Correcting the gingival line can still be done whenever the pateint agrees to go through surgical procedures.

Conclusion & Clinical Implications: The goal of the treatment was to improve the esthetics of an implant supported single crown that was placed in an early age before the end of growth. Cementing lithuim Disilicate to porcelain crown is a valid option for correcting an existing implant supported restorations.

THE EFFECTS OF MDP MICELLAR SOLUTIONS ON EXTRAFIBRILLAR

COLLAGEN DEMINERALIZATION AND DENTIN BOND PERFORMANCE

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Keywords: 10-methacryloyloxydecyl dihydrogen phosphate (MDP); extrafibrillar collagen demineralization

Purpose/Aim: This study was aimed to investigate extrafibrillar collagen demineralization of dentin induced by primers consisting of micellar solution containing 15 wt%10-methacryloyloxydecyl dihydrogen phosphate (MDP) and its effects on the dentin bond performance irrespective of dry-bonding and wet-bonding?

Materials and Methods: Two MDP-containing primers were composed of 15 wt% MDP of an ethanol-aqueous (75:25 (75%EtOH-MDP), 55:45 (55% EtOH-MDP) V/V) solution. They were analyzed with conductivity meter and cryogenic transmission electron microscopy (Cryo-TEM). A total of 72 mid-coronal dentin disks were treated with the MDP-containing primers for 15 s (prime-and-rinse approach) or etched with phosphoric acid for 15 s (etch-and-rinse, control), thoroughly rinsed with water for 30 s, before they were air-dried or blot-dried. Afterward, they were applied with either of two adhesives (Single Bond 2 and Spectrum Bond) following the manufacturer's instructions. And composite resins from the same manufacturer were placed onto the adhesive-treated dentin surfaces in 1.5-mm incremental technique up to 4.5-mm, each light-cured for 20s. After storage in water for 24 hrs, the samples were vertically cut into micro-beams with a cross-sectional area of approximately 0.9 mm2. The micro-beams were subjected to micro-tensile bond strength (MTBS) tests after they were stored in water for 24 hrs or thermocycled for 10,000 cycles. The MDP-treated dentin surfaces were analyzed by thin-film X-ray diffraction (TF-XRD), Fourier transform infrared spectroscopy (FTIR), high resolution TEM (HRTEM) and scanning electron microscopy (SEM).

Results: Prime-and-rinse approach could increase the dentin MTBS, regardless of drying mode, thermocycling and adhesives($P>0.05$). The 24-hour MTBS of prime-and-rinse approach was significantly higher than that of the control for dry-bonding ($p < 0.05$). And after thermocycling, the MTBS of the 75% EtOH-MDP group was still significantly higher than that of the control ($p < 0.05$). For wet-bonding, there was no significant difference between MTBS of prime-and-rinse approach and the control ($p > 0.05$). The conductivity of 75%EtOH-MDP and 55% EtOH-MDP solutions were 1475±16.7 μc/cm and 2707±41.6 μc/cm, respectively. Cryo-TEM images showed that MDP self-assembled into different size of micelles in ethanol-aqueous solution. FTIR spectrum showed the presence of the methacrylate carbonyl peak at 1716 cm-1 on the MDP-treated dentin surfaces. And TF-XRD spectra showed three characteristic peaks of MDP-Ca salts on dentin. SEM and HRTEM images of 75%EtOH-MDP group showed that most of inter-fibrils of dentin were demineralized and the mineralized collagen fibrils could be detected on the treated dentin. And SAED pattern indicated crystalline phase at the top of demineralization zone.

Conclusions: Prime-and-rinse approach using micellar solution of 75%EtOH-MDP could achieve extrafibrillar collagen demineralization of dentin and increase the dentin MTBS of etch-and-rinse adhesives, irrespective of drying mode and thermocycling.

Graduate Student Oral Abstract Presentations

THE FABRICATION AND FEASIBILITY OF DIGITAL COMPLETE DENTURES

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Keywords: Digital, Technology, Complete Dentures

Case Presentation: Background
The application of digital technology has expanded to the construction of digital complete dentures. Some reports have claimed improved retention, phonetics and efficiency in fabricating dentures digitally with a reduced number of visits required. However, there is also evidence that this process is expensive and lacks a defined protocol.

Technique/Case Report
The technique adopted will be rapid prototyping (3D printing) and the data input will be that of a poured secondary impression and the try in (diagnostic) wax denture. A software program will be used to virtually articulate the scanned images of the models and the set up of teeth. The denture base and the setup teeth will be printed separately and then cemented prior to delivery.

Discussion
There are various methods and techniques that exist for digital aided fabrication of complete dentures. These range from 1 to 5 visit protocols, from milling to printing, and the data that are collected digitally also vary. It is well accepted that intra-oral scanners may not be suitable for taking a digital impression of the edentulous ridges and the soft tissues. Therefore, it is recommended that a conventional impression capturing the ridge, soft tissues and vestibuli be taken, a model poured and then scanned. There are also variations as to what stages of the manufacturing process are digitally aided. For example, the acrylic base of the bite block can be 3D printed/ milled, or the finished denture, or the denture base with teeth separately. Digital complete dentures can also be manufactured as upper and lower, single, immediate, duplication or implant supported.

Conclusion
Using the digital technology available in South Africa, a 3D printed digital complete denture was fabricated. The technique used and the patient's clinical outcomes will be reported, together with a preliminary cost analysis based on the materials used and the clinical and laboratory time spent.

ROHNER TECHNIQUE FOR RECONSTRUCTION OF COMPLETE

MAXILLECTOMY

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Case Presentation: The Rohner technique, first described by Dennis Rohner in 2000, allows for prefabrication of a free vascularised fibula flap with split skin graft and implants incorporated strategically. This technique benefits from the long straight bicortical fibular bone and the large diameter vessels providing predictable implant stability, optimal soft tissue healing and minimal bone resorption. This technique is prosthetically driven and considers the occlusion and prosthesis position in planning the free fibular flap reconstruction. This case presentation will describe the use of the Rohner technique for reconstruction of a complete maxillectomy defect. The patient is a 47-year-old female presenting with peripheral verrucous leukoplakia of the maxillary gingiva which had developed from a long-term oral leukoplakia. Given the high rate of progression to dysplasia and the high recurrence rate, the case required a complete maxillectomy. Reconstruction followed the Rohner technique with a fibula free flap where the implants are placed in the fibula eight weeks prior to maxillary resection and reconstruction. At second stage surgery, the fibula free flap with osseointegrated implants is taken to the mouth and aligned with a maxillary full arch implant-supported fixed dental prosthesis. Patient reviews are continuing with the most recent at 4 months post-operatively.

DIGITAL ORIENTED TREATMENT: NEW PROTOCOLS IN DIGITAL WORK? OW

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Keywords: Virtual Facial Analysis, Computer Guided Implants, Digital work?ow

Case Presentation: The aim of this presentation is to describe clinical trial case reports based on the combination of facial analysis software, CT cone-beam, Computer Aided Implantology, CAD-CAM technology, 3D printing. The protocol is called "Digital Oriented Treatment (DOT)". The ?nal goal is to optimise the treatment for the best patient satisfaction.

MANAGEMENT OF OBSTRUCTIVE SLEEP APNEA AN OVERVIEW AND CASE REPORT

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Keywords: Dental sleep medicine, Mandibular advancement device, Obstructive sleep apnea

Case Presentation: Obstructive sleep apnea (OSA) is a common sleep- related disorder characterized by repetitive episodes of nocturnal breathing cessation due to upper airway collapse. It has many predisposing factors therefore, its management depends on the severity and the causing factors. One of the recommended treatment modalities for mild obstructive sleep apnea is the Treatment with a mandibular advancement device(MAD).This presentation aims to deliver an idea about the different treatment modalities , that can be offered in the dental office according the recent researches and recommendations and in the end there will be a case of a 30-years- old male patient, who was diagnosed with mild OSA and referred from ENT department. In this case presentation, the prosthetic laboratory workflow will be presented.

TREACHER COLLINS SYNDROME: A CASE PRESENTATION

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Keywords: Treacher Collins Syndrome

Case Presentation: Treacher Collins Syndrome is a rare genetic disorder characterized by numerous developmental anomalies that are restricted to the head and face. The symptoms of this disorder vary greatly, ranging from almost unnoticeable to severe. A 4 year old female presented to the maxillofacial prosthodontics unit in the Department of Prosthodontics, University of the Witwatersrand with the complaint from the parents of wanting a prosthetic ear for the child. She had an older brother, and none of the family presented with features related to Treacher Collins syndrome. The extra-oral clinical features of the patient were indicative of Treacher Collins Syndrome. These included bilateral microtia, antimongoloid slanting of the palpebral fissures, malar hypoplasia, micrognathia, coloboma of the lower eyelids, diminished hearing, high vaulted palate, an anterior open bite with early onset of posterior crossbite. Whilst the main complaint was the need for a prosthetic ear, the parents had not fully understood the future implications of the child being diagnosed with Treacher Collins Syndrome. Hence, treatment not only focused on auricular prostheses, but included the psychological development of the parents (and invariably the child) and engagement with future team members who would be integral to the health of the child. Treatment of this condition is lengthy and requires a multidisciplinary approach. Each and every case is unique and needs to be assessed individually. Both the oral cavity and the air passage tend to be small in patients who have this syndrome. Its psychological and social effects may be devastating due to the facial malformations. Therefore, it is imperative that all dimensions of the syndrome be given equal attention for appropriate treatment.

AN ALTERNATIVE TREATMENT IN A CASE OF SEVERE BONE LOSS IN THE ESTHETIC ZONE

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Keywords: Cervical resorption, bone loss, esthetic rehabilitation

Case Presentation: The case presents an esthetic rehabilitation of a 58 year old man with cervical resorption of tooth 21 and attachment loss around tooth 11. B.G. (58 y/o) suffers from Alopecia Universalis. His chief complaint was unaesthetic appearance of the anterior teeth that prevents him from smiling. Several years prior to his arrival for treatment he was diagnosed with localize aggressive periodontitis around teeth #26 and #11. Tooth #26 was extracted and a regeneration surgery was conducted around tooth #11. The patient claims that excessive force was applied to tooth #21 during the surgery, which he believes has caused its cervical resorption. In clinical and radiographic examination: tooth #26 was replaced with an implant and successfully rehabilitated, tooth #11 showed attachment loss along the root and the apex, and the crown of tooth #21 was mobile, with a dark-pinkish color, and was fixated by a metal wire to the adjacent teeth.
The patient rejects any surgical treatments and presents an economic restriction for treatment. The main treatment goal was to provide B.G. with a restoration that would be esthetic and functional with the ability of self-maintaining. Yet the complexity of the case was providing this rehabilitation with minimal intervention while facing a comprehensive bone and tissue loss around the anterior teeth. Several treatment options are discussed, taking into account pros and cons for each one. The course of treatment and final rehabilitation will be presented.

MULTI-DISCIPLINARY THERAPY COMBINED WITH SOFT AND HARD -TISSUE AUGMENTATION FOR IMPLANT RESTORATION IN THE ESTHETIC ZONE

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Keywords: multi-disciplinary treatment, subepithelial connective tissue graft, implant

Case Presentation: This case report presents the multi-disciplinary treatment therapy for a patient with tooth fracture beneath the gingival margin in 12 lingual side and tooth loss in 11 due to trauma. The anterior alveolar crest in 11 showed severe bone resorption and the occlusion relationship of anterior teeth is deep bite. To reach the goal of both functional and esthetic restoration with minimal invasion, a multi-disciplinary therapy involving orthodontic, periodontic, endodontic, prosthodontics and implantology treatment was carried out. 12 cemented with a metal post was extruded occlusally for 2 mm through a 3-months orthodontic therapy to gain the ferrule effect, meanwhile, the deep bite occlusion relationship was relieved. After finishing the orthodontic therapy, implantation in conjunction with an in situ bone grafting with autogenous and allogenous bone supported by Ti mesh in 11 in combination with the labial frenulum lengthening were carried out. Meanwhile, a subepithelial connective tissue graft harvested from the palatal region was applied to the labial side of the pre-shaped Ti mesh, to increase soft tissue volume and prevent the Ti mesh exposure. 11 was restored with a temporary bridge. After submerged healing for 6 months, a satisfying alveolar ridge width was reached. Secondary surgery was carried out to remove the Ti mesh and a crown lengthening process was used in 12 to gain harmonious gingival level and to expose enough dental tissue for tooth restoration. A provisional implant restoration was used for gingival recontouring for one month to simulate similar gingival contour as 21. Transplantation of palatal keratinized mucosa in 11 was carried out to widen the keratinized gingiva surrounding the implant. Digital esthetic analysis and design was involved in restoration plan making. 12, 11 were respectively restored with zirconia crown and zirconia abutment supported zirconia crown, 21 was restored with a veneer to compensate the harmonious width-height ratio of anterior teeth. Finally, this restoration-driven implant placement results in a harmonious white and pink esthetics in the esthetic zone. A two-year follow up showed a stable gingival level and a healthy appearance in the anterior region.

Poster Abstract Presentations

Listed by Presenting Author – Alphabetical (Last Name, First Name)

Poster Abstract Presentations

WHEN TO DO CUSPAL COVERAGE FOR POSTERIOR VITAL TEETH AND ENDODONTICALLY TREATED TEETH?

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Keywords: Cuspal coverage, endodontically treated teeth, vital teeth

Purpose/Aim: BACKGROUND. Deciding when cuspal coverage is needed for posterior teeth is considered a challenge for dentists. The aims were to assess dentists' decision making regarding the need for cuspal coverage for vital teeth (VT) and endodontically treated teeth (ETT) with varying amounts of tooth structure loss. Identify clinical situations of dissimilarity and uncertainty in decision making.

Materials and Methods: MATERIALS AND METHODS. A random sample of 182 dentists were invited to participate in the survey. The survey included photos of 13 posterior teeth; 6 VT and 7 ETT. The clinical situations selected were based on a hypothetical scale of Typodont teeth with ascending amounts of tooth structure loss. A brief description of each situation was provided. Each dentist was asked to decide whether cuspal coverage is needed, not needed or if unsure. Descriptive analyses using SPSS were conducted. 75% was chosen as a cut-off point for assessing similarity in decision making. The unsure answer reflected uncertainty. Associations were assessed using chi-square test.

Results: RESULTS. 120 dentists participated (65.9% response rate); 70 females. Median for years of experience was 3.5 [IQR 1.1-10.8]. Analyses revealed similarity percentage <75% in decision making among dentists for 6 clinical situations; 4 VT and 2 ETT. More similarity were observed for situations at both ends of the scale with minimal and severe amounts of tooth structure loss, and more for ETT than VT. The highest percentages of uncertainty were more for VT than ETT. Clinical conditions of VT were more likely to receive the 'not sure' decision compared to ETT (X2, P<0.001). No association was detected with gender (X2, P=0.509), or years of experience (X2, P=0.223).

Conclusions: CONCLUSION. Dissimilarity and uncertainty in deciding when cuspal coverage is needed was observed especially for VT and teeth with moderate amount of structure loss.

REMOVABLE PROSTHODONTIC PRESCRIPTIONS: HOW DO STUDENTS COMPARE WITH CLINICIANS?

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Keywords: Removable partial dentures, prescriptions, communication

Purpose/Aim:
It is the responsibility of the clinician to design the removable partial denture (RPD) and communicate the prescription of the final dental prosthesis to the technician. RPD designing is part of the dental curriculum and it is expected that undergraduate dental students should be able to communicate the design of RPDs to the laboratory through high quality prescriptions. This study was aimed at investigating the quality of metal-based RPD prescriptions received by a major commercial laboratory in Melbourne, Australia. Communication of the design by final year dental students, post-graduate (prosthodontics), prosthetists, general dentists and prosthodontists were compared.

Materials and Methods:
Laboratory staff was requested to complete a checklist which was developed based on previously published literature. Presence or absence of the following items in the prescriptions were checked and noted: general information of patient and clinician, clinician's signature, RPD design including specific components. A final question on whether the technician needed to contact the clinician for clarification regarding the denture design was also included. Ethics approval was obtained from the University of Melbourne (1339644.1).

Results:
Two hundred and ten checklists were completed. Postgraduates were rated as the best for clear and accurate prescriptions (100%); undergraduates, 88.2%; specialists, 75%; prosthetists, 54.9%; and general practitioners (GPs), 20.8%. Accurate laboratory prescriptions

are required to produce high quality metal based RPDs. This study highlights the marked disparity in RPD prescription writing among professionals and dental students.

Conclusions:
Postgraduates and dental students were compliant with good quality prescriptions. However, the quality of prescriptions of independent qualified clinicians was much less compliant.

Postgraduates and final year dental students are well equipped in writing RPD prescriptions unlike clinicians. The profession should emphasise the importance of communication skills between clinicians and dental laboratory staff to avoid errors, remakes and to promote the delivery of a quality product to the patient.

LASER-ASSISTED MINIMAL INVASIVE THERAPY IN DENTISTRY

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Keywords: dentistry, laser, therapy

Case Presentation: Background. The surgical lasers can be used to optimize the therapy in various domains of the dentistry and to accomplish the esthetic and functional demands of the patients. Materials and method. 30 patients requiring pro-prosthetic surgical procedures and other dental interventions were treated with diode laser, Er,Cr:YSGG laser, and Er,Cr:YAG laser. VAS indices, discomfort degree, and the healing time were recorded postoperatory at 1 day, 3 days, and 7 days postoperatory. Results. Significant decreases of VAS indices, patients' discomfort and healing time were recorde d at 7 days, comparing to the results recorded at 1 day postoperatory. Conclusion. The minimal invasive laser-assisted techniques are associated to reduced postoperative pain, less discomfort and accelerated healing time

STUDY REGARDING CLASSIC VERSUS ERBIUM LASER-ASSISTED FRENECTOMY IN THE PROPROSTHETIC STAGE

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Keywords: frenectomy, laser, classic

Purpose/Aim: The aim of this study was to compare the evolution of the clinical postoperative parameters between Erbium laser-assisted frenectomy and frenectomy performed by classic surgery procedures.

Materials and Methods: Patients were selected from Clinical Base "Kogalniceanu M" of Dental Medicine Faculty, U.M.F."Grigore T.Popa" Iasi and a private dental practice (2015-2016. The laser procedures were performed by Er,Cr:YSGG, on test groups (laser-assisted surgical procedures) (20 patients) and control groups (scalpel groups) (20 patients). The postoperative evolution was recorded after 24 hours (T1), 3 days (T2) and 7 days (T3) and compared with T0 (baseline). It was assessed the postoperative evolution of clinical parameters as follows: VAS indices (pain intensity); patients' discomfort prevalence; healing time (days). Er,Cr:YSGG laser WaterLase (2780nm) (BioLase, USA) was used to perform frenectomy in the pro-prosthetic stage. The results were compared with control group.

Results: The results regarding VAS changes are as follows:
-significant statistical differences were found between scores VAS in T1 (day 1) for groups laserotherapy" and „control" ($p = 0.0001 < 0.05$); -significant statistical differences were found between the scores VAS in T2 (day 2) for groups laserotherapy" and „control" ($p = 0.0001 < 0.05$).; -significant statistical differences were found between the scores VAS in T3 (day 3) for groups „laserotherapy" and „control" ($p = 0.0001 < 0.05$). Significant statistical differences were found in favor of "laserotherapy" group for parameter postoperatory discomfort ($p<0.05$) and healing time.

Conclusions: The reduced postoperative pain, less discomfort and accelerated healing time by minimally invasive approach are factors that recommend Er,Cr:YSGG lasers for frenectomy in the pro-prosthetic stage.

DYNAMIC FUNCTIONAL IMPRESSION TECHNIQUE USING TISSUE CONDITIONER FOR MANDIBULAR REMOVABLE PARTIAL DENTURE: A CASE REPORT

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Keywords: dynamic impression technique, tissue conditioner, removable partial denture

Case Presentation: Due to relatively low support, retention and stability, mandibular dentures have been challenging even to a skilled practitioner. Throughout the process of the fabrication of mandibular dentures, the impression taking is considered to be of paramount importance. Numerous methods utilizing various impression materials have been introduced and studied, among which the dynamic functional impression technique using tissue conditioner is expected to be more physiological and functional method. Tissue conditioner serves as a temporary liner and its viscoelasticity enables physiological exercise in the oral cavity to be recorded over a long period of time.
A 67-year-old female patient visited Dental Care Center of Ajou University Medical Center, Suwon, Korea. Her chief complaint were multiple teeth in mobility. The maxillary teeth were preserved through periodontal treatment and supportive periodontal therapy, while the hopeless mandibular teeth were planned to be replaced with a bilateral distal extension removable partial denture. After extraction, a temporary denture was placed in the mandible during 3 months of healing period. #33, #43,44 teeth were restored with PFM surveyed crowns to function as the abutment teeth of distal extensions.
Dynamic functional impression technique was performed at the wax denture try-in stage. The resin base attached to the metal framework was used as a tray. The modeling compound was chosen for border molding and functional impression was prepared. After applying the adhesive, a dynamic impression was made using tissue conditioner. It was applied to the oral cavity for 15 minutes which was longer than the setting time, meanwhile the patient was instructed to chew, swallow and talk. An altered cast was made and the laboratory occlusal adjustment was carried out one more time to complete the removable partial denture. At the delivery stage, the patient was able to adapt to the new denture easily and only a few adjustments were needed. Both the patient and the practitioner were able to achieve satisfactory results.

INVESTIGATING THE AFFECT OF ELIMINATING THE SILANATION STAGE BY INCLUSION WITHIN RESIN-CEMENTS WHEN ADHERING CERAMICS.

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Purpose/Aim: To investigate the effect of two pretreatment methods (conventional vs. silane-containing) on the bond strength of a dual-cure self-adhesive resin cement's and the durability over time.

Materials and Methods: A total of 40 samples were prepared using two all-ceramic systems. 80 cylindrical turrets were formed for micro-shear testing and all were investigated by Tandom scanning microscopy (TSM) assessing failure modalities. The ceramic samples included (i) VITABLOCKS ® MARK II porcelain and (ii) IPS E-max lithium disilicate. The cements included (i) RelyX™ Unicem Self-Adhesive Universal Resin Cement (control group) and (ii) SAU-100A Kuraray-Noritake (test group). The samples were divided into four equal groups. Each cement was randomly allocated to the porcelain samples (n=20) or the lithium disilicate (n=20). Each ceramic sample received two cylindrical resin turrets. The turret was created as per manufacturer's instructions. All ceramic samples were pretreated with 5% hydrofluoric acid (20 seconds) before being air sprayed with water and air dried prior to turret creation. RelyX™ Unicem used a ceramic primer prior to turret formation. SAU-100A turrets were directly bonded to the ceramic surface. One turret was subjected to 24-hour storage (A) in distilled water (37oC) and (B) was subjected to 4-weeks storage in distilled water (37oC). After incubation, turrets underwent ??SBS (micro-shear testing). All data was statistically analyzed using a linear mixed model.

Results: Statistically significant effects found ($p<0.05$) in the interaction of the cement, on the other hand, no statistical significance were noticed during porcelain ageing ($p<0.05$). There was a statistically significant effect ($p<0.05$) of the interaction of the cement and ageing ($p<0.05$) with E.max. Interestingly the highest ??SBS (mean and SD) was SAU-100A 24h for E.max (16.30 (9.37) MPA). While the lowest ??SBS (MPA and SD) was for RelyX™ Unicem during 4weeks aging with porcelain (8.21 (6.07) MPA).

Conclusions: The initial bond strength of a silane-containing cement was higher than independent pretreatment with silane. Inclusion of a silane-coupling agent within the cement increased the micro-shear bond strength over time with porcelain but conversely decreased with E.max. This may have an implication on bonding techniques for indirect restorations.

THE ORAL HEALTH STATUS OF ATTENDEES AND RESIDENTS IN UAE CARE HOMES

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Purpose/Aim: The oral health status of day stay attendees and residents in care homes in the UAE has not been previously investigated. This cross-sectional study aimed to determine the oral health status of care home attendees and residents in the UAE.

Materials and Methods: All care homes identified from the UAE Ministry of Health website were selected and all subjects attending or residing in care homes were included, forming a convenience sample. The WHO classification was used for medical conditions. Oral and dental status was recorded on the WHO Oral Health Assessment form for adults (2013) and other demographic details were recorded separately. The three examiners had training and calibration exercises prior to conducting the dental examinations.

Results: A total of 107 participants with a mean age of 67.5 years (SD 15.65years) were examined. Nineteen subjects had significant cognitive impairment and could not co-operate and only partial examination was possible. Males (n=57) had a mean age of 69.2yrs (sd 16.3) which was not significantly different to the mean age of females (65.5yrs, sd 14.8). Most of the participants (n=70) had an ASA classification of mild systemic disease whilst 25 were classified with severe systemic disease. Periodontal problems were present in 58 (72%) of 81 dentate participants since 26 participants were edentate. Overall mean DMFT was 23.2 (sd 9.0) but mean DMFT in males was significantly greater (26.5) compared to females at 19.8 ($p<0.001$). Eighteen participants out of 88 (20.5%) complained of pain or soreness at the time of examination. The frequency of tooth brushing/cleaning the mouth was not correlated to participants' immobility. Educational attainment predicted 25% of the variance of DMFT and 40% was accounted for when gender and medical condition were included in the linear regression model.

Conclusions: Oral health was generally poor with high caries experience. Pain and discomfort was present in a significant number of participants. Dental care is a priority for this group.

EFFECT OF DENTURE WEAR ON RESIDUAL RIDGE IN EDENTULOUS PATIENTS: CASE CONTROL STUDY

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Keywords: Dentures, Bone, Resorption

Purpose/Aim: The aim of this study was to investigate the effect of complete denaturing wearing on residual ridge resorption in edentulous patient compared with edentulous patient who never wore dentures.

Materials and Methods: As part of a large study primarily investigating predictors of success of complete dentures, comprehensive data that might be relevant to complete denture outcomes was collected for 723 edentulous patients. A secondary objective of the large study was to investigate factors associated with ridge resorption.
Inclusion criteria: Patients who either were never able to wear complete dentures or had chosen not to wear complete dentures were identified. Patients were required to be edentulous for at least five years.
Exclusion criteria: Patient who had been rendered edentoolous on one arch before the other arch were excluded because of the possibility that resorption might be accelerated in the edentulous arch. Patients who were smokers, those taking steroids, or bisphosphonates, histories of autoimmune diseases, osteoporosis at any time during their period of edentulousness were excluded. Per the inclusion and exclusion criteria, patients were chosen from the database. Case and control group were matched for age, sex and time since being rendered edentoulous. Statistical analyses were undertaken using Pearson's 2 (Chi square) test and Fisher's exact test as the data were categorical and come of the cells in the contingency tables contained small numbers.

Results: A total of 30 patients who had not worn dentures for five years or more and who met inclusion and exclusion criteria were identified. These were matched with 30 controls. All control patients were the same age or within 2 years of the same age and had been edentulous for the same number of years or within 2 years of their respective controls. There was no significant difference between age and time since being rendered edentulous between case and control

Conclusions: The authors conclude that wearing complete dentures for more than 5 years has a massive effect in the amount of ridge resorption within period of 5 years.

DEVELOPING A METATHEORY OF HOW PEOPLE MANAGE TOOTH LOSS

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Purpose/Aim: To review theories likely to explain how patients manage loss of teeth.

Materials and Methods: A systematic search in four databases and grey literature identified relevant articles explaining psychosocial responses to loss of anatomical parts. Three investigators read the article selected on defined inclusion/exclusion criteria, and by consensus analyzed the findings through an interpretive process to deconstruct and interpret each theory, categorize similar theoretical constructs, and synthesize the theoretical perspectives into a single metatheory offering the most plausible explanation of people's responses to tooth loss. Interviews with18 participants experiencing loss of all remaining teeth in at least one jaw were analyzed to explore the clinical relevance of the metatheory.

Results: The search yielded 2,539 citations from which 288 articles identified 89 primary theories with 586 constructs that together constituted seven construct categories. Further qualitative synthesis of the primary theories and construct categories produced five dominant theories on: 1) communications; 2) developmental regulation (life course/span); 3) emotions; 4) resources; and 5) social cognition. Subsequently, the 18 interviews confirmed the relevance of the five dominant theories to the experiences of the participants. For example, before and after tooth loss, they engaged in adaptive behaviors according to Developmental Regulation Theory; implemented coping strategies according to Emotion Theory, Social Cognition Theory and Resource Theory; sought help from friends and dental professional according to Communication Theory, and modified their physical and social activities according to Social Cognitive Theory.

Conclusions: A qualitative synthesis from 89 primary theories identified a metatheory with five dominant theories on communications, developmental regulation, emotion, resource, and social cognition that offer a plausible explanation of how people respond comprehensively to loss of teeth. This metatheory provides a reasonable educational and clinical foundation for preparing patients and their dentists for managing extensive tooth loss.

EFFECTIVENESS OF SPRAY DISINFECTANTS ON DENTAL IMPRESSIONS

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Purpose/Aim: The disinfection of dental impressions is fundamental to prevent cross-infection from the dental surgery to the laboratory. This study aimed to compare the effectiveness of 2 spray disinfectants.

Materials and Methods: Two disinfectants were compared, a new non-aldehyde alcohol based disinfectant, Bossklein (Silsden, W Yorks, BD20 0EF, UK) and an aldehyde based disinfectant, MD520 (Dürr Dental, 74321 Bietigheim-Bissingen, Germany). Impressions taken on the prosthodontic and orthodontic clinics were swabbed immediately after rinsing under running tap water (pre-disinfection) and after spraying (post-disinfection). Maxillary or mandibular impressions taken in alginate (irreversible hydrocolloid), polyether and polyvinyl siloxane (PVS) were swabbed from the same gingival areas before and after spraying. Manufacturer's instructions were followed regarding the spray protocol for Bossklein which was to soak thoroughly and leave to dry naturally. To standardize the method of delivery, hand spraying only, MD520 was also used from a spray bottle. Swabs were transported to the microbiology laboratory in Amies medium. All swabs were plated onto blood agar within 2 hours. Plates were incubated for 3 days at 37?C then at room temperature for 3 days.

Results: A total of 87 impressions were assessed (alginate=41; PVS=31; polyether=15). The counts were categorized into 2 groups: no growth or growth present. Post-disinfection contamination was present on 6 alginate and 6 PVS impressions but only 1 polyether impression ($x2=1.27$, NSS). Analysis of post-disinfection growth according to impression and disinfectant found significantly more contaminated PVS impressions sprayed with Bossklein than with MD520 ($x2= 5.37$, $p<0.05$). Disinfection with MD520 resulted in only 2 contaminated impressions, both in alginate.

Conclusions: Spray disinfection of dental impressions may not be as effective as immersion methods and Bossklein was less effective than MD520. Effective spray disinfection relies on correct operator technique such as thoroughness of soaking. A low number of trigger squeezes of spray bottles may be related to cost saving which is an issue immersion disinfectants do not have. Dental staff must be trained appropriately and understand that disinfection protocols differ.

PROSTHETIC REHABILITATION OF A BRUXIST PATIENT WITH SEVERE DENTAL WEAR

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Keywords: EMG, dental wear, bruxism

Case Presentation:
PURPOSE: Dental wear because of bruxism takes place in different positions depending on whether the bruxism is vertical or horizontal. The most common tooth wear is in horizontal direction. Dental wear caused by horizontal bruxism occurs in the incisal surfaces of the anterior teeth and in the occlusal surfaces of the posterior teeth. This type of wear is a typical appearance of dental grinding. The loss of vertical dimension is inevitable in cases where atrision is severe. Management of severe dental wear due to bruxism is a challenging situation because of the common reduced amount of remaining dental structure and loss of vertical dimension of occlusion. Severe bruxism and extensive dental wear often necessitates the esthetic and functional rehabilitation of a full dentition.
CASE REPORT: A 36-year-old female patient presented to our clinic with the complaint of non-aesthetic appearance as a result of dental wear. During intraoral examination severe dental wear was observed, while extraoral examination revealed thinner lip appearance in the centric occlusion. EMG recordings were obtained from the patient before the treatment. Gingivectomy was performed to increase the clinical crown length. All lower and upper teeth were prepared and the patient was treated with a temporary prosthesis for 4 weeks in order to get used to the new vertical dimension. At the end of 4 weeks, the treatment was completed by applying zirconium crowns to the upper anterior teeth and metal-ceramic crowns to the remaining teeth. After restorations were completed, a canine guided stabilization splint was applied to the patient. 3 months later, EMG records were repeated.
RESULT: No mechanical complications were observed in the restorations of the patient during the 3-month follow-up period. During clenching both temporal and masseter muscles showed increased EMG activity. In rest position, all muscles EMG activities were decreased.

INNOVATION IN THE DESIGN OF THE PALATAL PLATE OF IMMEDIATE OBTURATOR PROSTHESES

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Keywords: losses of substance jaws, Palatine Plate, immediate Prosthesis

Case Presentation: Immediate prosthetic reconstruction of the loss of substance following tumour removal surgery consists initially of fitting and adjusting the palatal plate preoperatively on a corrected model. In a second step, the obturator is made intraoperatively. The time available to the maxillofacial prosthesis specialist for this immediate reconstruction may be limited by the duration of the excision surgery and by the constraints of general anesthesia. In the dentate subject, the fitting and adjustment of the palatal plate and claps in the operating room can be tedious due to difficulties in opening the mouth and accessing the posterior teeth, bleeding, and the patient's position. Hemiplaques respecting the tumor, tested and adjusted in the mouth before surgery in the chair, on a conscious patient, facilitate the intraoperative placement of the palatal plate in the mouth. The authors describe the steps of this new technique for the production of the palatal plate, emphasizing its advantages (saving time, peace of mind for the practitioner and better adaptation of the prosthesis).

IMMEDIATE PROVISIONALIZATION OF AN IMPLANT PLACED IN FRESH SOCKET FOR THE REPLACEMENT OF MAXILLARY INCISOR

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Keywords: provisionalization, immediate implantation, zirconia crown

Case Presentation: Background: The aim of this case report was to evaluate clinical outcome of the treatment after 2 years following the placement of immediate implant in fresh socket and immediate provisionalization.
Technique/case report: A 40-year-old female patient was referred for replacement of the upper left central incisor. According to the computerized tomography imagination, intact buccal bone plate and of apical pathology was observed. Atraumatic tooth extraction (flapless surgical approach) was performed as described previously to preserve the buccal plate. An implant (4.1mm width, 12mm height, Straumann Bone level SLActive) was inserted in cingulum position. The gap between the implant and buccal plate was filled with xenograft (Bio-Oss®) to preserve bone integrity and viability. Primary stability was measured via Ostell. 77 ISQ and 40 Ncm placement torque value was noted. The clinical conditions were suitable for immediate implant loading. Two phases one stage impression was made with polyvinilsiloxane. After model fabrication, a screw-retained provisional resine crown was manufactured onto the variobase abutment in the same day. All contacts in centric and eccentric movements were removed. Patient was recalled for follow-up examinations. Screw-retained bilayer zirconia crown was fabricated after 4 months of surgery. ISQ values, periodontal parameters, PES and WES scores were observed during follow-up.
Results: Radiographic examination showed 0.7 mm mesial and 0.8 mm distal bone loss after 2 years. Ct examination revealed that buccal plate was preserved totally. Midfacial recession was not observed. PES (8), WES (10) scores showed an (almost) perfect outcome.
Discussion: 2-year clinical follow-up confirm that implant placed into fresh socket followed by immediate provisionalization in the esthetic zone revealed encouraging results. This may be associated with strict case selection. Moreover according to the SAC Classification [straightforward (S), advanced (A), complex (C)] it is considered a complex procedure and must be applied by well-educated and experienced dentists. ?Conclusion: Immediate implant placement and non-functional loading might be a viable treatment choice if a flapless procedure and atravmatic extraction was performed in sites with ideal anatomical conditions such as an intact facial bone wall.
Clinical implications: Immediate provisionalization in fresh sockets is an attractive approach and esthetic results may be gained if strict selection criteria was applied.

EFFECT OF INTRAORAL SCANNER, PRINTER AND DIGITAL ANALOG SYSTEM ON ACCURACY OF 3D PRINTED MODELS

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Keywords: Digital, 3D-printing, implantology

Purpose/Aim: Digital workflow for producing implant-supported restorations involves the usage of intraoral scanners (IOS). From IOS data 3D printed master model is often fabricated using the selected type of digital analogs. There is a lack of data regarding the effects of IOS, 3D printer, and digital analog type on the local and global accuracy of digital analog positions in 3D printed master model. Moreover, errors arising in each step/stage should be identified.

Materials and Methods: Two Straumann BLT 4.1 mm RC implants were inserted in the reference model (REF) left quadrant, in the location of second premolar with 0° angulation and second molar with 5° angulation. Three calibration spheres of 5 mm in diameter (±1 µm) where placed on the left quadrant at the model base. Scan bodies (3Shape) were attached to the implants and model was scanned with Nikon Altera 10.7.6. industrial scanner (REF-stl). REF model was scanned 10 times with E3 (3Shape) scanner for validation. Ten digital impressions were taken with Trios3 (3Shape) intraoral scanner (IOS-stl). The closest to the overall average of intraoral digital impressions STL file was selected for 3D printing. Asiga MAX and Next Dent 5100 3D printers were used to duplicate the reference model. Two types of digital implant analog systems were placed into the models: ELOS Print Model Analog and NT-trading DIM-ANALOG. In total 4 groups containing 10 quadrant 3D printed models were created. Later models were scanned with a validated E3 scanner (3D-print-stl). STL file superimpositions and measurements were performed using Geomagic Control X 2018 software. Distance, vertical shift, rotation and angulation measurements were made locally and globally.

Results: Validation procedure of E3 scanner showed the trueness of 26 µm and precision of 16.8 ?m. Digital impression procedure with Trios 3 introduced 53 µm distance between the implants, 34.7 µm vertical shift, 0.283° angulation and 0.230° rotation errors locally. Comparison of REF_stl and 3D_print_stl files showed most accurate Asiga MAX and Elos PMA analog combination: 37.2 µm distance

between the implants, 39.7 μm vertical shift, 0.212° angulation and 0.769° rotation errors locally. Majority of detected differences were statistically significant ($p<0.05$).

Conclusions: Asiga MAX 3D printer performed more accurately than NextDent 5100. ELOS Print Model Analog showed most accurate result both locally and globally than NT trading. Implant angulation of 5° provides more accurate analog position in the master model than 0° angulation. Intraoral scanning had significant influence in overall error propogation. Further studies are needed to evaluate other factors.

RESTORATIVE TREATMENT AND FLAPLESS CROWN LENGTHENING FOR ANTERIOR TEETH

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Keywords: Indirect restorations, esthetic flapless crown lengthening

Case Presentation: Multidisciplinar approach is often needed when we plan restorative treatment for anterior teeth. Restoring front teeth we have to think about the "white", as well as "pink" esthetics. Esthetic crown lengthening has several myths – from unstable gingiva margin to unclear treatment protocol. The lecture will be dedicated to analyze pros and cons of flapless approach for esthetic crown lengthening, to discuss the planning and methods for its surgical procedures together with different restorative treatment types.

CYTOTOXIC EVALUATION OF ZIRCONIUM OXIDE NANOPARTICLES ADDITIVE TO ACRYLIC BASE MATERIAL

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Keywords: Cytotoxicity, L929 mouse fibroblasts, MTT assay

Purpose/Aim: The purpose of this in vitro study was to evaluate the cytotoxic effect of zirconium oxide nanoparticles (ZrO2NPs) with different concentrations, which were added to acrylic resins using cell culture method with L-929 mouse fibroblasts.

Materials and Methods: In total, 36 disc-shaped specimens per each group were prepared with the dimensions of 5?mm diameter and 2?mm thickness. Mixing proportions were applied according to the instructions of the manufacturers under aseptic conditions. Specimens were prepared from acrylic resin filled with ZrO2NPs. ZrO2NPs were added to the acrylic resin powder 1% and 2% by volume. Control group specimens were prepared from unmodified acrylic resin. The following represents the groups in the study: GI:Control group; GII:Acrylic resin and the addition %1 ZrO2NPs; GIII:Acrylic resin and the addition %2 ZrO2NPs. Cytotoxicity was evaluated with 3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide (MTT) assay using L929 cells after 24,48,72-h cell incubation period. The cytotoxicty were calculated. One-Way ANOVA was used to analyze the cytotoxicity of each group. ($p<0.05$).

Results: According to the results of 24-hour analysis using MTT test; the control group and the 1% ZrO2NPs were not statistically different and more biocompatible, the 2% ZrO2NPs added group was statistically different. According to 48 hour analysis results, there is no difference between the groups. According to the 72-hour results; the control group was statistically different and more biocompatible than the groups with 1% and 2% nanoparticle added.

Conclusions: This in vitro study, the incorporation of ZrO2NPs into conventional acrylic resin, has not impaired the biocompatibility of acrylic resins.

INFLUENCE OF DIFFERENT ARGON PLASMA IRRADIATION TIME ON SHEAR BOND STRENGTH OF Y-TZP ZIRCONIA RESIN INTERFACE

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Purpose/Aim: The goal of study was to evaluate the shear bond strength of zirconia after application of different argon plasma irradiation time.

Materials and Methods: A zirconia blocks divided into four groups according to surface modifications. The surface of the samples was

treated by argon plasma with different irradiation time (2,5 -15 - 20 min). Contact angles of specimens were measured with formamide to quantify surface hydrophobicity. Experimental groups were divided into two subgroups; in the first subgroups specimens were cemented with using ceramic primer and second subgroups were cemented with resin cement without primer. After cementation, the shear bond strength test was performed. Data were analyzed by One-way ANOVA and post-hoc Tukey tests. $p < 0.05$ value was considered statistically significant.

Results: The highest mean shear bond strength (SBS) values were recorded in the application of 20 min laser irradiation time (Group B1: 28,45 ± MPa and Group B2: 24,69 ± 5,08 MPa). In the application of primer plus to plasma, SBS of all groups showed increased values however, only A (15 min plasma duration) and C groups (2.5 min plasma duration) revealed statistically significant different higher values.

Conclusions: Argon plasma application improved the surface energy and increased the shear bond strength of resin cement to zirconia.

DIGITALLY FABRICATED GLASS-CERAMIC VERSUS NANOCERAMIC VENEERS: A SPLIT-MOUTH STUDY

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Keywords: esthetic dentistry, glass-ceramic veneer, nanoceramic veneer

Case Presentation: DIGITALLY FABRICATED GLASS-CERAMIC VERSUS NANOCERAMIC VENEERS: A SPLIT-MOUTH STUDY

Objectives: To evaluate the clinical performance of laminate veneers fabricated with two different materials. Materials and methods: Fourteen patients received digitally fabricated 28 veneers (Cerec 3D, DentsplySirona) (n=14 leucite(L) glass-ceramic-IPS EmpressCAD IvoclarVivadent; n=14 resin nanoceramic(R)-LavaTM Ultimate, 3MESPE) and adhesively cemented (Variolink N). All patients were recalled at 6 and 12 months for clinical evaluation by FDI criteria using IBM SPSS 20.0 software (Friedman test with Bonferroni correction and Dunnett-test;?=0.05,SPSS Inc, Chicago USA) and Kaplan-Meier comparison. Results: At the end of 12 months, a total of 7 failures (1 total debonding in group L, 6 veneer fractures in group R) occurred. Duration in the mouth was 7,643 m in R, and 11.357m in L. Esthetic scores for R group were: mean rank: 27.5, 59.78, 66.64 at 0, 6, 12 m, respectively, while for group L, mean rank were 27.5, 35.64, 37.92; at 0, 6, 12 m, respectively (p=0.005). For functional scores mean rank for group R were: 30.5, 60.64, 63.14 at 0, 6, 12m, respectively, while for L: 30.5, 33.85, 36.35 at 0, 6, 12m, respectively (p=0.001). Clinical evaluation scores were: mean rank: 26.5, 61.71, 68.57, at 0, 6, 12m, respectively for group R and, mean rank: 26.5, 34.71, 37.00 at 0, 6, 12m, respectively for group L (p=0.002). Group L showed higher esthetic and functional properties. All criteria changes for L and R groups between 6 and 12 m were significant ($p<0.001$). Conclusion: Digitally fabricated leucite-reinforced glass-ceramic veneers exhibited higher clinically acceptable performance than resin nanoceramic veneers at 12 months.

EFFECT OF NON-THERMAL PLASMA ON THE BOND STRENGTH OF GLASS CERAMICS WITH RESIN CEMENTS

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Purpose/Aim: The aim of this study was to evaluate the effect of non-thermal plasma (NTP) on the bond strength of different glass ceramics with different resin cements.

Materials and Methods: In this study, 80 samples from each material group obtained from IPS e.MAX CAD (EC) and Vitamark II (VM) CAD / CAM blocks, were divided into 16 groups according to the combination of 4 surface treatments (Hydrofluoric acid (HF) +Silane (Porcelain Silane-PS); PS; HF+NTP+PS; NTP+PS) and two resin cements (Single Bond+Rely X Ultimate-SRX; Zenitcem-Z) After the surface treatments, the samples were then cemented to composite cylinders. After 24 hours (37 °C, 100% moist), shear bond strengths were measured with universal testing machine. Sample surfaces were examined with SEM (Scanning Electron Microscope). Three-way ANOVA and Bonferroni tests were used for the statistical analysis.

Results: The bond strength was not statistically significant in NTP treated ceramic groups; predominant failure type was mixed. SRX showed higher bond strengths than Z in ceramic groups treated with HF and PS ($p<0.05$). VM showed higher bond strengths in Z resin

cement groups treated with PS or NTP + PS than EC ($p<0.05$). HF increased the bond strengths regardless of ceramic and cement type ($p<0.05$).

Conclusions: Non thermal plasma pretreatment has no significant effect on the bond strength of glass ceramics with resin cements when ceramic surfaces were also treated with silane.

EVALUATION OF THE ACCURACY AND PRECISION OF 5 INTRAORAL DIGITAL SCANNERS: AN IN-VIVO 3DIMENSIONAL ANALYSIS

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Keywords: Digital scanner, digital dentistry, digital smile design

Purpose/Aim: Many intraoral scanners that promise exceptional performance are actually in the market, but even if many data are available on in vitro tests or on plaster models, still few data are published on comparisons performed in in vivo conditions. The present study aims to compare 5 models of intraoral scanners on the market for the in vivo acquisition of full dental arches.

Materials and Methods: 5 digital scanner models have been selected for the study: A) AADVA IOS100, GC Corporation, Japan; B) Emerald, Planmeca OY, Finland; C) Trios 3, 3Shape, Denmark; D) CS3600, Carestream Health Inc, USA; E) AADVA IOS200 (beta version), GC Corporation, Japan. A single patient was selected as an in vivo scan model. 10 reference points were placed on the patient's teeth in upper arch. For each device, 10 scans of the arch were performed by a single operator with proven experience in using digital scanners, and respecting manufaturer's instructions (scan path and movements). Scan time and number of interruptions have been recorded. At the end of the scanning session, a PVS impression has been taken to obtain a plaster model used as "gold standard". The distances between the 10 reference points present on each 3D model were measured by 3 different operators using Final Surface™ software (version 6.8.5, Gfal, Germany). For continuous variables, the mean, standard deviation, minimum, median and maximum are calculated. For categorical variables, absolute and relative frequencies are reported. Moreover for each distance, a one way ANOVA has been implemented and Dunnett test has been applied in order to compare all the mean differences with all the scanner and the gold standard.

Results: The average scan time was 4'07 "for IOS100 (3.4 interruptions), 4'48" for IOS200 (7 interruptions), 3'08" for CS3600 (1.2 interruptions), 2'28" for Trios2 (3.1 interruptions), 2'45" for Emerald (2.3 interruptions). IOS200 test and IOS100 proved to be the fastest in preparing the model (post-processing) with 18" and 21" respectively, followed by Trios2 (24"), Emerald (47") and CS3600 (1'30 "). Compared to the "gold standard" plaster model, Emerald was less accurate in 4 of the 11 measurements, followed by IOS100 (3 of 11), and Trios2 and CS3600 (1 of 11). IOS200 was the only one that showed no statistically significant differences.

Conclusions: All tested devices appeared to be sufficiently precise to respect the tolerability currently accepted in prosthetic dentistry, equal to about 150/200 microns. Some scanners showed statistical differences in some measurements. Unexpectedly, no distortions were detected in measurements between the most distant marks. Scanning technique and respect of manufacturer's indications still play an important role in the final image quality. Scan time doesn't seem to be related to final image quality. AADVA IOS200, CS3600 and Trios2 seem to be the most reliable choices.

EFFECT OF HOME BLEACHING TREATMENT ON THE TRANSLUCENCY OF NOVEL CAD-CAM CERAMIC MATERIALS

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Keywords: CAD-CAM, home bleaching, translucency

Purpose/Aim: The purpose of this study was to evaluate the effect of carbamide peroxide home bleaching treatment on the translucency of CAD-CAM ceramic and nano-ceramic hybrid materials considering the fact that bleaching therapies are often performed in patients presenting restorations.

Materials and Methods: Eighty specimens (14x12x1 mm) were fabricated from 5 different monolithic CAD-CAM block materials as lithium disilicate ceramic (EM) (IPS e.max CAD; Ivoclar Vivadent AG), feldspathic ceramic (M) (Vitablocks Mark II; Vita Zahnfabrik), zirconia-reinforced lithium silicate ceramic (S) (Vita Suprinity; Vita Zahnfabrik), resin nanoceramic (L) (Lava Ultimate CAD-CAM Restorative; 3M ESPE) and dual-network ceramic (E) (Vita Enamic; Vita Zahnfabrik). All CAD-CAM materials were fabricated in shade A2, high translucency (HT). Polishing (p) and glaze (g) procedures were performed for only one side of the specimens to simulate clinical conditions. The specimens were subjected to thermal aging process using the thermo-cycling device between 5 °C and 55 °C for 10,000 cycles with a dwell time of 30 seconds. After thermal aging, the carbamide peroxide bleaching agent was applied to the surface of each specimen for 6 hours per day for 8 consecutive days. During the bleaching process, the specimens were kept in an incubator at 37 °C. A calibrated spectrophotometer (Vita Easyshade Advance) was used to measure CIELAB factors (L, a, b) for the baseline, after thermal aging and after bleaching. Translucency parameter (TP) was calculated with the TP formula at baseline (TP0), after thermal cycling (TP1) and after bleaching procedures (TP2). The data were analyzed using Repeated Measures ANOVA and post hoc comparison test with Bonferroni correction at the significance level of .05.

Results: The interaction between CAD-CAM materials, thermal aging and bleaching procedures for TP values found to be statistically significant ($P<.05$). There were no significant differences for Sp and Ep specimens after thermal aging and bleaching procedures ($P>.05$). After bleaching treatment, for Mp and EMg specimens TP values decreased significantly ($P<.05$). There were statistically significant differences between the groups ($P<.05$) regarding the respective TP values.

Conclusions: Within the limitations of this study, carbamide peroxide home bleaching agents may affect translucency of different CAD-

CAM restorative materials. Clinicians should be careful while applying the home bleaching treatment to patients who have CAD-CAM ceramic restorations.

THE USE OF THE COPY DENTURE TECHNIQUE TO FABRICATE A TREATMENT DENTURE. A CASE REPORT

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Keywords: treatment, denture, copy

Case Presentation: The copy denture technique facilitates the replication of the good features of existing dentures. The assessment of the existing dentures is mandatory and provides essential information for diagnosis and treatment planning. Patients tend to adapt to the new dentures quicker because of the reproduction of familiar features. Consequently, the use of this technique was the optimal choice for the fabrication of a treatment denture before proceeding to the new set of dentures.
Miss M. was a 73 year old female who presented in the Postgraduate Prosthodontics Clinic with pain and disfunction of the mandibular complete denture and complained she was unsatisfied with her complete dentures. Clinical examination revealed that the mandibular edentulous ridge was severely thin and sharp which is speculated to be the reason of the patient's discomfort. Her present dentures were made 18 months ago and they were the second pair of dentures that the patient has had, a year after her first set of dentures. A copy of the mandibular denture was made, exhibiting the features of the existing dentures which were satisfactory and were to be reproduced in the new dentures, while facilitating controlled and predictable modification of the undesirable features. The copy denture was then extended to cover the retromolar pads, the buccal shelfs and the lingual flange areas. The copy denture was used for the centric relation registration, the mounting of the casts and the set-up of the teeth which were identical of those of the existing denture. At that point border molding and the final impression was made following the extension to the retromolar pads, the buccal shelfs and the lingual flange areas, so that retention and stability be increased. After 1 month of successful function with the treatment denture (modified copy denture) the decision for the construction of the final set of dentures was taken. Considering the outcome, it could be concluded that the copy technique as means of producing a treatment denture, was successful for treatment of such cases of denture disfunction.

IMMEDIATE LOADING OF MANDIBULAR OVERDENTURES RETAINED BY TWO MINI-IMPLANTS: 3 YEARS FOLLOW UP RESULTS

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Purpose/Aim: To evaluate the efficacy of a clinical protocol of immediately loading mandibular overdentures retained by two mini implants. The outcome was assessed in the context of measures of patient satisfaction, masticatory cycles and masticatory efficiency at 3 years follow up.

Materials and Methods: A sample of 11 patients was recruited and the clinical protocol consisted of immediately loading 2 mini implants (Locator Overdenture Implant (LODI)- Zest Dental Solutions) - 10 mm long and 2.4 mm or 2.9 mm in diameter - by means of a mandibular overdenture connection of locator attachments. Each patient filled in a satisfaction questionnaire and underwent masticatory cycle recordings and masticatory efficiency tests. Implant-related evaluations were carried out by assessing probing depth (PD), plaque index (PI), bleeding on probing (BOP), mobility and pain. All tests and evaluations were carried out seven times: before implant surgery (T0), before implant insertion under anesthesia (T1) and following implant insertion while still under anesthesia (T2), three months (T3), six months (T6) one year (T12) and three years(T36) after implant insertion.?

Results: Implant survival rate was 95%, and statistically significant increases ($P < .05$) in masticatory cycle patterns, masticatory efficiency, comfort, stability, and phonetics were also recorded.

Conclusions: Based on these preliminary data, the presented protocol may be considered a viable treatment option for the edentulous patient with resorbed ridges, providing improved prosthesis stability, comfort, and function while decreasing surgical invasiveness and clinical time.

PROSTHETIC CLASSIFICATION OF MISSING TEETH PROVIDING POSSIBLE TREATMENT OPTIONS

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Keywords: classification, treatment, torque

Purpose/Aim: Prosthetic classifications supposed to classify missing teeth and provide possible treatment options. Hereby we introduce a classification named after Fábián and Fejérdy that ensures treatment options based on number and position of remaining teeth and effect of torque induced by vertical component of masticatory force(VCMF). In general, this system prefers dental support when giving suggestions about planned prosthetic device(PPD).

Materials and Methods: According to Fábián and Fejérdy classification an edentulous arch belongs to Class T, while one with all teeth present, even if some teeth are destructed, is Class 0. It differentiates 3 classes (Class 1, 2 and 3) for partially edentulous jaws, with 5 subclasses: 1A, 1B, 2A, 2B, 2A/1. Class 1 has enough teeth for full dental support of the PPD, consequently PPD will not move to any direction. In subclass 1A VCMF cannot induce torque, PPD is a simple bridge. In subclass 1B VCMF can cause torque, which is compensable in PPD by extending bridge to additional abutment teeth. In Class 2, as a consequence of number and position of remaining teeth, VCMF can move PPD to one side of fulcrum line connecting teeth. Therefore, support of PPD needs to be partially mucosal. In subclass 2A remaining or missing teeth are in one block; uni- or bilateral missing teeth at the molar, even premolar zone or at least 7 missing front teeth. Subclass 2B is combination of the above mentioned and missing tooth/teeth in between. In 2A and 2B PPD is removable partial denture or complex denture, both with dento-mucosal support. Subclass 2A/1 is subtotal edentulousness, where torquing forces act on one side of fulcrum line connecting few remaining teeth. In 2A/1 PPD is removable partial denture or telescopic overdenture with muco-dental support. In Class 3 due to positon of remaining teeth, torque acts on both sides of fulcrum line connecting them. As a result, PPD -muco-dentally supported telescopic overdenture- may tilt.

Results: This system has been integrated into the undergraduate program of Semmelweis University, Budapest with great success.

Conclusions: It serves as a useful tool for dental practitioners for years now.

RETAINING INTERIM OBTURATOR IN COMPLETELY EDENTULOUS PATIENTS WITH BILATERAL MAXILLECTOMY

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Keywords: Edentulous, Maxilectomy

Case Presentation: Background: An obturator addresses the most imminent issues of nutritional insufficiency and impaired speech in patients with intra-oral maxillary defects in the interim period. It is a considerable challenge for a prosthodontist to rehabilitate and sustain the prosthesis in edentulous patients with bilateral maxillectomy. The outcome of the prosthetic intervention following maxillectomy in this critical period remains severely compromised in edentulous patients and/or patients presenting with bilateral maxillary defects. In such a scenario, one has to look beyond oral cavity for sustaining the prosthesis intra-orally and fulfill the functional needs of the patients.
Case Report: Four male patients were referred for prosthodontic treatment to meet their present and impending nutritional and speech issues after surgical resection of the maxilla. Three patients would also require adjuvant radiotherapy, and it was anticipated that their nutritional status would further get complicated with time. There was no plan to reconstruct the defect surgically in any of these patients. As anticipated, the conventional obturator failed to provide adequate retention in all four patients. Patients were then kept on a feeding tube and underwent a miserable period concerning their food intake and speech. An interim obturator in 4 edentulous, male patients with bilateral maxillectomy was retained utilizing a custom fabricated head-gear face-bow assembly.
Discussion: Compelling evidence is lacking with respect to the treatment outcome when the defects are closed surgically in comparison to its prosthetic rehabilitation. Customized head-gear retained obturators were adequately retentive and did serve its purpose well in all four patients. It also gave the liberty to alter retention and refine the prosthesis at will, provided access to the operated site for a quick evaluation of disease recurrence, and was economical to the patients
Conclusion: A customized and accurately adapted head-gear face-bow assembly has an immense potential to function as a valuable, prudent, and sole retentive aid for a non-implant retained obturator in edentulous patients with extensive maxillary defect. Clinical Implication: In addition to fulfilling the functional and nutritional needs, providing prosthesis in the interim period in the edentulous patients with extensive maxillary defects has an immense positive psychologic effect for the future treatment.

FACTORS AFFECTING MOUTH OPENING IN HEAD AND NECK CANCER PATIENTS: PRELIMINARY DATA IN 322 PATIENTS

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Keywords: Head and Neck Cancer, Radiotherapy, Trismus

Purpose/Aim: 1. To present a preliminary data on the various factors influencing mouth opening in head and neck cancer survivors over a period of 12 months.
2. To find a correlation between these factor in causing Trismus.

Materials and Methods: Inter-incisal maximum mouth opening was measured in 322 head and neck cancer patients before beginning of oncology treatment, and then at 3,6,12 months after completion of the treatment. The one year data obtained on mouth opening was co-related to variables such as pre-treatment mouth opening, stage of the cancer (extent of the pathology), site of the pathology, and the type of treatment rendered in various combinations (RT and/or Surgery, and/or chemotherapy). Change in mouth opening with regard to various parameters individually and their combination was explored and will be presented.

Results: Out of 322 patients recruited, 178 patients completed their 3 months follow up and 85 completed their 6 months follow up. 108 patients are currently undergoing radiotherapy and 36 patients were considered drop outs due to various reasons. Significant decrease in mouth opening was found at 3 and 6 months after completion of treatment in relation to pre-treatment mouth opening and stage of the disease. Data obtained at one year shows a gradual improvement in mouth opening signifying improvement in mouth opening with period of time. In comparison to the various treatment modalities, it was found that those patients who underwent surgery and then radiotherapy had minimal mouth opening at baseline and their mouth opening did not improve over a period of 1 year. Considering the affect of site on mouth opening it was found that patients diagnosed with carcinoma of hypopharynx, nasopharynx, and larynx did not develop trismus at any point of time. While, patients diagnosed with carcinoma of oral cavity, oropharynx, salivary glands were more prone to develop trismus.

Conclusions: All 322 patients underwent radical radiotherapy and were put on mouth opening exercises from the pre-treatment stage and were motivated to follow the exercise schedule at follow up appointments. These are the initial data and not all patients have completed their scheduled follow up, however, a significant trend is observed towards development of trismus in first six months after treatment. At one year, mouth opening shows improvement which may be related to natural healing and mouth opening exercise as prescribed.

LEARNING CURVE OF AN INTRAORAL DIGITAL SCANNER ON SOUND TEETH

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Keywords: DIGITAL IMPRESSION, IOS, LEARNING CURVE.

Purpose/Aim: The aim of this experimental study was to establish the learning curve of two operators in the use of an intraoral digital scanner (IOS) on maxillary anterior sound teeth, by calculating the time needed to take the scans.

Materials and Methods: Two operators were selected: one without any experience, one that had already used the intraoral scanner in two years clinical practice. Each one of them took 20 consecutive impressions in the same patient using the "ortho" mode of the Aadva IOS software 3.0, fast modality, strictly following the manufacturer's instructions.
In order to proceed under standard conditions, particular attention was put in cleaning and drying the area of interest. The time spent to insert the patient's data, and to prepare the field was registered and named as "preparation time". The same was done with the "scanning time", and with the "control time" needed to check and save the model created.
These times were evaluated and statistically analyzed using simple and multiple analysis of Variances (ANOVA and MANOVA test with Bonferroni multiple comparison test).

Results: A learning curve was present in both operators. The naive operator reached statistically significant reduction until the last round of measurements; conversely the expert operator obtained a statistically significant difference immediately after the first rounds of measurements. With experience a plateau of total time around 2minutes and a half has been reached.

Conclusions: In order to reach the best performance on taking an intraoral impression few 'preliminary' scans are needed when both an expert and/or an operator without experience are evaluated. The first scans might be considered as preliminary scans useful in order to 'learn and understand' the mouth area in need to be scanned and to point out the strategy of scan will be best to be used in each clinical condition.

17-YEAR FOLLOW-UP OF 26 IMPLANT-RETAINED REMOVABLE PARTIAL DENTURES

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Keywords: Implant-Retained Removable Partial Dentures, long term clinical outcomes

Purpose/Aim: The purpose of this 17-year retrospective study was to evaluate the long-term outcomes of implant-retained removable partial dentures (IR-RPDs). The strategic placement of one or two implants per arch is a renowned method to avoid clasps, obtaining therefore (1) a better esthetics and (2) the preservation of residual teeth, preventing dangerous forces. Nevertheless, the long-term clinical behavior of IR-RPDs could be controversial.

Materials and Methods: 32 partially edentulous patients (mean age 58.2 years) received 64 dental implants (SET; Mech&Human, Italy), from one to three two-stages fixtures each, and the relative ball-attachments to retain removable partial dentures (RPDs). Surgeries were performed by three independent operators and required three months of healing for mandibular implants and six months for maxillary. After prosthetic fabrication and insertion, patients underwent annual recall program consisting in (1) implant hygiene and check-up, (2) replacement of the resilient component of the attachment (regardless of wear) and (3) relining, if needed after evaluation of the bases with pressure-indicating paste. Failures and maintenance were recorded during the follow-up (207.3±2.4 months).

Results: Of the original 32 patients, 6 dropped out during follow-up; of the remaining 26 patients and 51 implants, four fixtures were lost: two did not osteointegrated and two failed during the follow-up due to excessive bone resorption. The 17-year implant survival rate is therefore 92.15%. Implant failures did not led to prosthesis failure because in all four cases was possible to place other fixtures: therefore, prosthesis success is 100%. A total of 154 relinings were performed during 17 years, with an average of one denture relined every 2.9 years. At year 13 of follow-up, an additional fixture was inserted to modify a patient's mandibular IR-RPDa into overdenture prosthesis.

Conclusions: IR-RPDs are a reliable intermediate solution that can reduce biological and economic costs, while maintaining implant treatment benefits and the ease of RPDs procedures.

ANALYSIS OF MARJINAL DISCREPANCY OF METAL-CERAMIC CROWNS WITH LASER SINTERING METHOD

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Keywords: Direct metal laser sinter, metal-ceramic crown, silicone replica

Purpose/Aim: With advancing technology and increasing esthetic expectation, the usage of full ceramic and zirconia substructures increased. However, metal-ceramic restorationsare still the most frequently used restorations due to their high mechanical strength and lower costs. Although the traditional casting method was used in production of metal-ceramic restorations; with the advancing technology, restorations manufactured with CAD/CAM methods and direct metal laser melting method are increasing.The aim of this study was to evaluate the marginal fit of the restoration before and after porcelain superstructure application of metal-ceramic crown produced with direct metal laser sintering method at two different thicknesses, at the single and four-unit restorations.

Materials and Methods: Four-unit models were produced with upper first premolar and upper second molar as abutment teeth; single-unit models were produced as upper first molar. Metal substructures were produced with 0,4 and 0,5 mm thicknesses by laser sinter method. 4 groups were obtained in total with these parameters (n=10). After the metal substructures were obtained, marginal discrepancy values were measured by using the silicone replica method and saved at the computer. Then porcelain was applied on metal substructures. Silicone replicas were obtanied from the samples that completed the porcelain process and marginal discrepancy values were measured. Kruskal Wallis test was used for comparison among groups. Bonferroni-corrected Dunn test was used to determine the group or groups that created intergroup differences. In the same group, Wilcoxon test was applied to determine the changes occurred after the infrastructure and superstructure. $p<0.05$ was considered statistically significant.

Results: According to the results, significant decrease of marginal discrepancy was observed at the single unit 0,4 mm restorations at mesial region. There was significant decrease of marginal discrepancy at the single unit 0,4 mm restorations on distal sides. There was a statistically significant increase of marginal discrepancy at the single unit 0,4 mm and 0,5 mm groups at the occlusal sides. At molar teeth; there was a statistically significant increase at the four unit 0,4 mm restorations on the mesial sides.. A numerical decrease was found at the four-unit 0,4 mm restorations distal sides.
At premolar teeth; there was a statistically significant decrease was found in all groups at the mesial region. There was a statistically significant increase at the four-unit 0,4 mm and 0,5 mm restorations in the distal regions. A statistically significant increase was found at the four-unit 0,4 mm restorationss on the occlusal sides of premolar teeth. four-unit 0,5 mm restorations found a statistically significant decrease.

Conclusions: In the four-unit samples, the marginal discrepancy values in the mesial region was lower than the marginal discrepancy values in the distal region.
In four-unit samples, the marginal discrepancy values in the distal region is lower than the marginal discrepancy values in the mesial region

DRY MOUTH SYNDROME AND ORAL HEALTH IN NURSING HOME RESIDENTS WITH COMPLETE DENTURES

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Keywords: dry mouth, complete denture, frail elderly

Purpose/Aim: Dry mouth syndrome is frequently present in the old age individuals and is often associated with denture stomatitis. The purpose of this study is to investigate the correlation of dry mouth syndrome with the aerobic oral microflora of the dependent elderly wearing complete dentures.

Materials and Methods: The study was conducted on a group of 30 patients (20 patients with DMS, 10 without) wearing complete acrylic dentures, recruited from a nursing home. Dry mouth syndrome was diagnosed subjectively through out a questionnaire and objectively by measuring the stimulated salivary flow. Saliva samples were collected with a swab from 3 different locations: upper denture mucosal surface, middle hard palate mucosa and floor of the mouth and inoculated on different media (blood agar, Chapman agar, bile esculine agar, Chromagar ECC, Sabouraud agar, Chromid OXA 48, Chromaid ESBL). MALDI-TOF mass spectrometry was used for the identification of recovered bacterial and fungal strains. Additional parameters like the level of oral hygiene, fitting of the denture and the health of the oral mucosa were taken into consideration.

Results: 50% of the subjects were aged 80-90 years old, 52% of which being female. A total of 44 bacterial strains have been identified. All the patients in the dry mouth group presented poor oral hygiene and denture plaque, 95% of the dentures had low retention and stability and 75% of patients had oral lesions caused by denture. Out of 44 different bacterial strains that were identified, 84% were found on the mucosal surface of the upper denture of patients with dry mouth. The aerobic cultivable microbiota was very diverse, the most prevalent bacteria genera being Staphylococcus spp., Streptococcus spp.,Neisseria spp,Lactobacillus spp., Klebsiella spp., Actinobacter spp., Enterobacter spp., Pseudomonas spp., while Candida spp. strains were isolated from 90% of the investigated patients. Staphylococcus spp was the most frequent isolated bacteria after Candida Spp in both groups.

Conclusions: The mucosal surface of the upper denture presented the highest variety of microorganisms. While the diversity of oral microorganisms was present in both groups, dry mouth syndrome was significantly associated with poor oral hygiene, a lack of stability and retention of the denture and with oral ulcers. Better understanding of oral microflora and the impact the dental hygiene and dental treatment has on bacterial colonies is essential in modern dentistry.

DIFFERENCES BETWEEN A TRADITIONAL AND AN INNOVATIVE METHOD OF IMPRESSION TO RESTORE A MAXILLOFACIAL DEFECT

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Keywords: maxillofacial, epithesis, CBCT

Case Presentation:
Facial defects result from trauma, neoplasms or congenital malformations. Facial prostheses replace face missing parts by means of adhesives or, when it is possible, through implants. Processing an epithesis is a complex procedure that requires several operative sessions, from impression to wax modeling parts of the face with complex anatomy. Conventional extraoral impressions, obtained with materials such as alginate and polysulphide, can be used to record the characteristics of defects and to obtain an adaptation of facial prosthesis. In recent years, advanced digital processing methods have been used, in an attempt to remedy some of the clinician's difficulties in the rehabilitation of facial defects.

In this case report we want to investigate traditional tecniques limits and advantages that can be obtained through the introduction of a CAD / CAM method in maxillofacial prosthetics.

To do this we will describe the construction of nasal epithesis of an oncological patient, which has been rehabilitated using a traditional method of impression and an impression obtained with Cone Beam TC method.

From traditional impression was obtained a stone model; from virtual processing of CBCT was obtained a plastic model, printed with a 3d printer. Two noses prostheses were modeled, tested on patient, printed in silicone and delivered to the patient.

We reached the following conclusions:
- reduction of work sessions and more comfort for the patient with the CBCT impression
- absence of significant differences in the fitting of the two epitheses
-radiation dose supplied to carry out the CBCT, even if minimal, must always be taken into consideration before prescribing the examination.

There are no methods in literature to quantify the greater efficacy of one impression over another. The different characteristics with which defects occur require a specific approach, both in materials choice and in impression techniques. The use of a scanner, with the possibility of virtually modeling the missing part and printing it directly in silicone could be a revolutionary scenario; by now 3D printing has become part of medical practice, but the subjective character and lack of evidence to support the advantages that this tool brings with it, still do not allow conclusive statements. The high costs and the advantages that are not always proven make it debatable whether 3D printing is suitable for all types of patients: in our field it could certainly be an aid for less experienced operators in managing complex cases. Certainly it would be advisable to continue on this path, to assess what the reactions of other patients could be and the degree of satisfaction that they could achieve with the same procedures.

TORONTO "SNAP": A NEW TECHNIQUE IN FIXED IMPLANT PROSTHODONTICS

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Keywords: TorontoSnap, Screwaccessholes, Seeger

Purpose/Aim: The aim of this case series is to introduce an innovative technique that eliminates the screw access holes in fixed prosthodontics on dental implants, without resorting to cement. Further research is needed to evaluate long-term success rates of this new prosthetic solution, that we called “Toronto Snap” (TS).

Materials and Methods: Twenty-four patients were in need for partial or complete fixed restorations on implants. After conventional implant surgery, we adopted the immediate loading protocol in all cases, when the primary stability was homogeneously achieved. Our customized abutments have been screwed into all the placed fixtures, and acetal resin rings called “Seeger”, engineered specifically to assist the screws in retaining and securing the prostheses on the abutments, have been applied into the prostheses bases. We waited 12 months to verify whether the Seegers could assure stability and retention without any screw or cement.

Results: We faced no detachments or complications during these 12 months, and our TS worked properly even in full-arch restorations, similarly to conventional screwed implant bridges. X-ray exams prove tight connection between the abutments and the prostheses in absence of the screws. No need to switch the rehabilitations to completely fixed ones by adding screws inside the threaded head of the abutments was found during the observation period.

Conclusions: Within the limitations of this clinical trial, the use of Seegers alone turned out to be a successful solution in terms of retention, aesthetics and convenience. Since the Seegers take advantage of the divergency between the implants and each guarantees 8 kilograms of retentive potential, TS could be a viable option for fixed restorations on multiple or tilted fixtures, avoiding vestibular screw access holes without cement. In the future, we intend to test TS for longer time in our patients.

EVALUATION OF USING A SINGLE IMPLANT AS A SUPPORT ELEMENT FOR THE LOWER

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Purpose/Aim: The study included 31 patients. All patients had had the toothless maxilla and mandible and used complete prosthetic restorations. All subjects had adaptation problems, mainly due to poor retention and stability of complete lower jaw denture. The study assumed making a new set of complete prosthetic restorations. The surgical procedure consisted in introducing an implant in the midline of the mandible.

Materials and Methods: The analysis of a change in implant stability was based on the examination performed with the use of Periotest device. The observation was focused on monitoring the patients for service needs resulting from the use of dentures supported by a single implant in the mandible. Separate tests were performed and used the finite element method (FEM) to conduct the comparative assessment of biomechanical parameters for lower jaw OVD supported by two and one implant. The comparative assessment of the retention value of prosthetic fasteners was based on the test determining the force necessary to rupture the connection between the matrix and patrix. The evaluation scale based on the answers to the questions contained in the survey was applied to determine the level of patient’s satisfaction with the dentures

Results: The analysis of the implant stability measurements showed no statistically significant change in the above parameter. The most common service problem was deactivation of the fixing matrix. The analysis of biomechanics of dentures using FEM demonstrated that the biomechanics of the bones the system based on one implant allows the denture to freely adapt to a certain extent to the temporary condition of the masticatory system. The results obtained in the tests measuring the force disconnecting a precise retention elements showed a wide range of retention values for the Locator system inserts. The analysis of the results of patient’s satisfaction shows a smaller level of discomfort associated with the use of overdentures supported by one implant.

Conclusions: -????

IN-VITRO COMPARISON OF MECHANICAL AND PHYSICAL PROPERTIES OF VARIOUS PROVISIONAL RESTORATION MATERIALS

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Keywords: provisional restoration, color stability, flexural strength

Purpose/Aim: It is important for patient comfort and satisfaction that provisional restorations should not fracture, get deformed and show discoloration while in use. In our study, 6 different provisional restoration materials were subjected to micro hardness test and flexural test in order to measure mechanical strength, surface roughness test and discoloration tests in order to evaluate esthetics. With the help of these tests, we searched for materials that are advantageous during clinic use.

Materials and Methods: Vita CAD-Temp and Ivoclar Telio-CAD blocks for CAD/CAM are used in our study. Other materials used in our study are Revotek LC (UDMA), Protemp 4 (Bis-acryl), Dentalon Plus (PEMA) and Imident (PMMA). Samples for 3-point bending test are manufactured with dimensions 2 x 2 x 25 mm according to ISO 4049 (n=15). Samples were loaded with a universal testing machine until fracture occurred. For micro hardness, surface roughness and discoloration tests, disc shaped samples with 10 mm diameter and 2 mm thickness were manufactured (n=15). Baseline color measurements were made after Vickers micro hardness and surface roughness tests. As a coloring agent, coffee was chosen. All samples were immersed in coffee solution for 7 days. Second color measurements were made. ?E values, which shows discoloration, were calculated. Statistical analysis of the data was made with SPSS for Windows 11.5. Kruskal Wallis test was used in order to evaluate level of significance ($p<0,05$).

Results: Flexural strength values varied between 146 MPa and 63 MPa. The strongest groups were Imident and Protemp 4. Micro hardness and surface roughness evaluation showed methacrylate resins are better than other groups. As color stability, PMMA groups were found to discolor less than other groups. Revotek LC and Protemp 4 showed clinically unacceptable ?E values (?E>3.3).

Conclusions: Based on this study data, it is advised to use heat polymerized PMMA when long-term use is indicated.

A THERMOSENSITIVE CHITOSAN-BASED HYDROGEL FOR SEALING AND LUBRICATING PURPOSES IN DENTAL IMPLANT SYSTEM

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Keywords: lubricant, sealant, thermosensitive hydrogel

Purpose/Aim: Mechanical and biological complications associated with implant systems happen frequently in the clinic. Therefore, the current study aimed to develop a chitosan (CS)-based thermosensitive hydrogel for sealing and lubricating purposes in dental implant system.

Materials and Methods: In this study, a thermosensitive hydrogel made up of CS, ?-glycerophosphate pentahydrate (?-GP), and povidone-iodine (PVP-I), called CS/?-GP/PVP-I thermosensitive hydrogel, was fabricated. Three experimental groups with different volume ratios of CS to ?-GP were prepared, namely 16/4, 13/7, and 10/10 groups. The surface topography of the different groups and their physicochemical characteristics were examined by SEM, FTIR, and X-ray diffraction analysis. The cytotoxicity of the hydrogel was examined by CCK-8 test. In vitro antibacterial efficiency was analyzed by the spread plate method. Sealing ability was detected by incubating two-piece implants in Escherichia coli suspension. Lubricating ability of the hydrogel was evaluated by the removal torque test with a calibrated digital torque meter.

Results: The CS/?-GP/PVP-I thermosensitive hydrogel was fabricated and showed a highly porous structure under SEM. An in vitro cytotoxicity test demonstrated that 13/7 group displayed no cytotoxicity. Furthermore, all three groups showed obviously antibacterial effects. In the sealing ability test, 16/4 group showed the best sealing ability. The removal torque of 16/4 group and 13/7 group was significantly greater than control group.

Conclusions: Based on our findings, and within the limitations of this study, it could be concluded that the thermosensitive and

antibacterial CS/?-GP/PVP-I hydrogel with sealing and lubricating ability was successfully prepared. The hydrogel had better sealing and lubricating effects when the volume ratio of CS to ?-GP was 16/4.

COMPARISON OF ADHESIVE BONDING EFFECTIVENESS OF RESIN-CEMENTS AND FLOWABLE-COMPOSITES IN LUTING GLASS-CERAMICS TO DENTINE

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Keywords: e.max CAD full ceramic, adhesive cementation, shear bond strength

Purpose/Aim: The aim of this study was to evaluate the adhesion success of resin cements and composite resins applied in different bonding protocols between ceramic-bonding agent-tooth interface.

Materials and Methods: 108 non-caries human third molar teeth were embeded in acrylic blocks, grinded from the occlusal surfaces until dentin was exposed and were divided into 9 randomized groups (n = 12). 108 ceramic samples were prepared in disc shape (3 mmX 3 mm) from IPS e.max CAD blocks. Four different resin cements; Variolink Esthetic DC (Ivoclar vivadent), G-cem Link Force (GC), Panavia V5 (Kuraray), Maxcem Elite Chroma (Kerr) and three different flowable composites; G-aenial universal flow (GC), Herculite XRV Ultra Flow (Kerr), Vertise Flow (Kerr) and one pre-heated composite; Enamel Plus HRI (Micerium) is luted to the prepared occlusal surfaces of the teeth with different protocols (etch and rinse, self-etch and self-adhesive) according to the instructions of the manufacturers. The specimens were thermocyled in 5 ± 2°C and 55 ± 2 °C water baths for 20 sec. Shear bond strength test was performed in a Universal Testing Machine (AGS-J, SHIMADZU) and data was recorded. Failure surfaces were observed by stereomicroscope and fracture types were evaluated. Data was analyzed by one-way (Anova) test (?=0.05 .

Results: Mean shear bond results of G-aenial universal flow luted with total-etch protocol 15,42 MPa, G-cem Link Force 12,69 MPa, Herculite XRV Ultra Flow11,51 MPa were found to be significantly higher than the other groups ($p < 0.05$). The bond strength values of the other materials in the total-etch group were determined as Enamel Plus HRI 4,84 MPa and Variolink DC 3,15 MPa. The results of the samples in the self-etch group were Maxcem Elite Choroma-SE 3.91 MPa and Panavia V5 3.69 MPa. Results of the self-adhesive group were very low in Maxcem Elite Choroma (SA) 0.83 MPa and Vertise Flow 1.87 MPa.

Conclusions: As a conclusion, it has been shown that flowable composites can be an alternative to resin cements when bonded with total etch procedures. The bond strength of self-etch and self-adhesive applications is still controversial and their bonding performance is still to be developed.

CEMENT OPACITY AND COLOR AS INFLUENCING FACTORS ON THE FINAL SHADE OF CERAMIC RESTORATIONS

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Keywords: Cement Influence, Ceramic, Translucency

Purpose/Aim: The final color of all-ceramic restorations is not merely a shade selection process, but rather the combined result of several factors, including the degree of translucency, the thickness of the restoration, the color and the opacity of the luting agents. Aim of the present study is to investigate the influenced of different color and opacity of luting cements on the final shade of ceramic restorations relative to different degrees of translucency and to investigate on the interactions between the tested factors.

Materials and Methods: Five resin cement colors were selected in combination with four different thicknesses of CAD/CAM ceramic materials, a composite substrate was used as dentin color reference (n=3). The color of the specimen was measured with a spectrophotometer equipped with an integrating sphere before and after cementation (CIELab*). Cement and ceramic color (CIE Lab*) and translucency (TP) were assessed by measuring 1 mm thick disk for each of the cement shades and tested ceramic. The differences in color before and after cementation were evaluated by applying the ?E00(1:1:1) formula. The same formula was applied for calculate the difference in color between the tested cements and the ceramic, Delta TP were calculated in order to identify the difference in

translucency.
Data were statistically analyzed with a Two-Way ANOVA followed by the Tukey Test for post-hoc comparison ($p<0.05$). The acceptability and perceptibility threshold were set respectively at ?E00=1.8 and 0.8.
The correlation between factors was determined by evaluating Pearson's correlation values "r" ($p<0.05$).

Results: All the tested cement colors had a statistically significant influence in the final color of ceramic restorations. Only the combination of clear cement and Thick/opaque ceramic result in a not perceptible color change, the application of resin cement with thin and translucent ceramic always are responsible of color changes that exceed the acceptability threshold.
Significantly lower changes were induced on the final restoration by translucent cements, particularly when its color was close to that of the restoration. Conversely, when the opacity of the cement was higher than the restoration, significant color changes were measured.

Conclusions: The final shade of ceramic restorations can be influenced by resin cements; the magnitude of influence is related to the cement optical properties. The relevance of factor cement translucency was greater than that of cement color. Opaque colored cement based on the common shade guide and transparent cement could probably help the clinicians to easily match the desired shade after cementation.

MINI-IMPLANTS SUPPORTED KENNEDY CLASS I REMOVABLE PARTIAL DENTURES - A 3-YEAR FOLLOW-UP OUTCOMES

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Keywords: mini dental implants, removable partial denture, support

Purpose/Aim: Clinical outcomes, marginal bone loss (MBL) and Patient Reported Outcome Measures (PROMs) in Kennedy Class I patients without posterior teeth, rehabilitated with mini-dental implants (MDIs) in canine/first premolar sites supporting removable partial denture (RPD) have not been documented.
The purpose was to assess radiographic and clinical outcomes and PROMs of MDIs supporting Kennedy class I free-end saddle RPDs in a controlled prospective study.

Materials and Methods: Ninety patients received MDI-retained RPDs. Patients were recalled on 12, 24 and 36 months. Marginal bone loss (MBL), Modified Plaque (MPI) and Bleeding (MBI) Indices were assessed. MDI and prosthodontic complications were recorded, as well as PROMs using OES, CFQ and OHIP14 questionnaires.

Results: The 1-year success rate was 97.6% in 86 responding patients (4 MDIs were lost soon after loading, 2 in the mandible and 2 in the maxilla). Mean 1-year MBL was 0.24 ± 0.36mm, and 0.32 ± 0.49 mm after two years in 61 patients who responded. Mean MBL was 0.40± 0.51 in 56 respondents after 3 years. No MDIs were lost after the first year. The success rate was 96% and the survival with good prognosis 0.8% after 2 years; it was 95.2% and 1.6% after 3 years, respectively. A bit higher MBL was recorded in females and younger patients, without significant differences in any observation stages ($P>.05$). All questionnaires showed high treatment effects which remained unchanged throughout the 3-year observation period.

Conclusions: Two MDIs in previous canine/first premolar sites supporting free-end saddle RPDs is a successful treatment option according to our 3-year results.

TELESCOPIC REMOVABLE RESTORATION IN THE MAXILLA – A CASE REPORT

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Case Presentation: Background:
Patients who have undergone radiotherapy during head-and-neck Ca treatment require special consideration in their prosthetic rehabilitation. Xerostomia and radiotherapy-induced caries often lead to tenderness in the mucosa and partial edentulism respectively. Removable dentures are not easily accepted and combined with a possible contraindication for implant-supported restorations, one must seek out alternative treatment plans.

Case Report:
A 68-year old female patient presented in the postgraduate clinic of the Dental School of the National and Kapodistrian University of Athens with radiotherapy-induced caries. The only maxillary teeth deemed restorable after multiple extractions were her right first molar, first premolar, and all four incisors. A telescopic removable prosthesis was decided upon as a treatment plan. The teeth were prepared and restored with individual cast Co-Cr inner crowns to reduce the cost. The outer crowns and framework of the prosthesis were constructed with milled PEEK, to ensure a lighter and more esthetic result. For greater aesthetics, the teeth were individually designed and milled from PMMA, and then attached to the framework.

Conclusions:
Telescopic restorations can prove to be a viable alternative treatment plan in partially edentulous patients with xerostomia and a medical history that contraindicates implant treatment.

IMPLANT AND ROOT - SUPPORTED OVERDENTURES AND FUCTION OF MECHANORECEPTORS

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Keywords: implant, root, mechanoreceptor

Case Presentation: Mastication is the basic function of maxillofacial area and together with good blood perfusion of masticatory muscles is partially responsible for correct cognitive functions. Tooth loss and masticatory difficulties are positively correlated with having greater problems with memory. Implant and root-supported overdentures are reliable and recommended solutions especially in the elderly often afflicted by dementia.
Quality of masticatory cycle is driven by the mechanoreceptors located in the periodontal membrane, adjacent skin, mucosa, muscles, ligaments, bones and TMJ.
In absence of periodontal ligaments osseointegration together with osseoperception partially takes over function of periodontal control of the jaw actions and also influences the precision of direction, magnitude and rate of occlusal load application.

Aim of the study: Assessment of function of overdentures according to the length of service, adjustment and repairs, prosthetic status of opposing jaw and evaluation of treatment quality from the patient´s aspect in comparison with removable dentures.

Methods: Sixteen overdentures with mixed support were examined in the group of sixteen patients after the period from one to 17 years of function: 8 edentulous patients with implant-born overdentures in the lower jaw, 2 patients with root and implant-born overdentures, 6 patients with root-born overdentures. Age of patients ranged from 48 to 75 years in average 66,25 years. Examined criteria: length of function, adjustments and repairs, prosthetic status of opposing jaw, and patient evaluation of overdentures (function, esthetics, and severity of oral hygiene).

Results: Minimal span of function was 7 years, maximal length was 17 years, 11 years in the average. All dentures were found clinically intact after 1 year of function. 75 % needed relining of saddles, replacing of implant ball attachments was indicated in the period of 2-10 years after insertion, replacement of male parts after 5,5 years in average. Replacing of female parts was done after 2-7 years of function, in average after 4,5 years. 75% of patients had the complete denture in opposite jaw and 25% had the removable partial denture. Patient´s evaluation involved: excellent function in 94%, satisfactory in 6%, esthetics excellent in 80% and 20% good, oral hygiene excellent in 50%, good 25% and satisfactory in 25%.

Conclusion: All presented patients preferred overdentures from all points of view.
Quality of masticatory function is more efficient in case of implant and root-supported overdenture as compared with the conventional removable denture. Osseoperception is proposed to recognize oral kinesthetic perceptual abilities in the absence of functional periodontal mechanoreceptive feedback.

LLLI EFFECT ON BIOLOGICAL BEHAVIOR OF IMPLANT ABUTMENT MATERIALS

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Keywords: LLLI, Lithium Disilicate, Titanium

Purpose/Aim: Although Ti abutments' clinical success is well documented, Ti base abutments were introduced in order to combine the benefits of having Ti to Ti connection with high esthetics. Recently, Lithium disilicate ceramic (LDS) was investigated veneering material at Ti based abutments due to its high translucency and superior optical properties, along with LDS all ceramic restorations. In the literature, there are only few in vitro studies investigating the mechanical properties, although potential cytotoxicity for dental all ceramic systems has already been reported. At the same time, biostimulatory effect of low level laser (LLLI) on cell proliferation and soft tissue healing is well documented.
The purpose of this in vitro study was to evaluate the effect of LLLI on biological behavior of implant abutment materials.

Materials and Methods: Primary cultures of human gingival fibroblasts (HGFs) were established from gingiva biopsy of a healthy donor and developed in DMEM culture medium, supplemented with 10% FBS and antibiotics/antimycotics (approval by the Ethical Committee of the Institutional Review Board). 3×104 HGFs/ well were seeded in 24-well plates. Two experimental groups of LDS and Ti (with and without LLLI) and two control groups of Teflon and cells (with and without LLLI) were examined. 12 samples were prepared for each group and the experiments performed in triplicate (n=36). After 24h incubation with 5% CO2 at 37?C, cells were irradiated with a diode laser (EPIC DIODE LASER, BIOLASE; 940nm; 0.2W) at 15J/ cm2 fluence. Cell viability and proliferation were evaluated by MTT assay 24h, 48h and 72h after the LLLI. Scanning Electron microscopy-SEM (JEOL J.S.M. 840A, Tokyo, Japan) and EDS analysis were performed for evaluation of HGFs' attachment and morphology and investigation of surface composition. Quantification of live/dead cells immunofluorescent labeling was visualized by Confocal Microscopy (NikonEZ-C1). Statistical analysis of the data was performed with SPSS ($p<0.05$)

Results: Mitochondrial activity of HGFs increased statistically significant at 24 hours only in case of LDS LLLI group, while Ti and LLLI groups presented statistically significant increase of HGFs at 48 and 72 hours (p?0.001). Statistically significant difference presented between cell groups and LLLI LDS and Ti groups. SEM and Confocal microphotographs confirm the results of MTT assay. SEM microphotographs present well spread cells with a typical morphology and an attractoid shape. Confocal images presented increase of the number of viable cells both in LDS and Ti after LLLI.

Conclusions: Under the limitations of this in vitro study, a positive effect of LLLI at 15J/cm2 on HGFs proliferation was reported. This biostimulatory effect could trigger further studies in order to establish a clinical protocol of LLLI for HGFs neighboring to implant prosthetic materials.

PROPERTIES OF URETHANE-BASED ADHESIVES WITH DIFFERENT CONCENTRATION OF ACETONE

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Keywords: Urethane-based dental adhesive, Acetone solvent, Polymeric and viscous properties

Purpose/Aim: Urethane-based dental adhesive presents advantages of flexibility, lower viscosity and biocompatibility. Acetone is the most appropriate solvent for the urethane-based adhesives. However, the ideal concentration of acetone in adhesives is controversial. The objective of the present study is to investigate the effect of different acetone concentration to the properties of urethane-based adhesive system.

Materials and Methods: Di-urethane di-methacrylate (UDMA), as one kind of the most used dental urethane-based monomer was utilized as solute and the acetone was solvent. The UDMA was dissolved in acetone to obtain gradient concentrations(100%, 80%, 50% and 20%).ATR-FTIR was utilized to detect the change of urethane group and the degree of conversion (DC). Viscosity of solution was tested by LVDV-1 viscometer.

Results: With the increase of acetone concentration, urethane bond peak strength decreased. Meanwhile, the urethane peak of UDMA shifted to higher wavenumbers which suggests that the hydrogen bonding of system also decreased. Meanwhile, with the increased concentration of acetone, the viscosity of solution reduced rapidly. The viscosity between each group had statistical difference($P<0.05$). When the ratio of UDMA reduced to 50%, the viscosity of solution even decreased by 95%. DC also exhibited a positive correlation to the UDMA concentration. UDMA had the highest degree of conversion (68.88%). When the concentration of UDMA decreased to 50%, the DC also reduced to 53.3%, and the rate of polymerization decreased.

Conclusions: Concentration of acetone has a significant effect to the polymeric and viscous properties of urethane-based adhesive system. It also affects the formation of hydrogen bond. Results of the present study indicated an in appropriate concentration of acetone solvent in urethane-based dental adhesive system might induce the decrease of properties. 50% should be the upper limit. For the limitation of the study, more properties such as penetrability, stability and bonding strength of adhesive should be investigated further.

RELIABILITY OF RFA IN ASSESSING IMPLANT STABILITY: A RETROSPECTIVE ANALYSIS

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Keywords: resonance frequency analysis, dental implant, stability

Purpose/Aim: Stable marginal bone levels (MBLs) supporting dental implants are essential for successful treatment outcome. While

there are various ways to evaluate implant stability, implant stability quotient (ISQ) assessed by resonance frequency analysis (RFA) is not only non-invasive but provide objective quantitative measurements. Therefore, the aim of this study was to assess the behaviour of ISQ values of failing implants, and its potential usage to identify the changes in MBLs.

Materials and Methods: The original cohort of 173 participants (65 males and 108 females; age range 21 to 85 years) with 383 implants were followed up to 10 years. Implant location, MBLs and ISQs were recorded at various recall times and entered for statistical analysis. Mixed model analysis was applied with the level of significance set at $P < 0.05$.

Results: The 10-year cumulative implant survival estimate was 95%. Twenty out of 21 failures occurred by Year 1 recall. The failed implants had lower ISQs at surgery (52.3±7.03) and baseline (52.5±4.20) when compared to surviving implants (surgery: 63.0±10.74; baseline: 62.3±8.30). However, the difference was statistically significant only at surgery. The mean ISQ values generally increased over time. Maxillary implants had lower mean ISQs compared to mandibular implants. The differences in the ISQ values between males and females as well as implant position within maxilla (anterior vs posterior) were less prominent. There was no correlation between the changes in the ISQ values and the MBLs.

Conclusions: There was a significant difference in the ISQ values at surgery between the failed and surviving implants. Mean ISQs showed a trend of increase over time, but there were differences with regard to implant location in the jawbone. Although the ISQ values cannot be correlated to the change of marginal bone levels, it may be a useful adjunct tool in assessing failing implants.

APOPTOTIC AND AUTOPHAGIC EFFECTS OF DENTAL ALLOYS MANUFACTURED BY DIFFERENT METHODS BASED ON 3D OMM

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Keywords: dental alloys, autophagy, apoptosis

Purpose/Aim: Based on the establishment of 3D oral mucosa model (3D OMM), the purpose of this study was to study the apoptosis and autophagy levels in human oral mucosa under the influence of dental alloys. It provides experimental basis and guidance for the selection of dental alloys with different manufacturing methods in clinical work.

Materials and Methods: In this study, seven groups of dental alloy specimens are fabricated, including cast Au-Pt alloy, cast Co-Cr alloy, computer-aided design / computer-aided manufacture (CAD/CAM) milling Co-Cr alloy, selective laser melting (SLM) Co-Cr alloy, cast commercially pure titanium (cp-Ti), CAD/CAM milling cp-Ti and SLM cp-Ti, which were immersed in the cell culture medium for 72 hours for preparation of specimen extracts. Then these specimen extracts were used to stimulate 3D OMM, and the tissues were embedded for immunofluorescence double staining to detect Caspase-3, TUNEL, p62, and LC3B. By comparing the results, the effects of different manufacturing methods on apoptosis and autophagy levels were analyzed.

Results: Immunofluorescence double staining showed that Co-Cr can induce oral mucosal cells to early apoptosis and autophagy, among which, cast Co-Cr may induce the highest level. Cp-Ti and cast Au-Pt could also increase the level of autophagy in the oral mucosa. But there was no significant difference among the three different manufacturing methods for cp-Ti. Seven dental alloys with different manufacturing methods had no significant effect on the late apoptosis of oral mucosal cells

Conclusions: Compared with Co-Cr, Au-Pt and cp-Ti have less biological effect on oral mucosal cells and show better biocompatibility. And compared with the traditional casting method, the use of new digital manufacturing methods, such as CAD/CAM milling or SLM, can significantly improve the chemical stability of dental alloys and reduce the biological effects of dental alloys on oral mucosal cells.

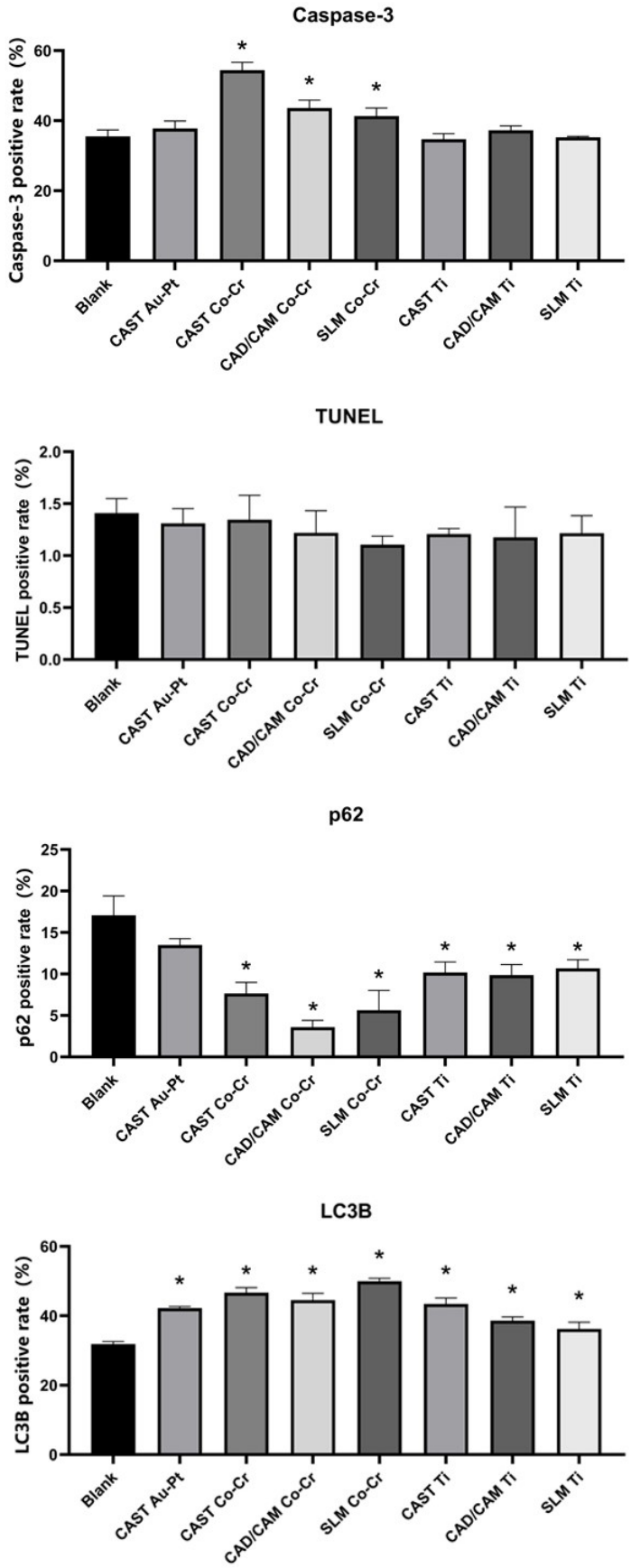

Figure1. Apoptotic and autophagic effects of dental alloys manufactured by different methods based on 3D OMM

AN ALTERNATIVE DIRECT-INDIRECT METHOD TO FABRICATE MULTIPLE CASTING POST-AND-CORES IN SEVERELY WORN DENTITION

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Keywords: Worn dentition, casting post-and-cores, Vertical Dimension

Case Presentation: It is always difficult to provisionalize the rehabilitation of a worn dentition in an increased vertical dimension, especially when the teeth have insufficient structure for retention. We herein present an alternative method to reconstruct worn dentition with full-mouth post-and-cores fabrication and provisional crowns in precise and minimal clinical procedures. A 70-year-old man had full-mouth tooth structure lost rapidly in the last three years due to severe GERD and post-CCRT dry mouth. Most of his teeth showed erosive wear and status of post-endodontic treatment. After a diagnostic wax up with determined vertical dimension, full mouth customized casting post-and-cores were designed. To contour the cores according to the diagnostic wax up and to minimize clinical procedures, we chose an alternative direct-indirect method for casting post-and-core fabrication. First, post spaces were prepared and were recorded with pattern resin by direct method. Then, full arch impression was made for remaining tooth structure and indirect post space recording. Before pouring the stone model, inlay wax was added over apical regions of all the silicone posts to offset the possible shortened length and distortion during multiple canal impression. After the stone set, the wax inside the canals was removed and the direct post patterns were fitted in. With this alternative direct-indirect method, we could build up all the cores on the direct post patterns on the articulator to achieve precise contours according to the diagnostic wax up. In such a way, we delivered all the post-and-cores and provisionals in a single appointment and achieved a precise and controllable outcome. It can be a treatment option when dealing with multiple post-and-cores fabrication in worn dentition rehabilitation cases.

COMPLICATIONS WITH REFURBISHING OF IMPLANT-SUPPORTED FIXED DENTAL PROSTHESES: A CASE REPORT

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Keywords: refurbish, implant-supported fixed dental prostheses.

Case Presentation: Background: Refurbishing of an implant-supported fixed dental prosthesis is often required to address time-dependent changes in the veneering acrylic which has a tendency to wear, discolor and fracture over time. The process of refurbishing may reveal unexpected complications with implant components. Thorough evaluation of clinical records, radiographs and clinical presentation is critical for a predictable refurbishing treatment plan.

Case report: A 59-year-old female with maxillary and mandibular implant-supported metal-acrylic fixed dental prostheses presented with concerns of repeated fractures of the maxillary anterior acrylic teeth. Initial clinical findings included evidence of repair of acrylic, generalized staining, generalized severe uneven wear of both prostheses leading to heavy anterior contact and loss of posterior occlusal contact, optimum bone levels, and passive fit of the maxillary and mandibular prostheses on the implants. Treatment plan of refurbishing of both prostheses was formulated to address the significant wear and compromised occlusal interface. Removal of the maxillary prosthesis revealed a worn-out prosthetic screw and a worn out angulated multi-unit abutment. Both were replaced. During the laboratory phase of treatment, one of the abutment cylinders of the mandibular prosthesis fractured so that the abutment screw could no longer retain the prosthesis at that site. The framework segment with the fractured fitting feature was removed and a new prosthesis segments waxed, cast and cemented with resin cement to the existing framework in a manner similar to the cementation of a titanium base to a zirconia prosthesis. The challenges and complications that arose during the refurbishing led to increased laboratory time, clinical chair time, and patient management difficulty.

Discussion: Angulated abutments have a thin band of threads to engage the prosthetic screw and can easily fracture. Prosthetic screw threads can wear with over manipulation or repeated removal and re-insertion. Similarly, framework components may fracture with repeated and prolonged application of compressive forces from the torque of the screws. All components require a thorough evaluation when the prostheses are removed pre-treatment to ensure the structural integrity of the prostheses and the implant componentry.

Conclusion: Treatment protocol for refurbishing of an implant-supported fixed metal-acrylic dental prosthesis requires a review of previous health records as well as assessment of the prosthesis and its associated implants and components before starting the treatment process. This evaluation will determine what components may need to be repaired or replaced and will allow the clinician to ensure appropriate pre-treatment consent.

Clinical Implications: Thorough evaluation prior to refurbishing ensures a predictable treatment outcome.

PREDICTIVE FACTORS OF OUTER CORTEX LOSS IN ADVANCED JAW RECONSTRUCTION

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Keywords: mandibular, maxillary, jaw reconstruction

Purpose/Aim: Head and neck tumour (HNT) patients are being treated with complex jaw reconstruction rehabilitation (JRR) procedures. Complex JRR involves a preoperative surgical design and simulation (SDS) using three dimensional digital technology for the microvascular fibular free flap reconstruction involving the primary installation of osseointegrated implants. Following complex JRR, adjuvant treatment may be delivered if required. The surgical driven design principles and protocols have evolved in the planning and delivery of the complex jaw reconstruction to support the completion of oral rehabilitation in the JRR pathway. This study investigated factors that may influence outer cortex loss (OCL) in complex jaw reconstructions.

Materials and Methods: Ethics approval was obtained for this retrospective chart review of adult (HNT) patients. Patients were included if they underwent primary osseointegrated dental implant placement at the time of jaw reconstruction for a HNT between January 2011 and March 2018 at the iRSM. Treatment variables were analyzed to determine factors associated with OCL. OCL was measured by reported incidence of osteoradionecrosis, osteomyelitis or a non-healing bone exposure (Figure 1,2,4,5).

Results: 62 patients fulfilled the inclusion criteria. 29 of the 62 (47%) patients underwent RT (Figure 6). RT was associated with OCL (Fisher exact test $P < 0.001$) (Figure 7). There was no OCL observed in the non-irradiated patients. There was no OCL observed in patients treated with the modified protocol. Figure 8 is an illustration of the timeline of OCL.

Conclusions: More research is necessary to determine the role of other relevant variables such as smoking, alcohol consumption, and patient's medical history. Initial challenges with OCL seems to be mitigated with changes in protocol to include HBO therapy*, Narrow Platform implant, and BIFF. The delivery of HBO before implant exposure surgery in the irradiated jaws may decrease the incidence of OCL.

REHABILITATION OF MAXILLARY DEFECT WITH IMPLANT SUPPORTED SCREW RETAINED HYBRID PROSTHESIS – A CASE REPORT

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Keywords: hybrid, implant, defect

Case Presentation: When treating implant patients a clinician may encounter more difficult cases than the ones that can be rehabilitated with standard restorations. Implant supported hybrid prostheses are an option for larger interocclusal dimensions, higher esthetic expectations, the patients who cannot use removable dentures, problematic implant positions due to anatomic limitations, occlusion anomalies etc. When one or more of these factors are present hybrid prostheses should be considered. In this report, 22 years old female patient who lost nearly half of her maxillary teeth and bone volume due to large cyst surgery, has came to our clinic for prosthetic rehabilitation. The patient has no systemic disease and non-smoker. After placing four implants, zirconia framework supported porcelain hybrid restoration was fabricated to overcome increased interocclusal height because of vertical bone defect. Canine guided occlusion was achieved. The patient was satisfied with the functional and esthetic results of the restoration and one and a half year follow up period no complications were observed. This case report suggest that implant supported hybrid prostheses can be a reliable alternative treatment procedure when a porcelain fused metal fixed restoration does not satisfy a patients requirements for esthetics, phonetics, oral hygiene and oral comfort.

SURFACE GAS-PHASE FLUORINATION FOR BONDING MONOLITHIC ZIRCONIA RESTORATIONS

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Keywords: Fluorination, Adhesion, Zirconia

Purpose/Aim: The objectives of this study are 1) To optimize the SixOy seed layer of the plasma fluorination treatment on the yttria stabilized zirconia (YSZ) surface to achieve the strongest possible bonding between YSZ and resin-based cements, and 2) to define the effect of plasma fluorination of YSZ monolithic occlusal veneers and regular crowns on the bond strength to resin-based cements.

Materials and Methods: For objective 1, the YSZ blocks were divided into four groups (n=10/group) according to the surface treatment, as follows: 1) control (no surface treatment, as sintered), 2) silica-coating (silica-coating using 30 µm silica-coated aluminum oxide particles), 3) gas-fluorination - SixOy seed layer of 5 nm, and 4) SixOy seed layer of 10 nm. YSZ blocks were silanated and bonded to resin composite cylinders using a dual-cure resin cement. The specimens were stored in deionized water for a period of 24 h prior to bond testing. The bond strength was calculated by dividing the fracture load by the cross-sectional area of the specimen. For objective 2, fifteen YSZ monolithic occlusal veneers and regular crowns did not receive surface treatment (control group); other fifteen were silica-coated. The remaining fifteen monolithic restorations will receive the best fluorination treatment found for the cementation surface in aim 1. All restorations were cemented onto resin composite replicas of a prepared mandibular first molar. The bonding area of the resin composite abutment was determined to calculate the nominal tensile strength after the test. So far, the restorations of only the control and silica-coating groups were subjected to the bond strength test. Those restorations were observed under the optical stereomicroscope to evaluate the fracture surfaces and determine the failure mode. Tukey HSD multiple comparisons test will be used to determine statistical differences in bond strength among all groups.

Results: Partial results were obtained, for objective 1. The silica-coated group showed higher bond strength values (11.55 ± 2.9 MPa) than the control group (6.91 ± 1.2 MPa). For the control group, the predominant types of failure were mixed (50%) and cohesive (50%), while for the silica coating group, 70% underwent mixed failure and 30% cohesive failure. For objective 2, the silica-coated occlusal veneers showed lower bond strength values (2.6 ± 0.1 MPa) compared to the regular crowns (3.5 ± 0.2 MPa). For both groups mixed failure was predominant (100%).

Conclusions: For objective 1 - The partial results confirm the effectiveness of the silica-coating over no surface treatment in YSZ structures and will allow us to have a negative and positive control for the gas-fluorination group. For objective 2 - Occlusal veneers had low bond strength compared to a regular crown even when the conventional silica-coating treatment was used.

***Winner of the Ivoclar Vivadent / ICP Research Fellowship in Dental Restorative Materials**

TOOTH AUTO-TRANSPLANTATION: AN ALTERNATIVE OPTION FOR ANTERIOR SINGLE TOOTH REPLACEMENT

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Purpose/Aim: To present survival and success rates of 18 auto-transplanted teeth during a follow up period of up to eight years and present three cases from the series to highlight how simple restoration of auto-transplanted teeth can result in a favourable, cost-effective alternative treatment for anterior tooth replacement, particularly in growing patients.

Materials and Methods: Sixteen consecutive patients (mean age at surgery, 13 years 2 months) had 18 teeth auto-transplanted between 2009 and 2018 and were followed up clinically and radiographically for up to 8 years 9 months. Pre-operative CBCT allowed for careful recipient site assessment and construction of a replica of the donor tooth, providing a 3D surgical template for accurate donor site preparation, greatly reducing each transplant's extra-oral time. Fourteen premolars, three supplemental lateral incisors and one canine were transplanted to replace teeth missing due to trauma (n=11); hypodontia (n=4); macrodontia (n=2); transpositioning (n=1).

Results: The survival rate (ie. percentage of teeth present at follow-up) of auto-transplanted teeth was 94.4% and the success rate (ie percentage of teeth with a healthy periodontium and without progressive root resorption or mobility) was 77.8%. One auto-transplanted tooth developed external root resorption and a widened periodontal ligament radiographically and required extraction. A further three teeth developed root resorption but remained in situ an average of 5 years 9 months after transplantation. Ten of 16 patients required direct or indirect restoration of the donor tooth to simulate the missing tooth at the donor site. Treatment outcomes of three restored cases are presented: indirect porcelain laminate veneer (n=2) and directly-placed composite resin (n=1).

Conclusions: A high rate of survival and success of auto-transplanted teeth was reported. Auto-transplanted teeth offer significant advantages over prosthetic tooth replacement by maintaining the periodontal ligament, proprioception, alveolar bone height and width, continued eruption and the option of further orthodontic tooth movement. Restoration and maintenance of the auto-transplant is relatively simple and cost-effective. Auto-transplantation should be considered in growing patients, especially because the advantage of maintaining alveolar bone volume means that dental implant placement remains an option for post-growth patients, in the event of auto-transplant failure, with reduced need for bony augmentation.

DIAGNOSIS AND EARLY MANAGEMENT OF A HIGH SMILE LINE PARTIALLY EDENTULOUS PATIENT: A CASE REPORT

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Keywords: removable, high smile, no flange

Case Presentation: Background: A removable dental prosthesis (RDP) is one of the primary methods for replacement of missing dentition. Its main advantages are reversibility, minimal invasiveness, and cost-effectiveness.

Objectives: This case report focuses on the diagnosis and early management of a patient with a large partially edentulous maxillary segment extending into the anterior region utilizing a removable partial dental prosthesis without a buccal flange.

Clinical Scenario: 54-year-old, ASA II female presented to the University of Toronto Graduate Prosthodontics Program wanting to replace her current maxillary and mandibular RDPs to improve aesthetics and function. The patient requested that the buccal flange of the maxillary RDP be minimized or absent. The patient's key diagnostic parameters were a non-physiologic occlusion characterized by reduced posterior support and unilateral posterior open bite, high smile line in maxilla, limited inter-occlusal space. Her partial edentulism was restored with subjectively and objectively sub-optimal maxillary and mandibular RDPs.

Discussion: Treatment objectives included addressing the patient's aesthetic demands within the constraints of a high smile line and patient's request for a maxillary RDP without a buccal flange; addressing the limited inter-occlusal space; increasing the reduced posterior support and providing the patient with a therapeutic occlusion that is functional, comfortable and sustainable. Treatments rendered included diagnostic records, diagnosis and treatment planning, fabrication of several diagnostic tooth set-ups to address patient's demands, and fabrication of maxillary and mandibular transitional acrylic RDPs based on the patient's-approved diagnostic tooth set-up.

Conclusion: Patient is currently wearing her maxillary and mandibular transitional acrylic RDPs and is satisfied with function and aesthetics. The patient's experience with the removable transitional prostheses will be used to guide definitive care. Tentatively, the definitive treatment plan is fabrication of maxillary and mandibular cast RDPs.

Clinical Implications: Buccal flange is an important component in the success of RDPs. It is influenced by several factors including presence of undercuts and aesthetics. These factors must be taken into consideration when determining the presence, absence or design of the buccal flange.

LEARNING CURVE OF AN INTRAORAL DIGITAL SCANNER ON NATURAL ABUTMENTS

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Keywords: Digital Scanner, Learning Curve, Natural Abutments

Purpose/Aim: The aim of this in vivo study was to evaluate the presence of a learning curve in taking intra-oral digital impression on natural abutments.

Materials and Methods: A patient who showed the indication for fixed prosthetic rehabilitation in the anterior maxillary sector (1.3-2.3) was selected. Two operators, one with a good level of experience and one without any experience with the intra-oral digital scanner,

performed 20 intra-oral digital scans of the upper anterior region each using Aadva IOS software 3.0 in “prosthodontics" mode of the system, precision modality, strictly following the manufacturer’s instructions. The protocol used for the impressions was divided into three phases: preparation, scanning and control. The time required for each step (preparation, scanning, control) and the total amount of time needed were recorded and evaluated statistically using simple and multiple analysis of variance ANOVA and MANOVA test with Bonferroni multiple comparison test ($p<0.05$).

Results: There were statistically significant differences for the total time recorded only in the first four impressions between the two operators; conversely, they were not statistically significant differences between the two operators during the following scans. The presence of a learning curve was observed in direct digital impressions, but there was no difference between the operators. Both operators showed a progressive reduction of the time needed to scan, until they reach a plateau of 2’27’’-2’44’’second per scan shot.

Conclusions: In order to use the intra-oral digital scanner to take impression of abutments, clinicians should take into account the need to learn how to use the device in that oral environment. Several scans are required to achieve standardized repeatable digital impressions with an acceptable quality. The time needed to take a digital impression was very reasonable.

REHABILITATION OF AN UNUSUAL PRESENTATION OF OSSIFYING FIBROMA WITH COMPLICATIONS

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Keywords: Rehabilitation, Maxillofacial Prosthodontics, Ossifying Fibroma

Case Presentation: Background
A 37 year old African female presented with a severe facial deformity. There was recurrence of a massive facial and cranio-orbital tumour, with severe orbital displacement and visual disturbance in the left eye. The patient previously presented with the same signs and symptoms in 2011 and was diagnosed with an ossifying fibroma of the ethmoid, sphenoid and maxillary sinuses and underwent resection of the affected tissue with reconstruction in 2012. In 2015, she presented with a similar picture again.

Management: The management of this patient is dependent on strong collaboration from a multidisciplinary team that includes maxillofacial and oral surgery, maxillofacial prosthodontics, neurosurgery, ophthalmology, plastics and reconstructive surgery, psychology and social work. The planned surgery is to occur in 2 phases. In phase 1 there will be resection of the affected tissues and removal of the orbital complex. A laser sintered titanium frame will be placed into surrounding bone at the initial surgery and will be used to support an immediate magnetic facial prosthesis. This period between phases, will allow for clearance of the diseased tissue, proper histology and diagnosis and healing to occur. Once there is sufficient healing, proper planning for phase 2 surgery and final reconstruction will occur, including a definitive prosthesis.

Discussion: In an African setting, limited access to healthcare, stigma associated with tumours or any pathology, and reliance on traditional healers as a first point of care, often result in considerable delay in detection, treatment, and rehabilitation. This patient was socially rejected and her appearance as well as loss of function in the eye has severely affected her quality of life. Once detected, it is imperative to manage these cases with proper diagnosis and planning with a multidisciplinary team from the outset and to employ proper surgical techniques to avoid recurrence of pathology. The patient is now set to undergo two more surgeries where the tissues will be given a chance to heal prior to final reconstruction. With the use of technology, planning and reconstruction can be more accurate and efficient. The patient’s well-being and quality of life must be considered throughout.

IMPLANT-PROSTHETIC REHABILITATION USING ZYGOMATIC IMPLANTS AND A CARBON FIBER FRAMEWORK

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Keywords: zygomatic implants, carbon fiber reinforced composite, framework

Purpose/Aim: Zygomatic implants represent a feasible treatment option to rehabilitate extremely resorbed maxillae avoiding bone-grafting. Two zygomatic implants can be placed in the posterior areas of the maxilla and traditional implants in the anterior areas. In case

of extreme maxillary atrophy, 2 zygomatic implants for each hemiarch can be used. Even if metal is the most used material to realize passive frameworks (they prevent micro-movements and evenly distribute occlusal loads onto the implants), currently there is a growing interest in composite resins, such as carbon fiber reinforced composites (CFRC). Compared to metal, CFRC provides similar stiffness and rigidity and optimal biocompatibility, but they are also cheaper, easy to produce, they allow chemical adhesion to the veneering resin and they are lighter. Such characteristics appear to be advantageous for the manufacturing of immediately loaded prostheses supported by zygomatic implants. The aim of this study was to evaluate clinical outcomes of immediately loaded zygomatic implants using a full-arch fixed prostheses provided with CFRC frameworks.

Materials and Methods: Between March 2017 and September 2017, 18 patients (13 women, 5 men; mean age of 62 years (range: 53 – 78), with severely edentulous resorbed maxillae or patients with failed GBR augmentation ,were treated with fixed screw-retained prostheses supported by zygomatic implants in the posterior areas and traditional implants in the anterior areas (n= 3) or four zygomatic implants, two for each hemiarch (n= 6) or four zygomatic implants and traditional implants in the anterior areas (n= 2). A plaster impression was taken after surgery, and prostheses were delivered within 24/48 hours. The prosthesis presented a carbon fiber framework, veenered with composite resin occlusal material. All the prostheses were provided with balanced occlusion and nightguards were delivered to the patients. At the 1-year follow-up cumulative survival rate (CSR) as well as periodontal parameters were evaluated (BoP, PI, PD). Technical and biological complications were also recorded.

Results: 80 implants have been inserted (45 zygomatic and 35 classic implants). At the 1-year follow-up, no patients dropped out. One implant was removed 4 months after implant placement due to an infection in a heavy smoker patient, however the prosthesis was kept in place maintaining the remaining implants as support. Implant CSR was of 98,8% and prosthetic CSR was 100%. The values of BOP and PD of peri-implant soft tissues were always physiological.

Conclusions: On the base of the present study, implant rehabilitation with zygomatic implants and fixed prostheses provided with a CFRC framework appears to be a valid treatment option in case of severely atrophic maxillae, with high success rate in the short term period.

WITH INCREASING OCCLUSAL VERTICAL DIMENSION

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Keywords: occlusal vertical dimension; occlusal reconstruction; oral health; quality of life

Purpose/Aim: To evaluate the feasibility and clinical effects of treating patients with decreased occlusal vertical dimension through occlusal reconstruction with one of the following methods: removable prosthesis, fixed prosthesis or removable-fixed combined prosthesis.

Materials and Methods: Observe and analyze the clinical data of three patients with decreased occlusal vertical dimension and rehabilitated using one of the above-mentioned prosthesis to reconstruct the occlusion. The effects of prosthetic rehabilitation for increasing occlusal vertical dimension on patients' quality of life were also evaluated.

Results: After 2-month follow-up, the patients were all satisfied with the prosthetic treatment outcome, and their OHIP14 results suggested that occlusal reconstruction treatment provides significant improvements in oral-health-related quality of life.

Conclusions: Although treatment of decreased occlusal vertical dimension through occlusal reconstruction is a complicated procedure, therapeutic effects of all the three methods is satisfying.

RETROSPECTIVE CASE SERIES OF REHABILITATION OF FACIAL DEFECTS WITH PATCH PROSTHESIS

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Keywords: Facial Defects, Rehabilitation, Prosthesis

Case Presentation: Retrospective case series of rehabilitation of facial defects with patch prosthesis

Keywords: Facial Defects, Rehabilitation, Prosthesis

Abstract: Statement of problem:
Facial defects arising from tumor extirpation may involve a major portion of the face. A reconstructive surgery is many a time not feasible or advisable. And in cases where reconstruction is carried out there is a chance that surgical complication may lead to facial defect. Cosmesis are significantly impaired and present a unique challenge to the reconstructiveprosthodontist.

Purpose: This study evaluated the functional and cosmetic success of rehabilitation of the facial defects by using facial Prosthesis. Material and methods: A retrospective chart review of 10 patients who underwent rehabilitation of facial defects was conducted. The main outcome measures were the quality of life pre and post prosthesis rehabilitation.

Results: 10 patients having different types of facial defects were rehabilitated with facial prosthesis.9 patients have been using the prosthesis satisfactorily. One patient failed to use the prosthesis as she found its use to be cumbersome.

Conclusion: In the patients reviewed, the facial prosthesis helped to improve the quality of life of the prosthesis significantly.

EVALUATION OF THE ACCURACY OF 4 INTRAORAL DIGITAL

SCANNERS WHEN USED BY UNTRAINED DENTIST

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Keywords: Intraoral scanner, Digital dentistry,3d model

Purpose/Aim: Intraoral scanners are described as precise and easy to use tools even for less experienced professionals. However, little data is currently available on the ability of these devices to produce precise and reliable images in real conditions of use even in inexperienced hands. This study aims to evaluate the precision and accuracy of different intraoral scanners used by a young dentist who has never used digital technologies for in vivo oral impressions.

Materials and Methods: 4 digital scanner models have been selected for the study: A) AADVA iOS100, GC Corporation, Japan; B) Emerald, Planmeca OY, Finland; C) Trios 3, 3Shape, Denmark; D) CS3600, Carestream Health Inc, USA. A single patient was selected as an in vivo scan model. 3 reference points were placed on the patient's teeth in upper left arch. For each device, 5 scans of the arch were performed by a single operator with poor experience in using digital scanners, trained for respecting manufaturer's instructions (scan path and movements). Scan time and number of interruptions and post processing time have been recorded. A PVS impression has been taken to obtain a "gold standard" for comparisons. The distances between the 3 reference points present on each 3D model were measured by 3 different operators using Final Surface ™ software (version 6.8.5, Gfal, Germany). For continuous variables, the mean, standard deviation, minimum, median and maximum are calculated. For categorical variables, absolute and relative frequencies are reported. Moreover for each distance, a one way ANOVA has been implemented and Dunnett test has been applied in order to compare all the mean differences with all the scanner and the gold standard.

Results: The average scan time was 3'57" for IOS100 (average 3,6 interruptions per scan), 2'01" for CS3600 (0,2 interruptions), 2'23" for Trios2 (0,4 interruptions), 2'15" for Emerald (1,6 interruptions). IOS100 proved to be the fastest in preparing the model (post-processing) with 18,4", followed by Emerald (21,8") Trios2 (23,4") and CS3600 (33,8"). Repeatability of the scans was very high since little standard deviations were reported between each set of 5 scans. No statistical differences were reported between different devices.

Conclusions: All tested devices appeared to be equally accurate and precise for prosthetic procedures, even if used by a less experienced operator. IOS100 seemed to be the slowest in scanning time, but absolutely the most manageable, being the smallest device and the most comfortable for the patient. CS3600 had the easiest scanning procedure, together with Trios2, but this last appeared to be heavy (750 grams instead of 200-300 of the others) and less manageable due to the shape of the device. Trios2 reported to be more painful by the patient due to edges pressing on cheeks. Emerald was quick in scanning, but seemed the slowest on sharp cusps.

REPOSITIONING ACCURACY OF IMPLANT PROSTHETIC COMPONENTS USED FOR DIGITAL AND CONVENTIONAL WORKFLOW

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Keywords: Repositioning, Implant, Component

Purpose/Aim: The aim of this study was to evaluate repositioning errors of implant prosthetic components used in conventional and digital workflows. The null hypothesis was that there are no differences in repositioning accuracy of investigated components and position is not depending on the torque level.

Materials and Methods: Seven implants (Microcone, Medentika) were fixed in milled steel blank using resin. Implant- and abutment-level impression copings, scan bodies, hex and non-hex Ti bases, and multi-unit caps (7 different components) were evaluated. A standardized test body was glued to each component at exactly the same position. The position of the component-test body complex (CTBC) was consecutively determined 7 times after manual disassembly and reassembly using 15 Ncm torque for the impression

components and multi-unit caps, while for the Ti bases 15 Ncm and 25 Ncm torque was applied. Predefined spots on the surface of the CTBC were sampled to detect any changes in position using a coordinate measuring machine (Fig. 1). Vertical, horizontal, sagittal and 3D discrepancies after each manual reassembly were monitored. A Mann–Whitney U test was used for pairwise comparison of the mean displacements of components to determine statistical differences ($p = .05$).

Results: Positional displacements were observed in all three axes. The mean (± standard deviation) 3D displacements of the implant-level pick-up copings (36 ± 8 μm) and scan bodies (26 ± 29 μm) were significantly greater than of the abutment-level impression copings (16 ± 8 μm) and scan bodies (12 ± 10 μm). The mean 3D displacement of the Ti base with hex (6 ± 5 μm) was significantly lower than that for the multi-unit cap (11 ± 8 μm). While non-hex Ti base (9 ± 7 μm) group have not significantly differed from the multi-unit cap group (11 ± 8 μm). There was a statistically significant difference in 3D deviations of hex (14 ± 21 μm) and the non-hex (15 ± 10 μm) Ti bases after increasing the torque from 15 Ncm to 25 Ncm.

Conclusions: Manual assembly and reassembly results in 3D positional changes of the impression copings, scan bodies and abutments. The components related to conventional and digital workflow could have deviations in the position up to 35 μm. The different torque levels could result in the positional change as well.

KNOWLEDGE AND PRACTICE ABOUT ORAL HYGIENE BY TRIBAL WOMEN OF UTTAR PRADESH-A COMMUNITY BASED STUDY

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Keywords: Oral health, tribal women, oral health issues

Purpose/Aim: Oral health is an inherent part of the general health and wellness of an individual. Dental caries, gum disease and oral mucosal lesions constitute the major oral health stigma in developing countries and among the deprived population. To practice healthy oral habits it is quintessential to have good oral health knowledge and attitude. Good oral hyiene practice and knowledge to oral health related issues among tribal population is considered to be an essential prerequisite for ameliorating oral health in a community. The purpose of the study was to assess the oral health knowledge and oral hygiene practices among tribal womens of Uttar Pradesh.

Materials and Methods: A cross sectional study was conducted among 200 tribal womens of Uttar Pradesh. Data was collected using semi- structured questionnaire by interview method and was analyzed by descriptive statistics.

Results: Majority of tribal womens did not know the association between tobacco consumption and oral cancer. They have poor knowledge about oral health issues. When tribal womens were asked about rinsing oral cavity with plain water after every meal, most of them were found not following this practice. It was found that most respondents(90%) brush their teeth regularly; more than half respondents brush their teeth once; and most respondents brush their teeth at morning.

Conclusions: In the present study, there is a gap in the oral health knowledge and oral hygiene practice among tribal women, which needs to be filled up by regular oral health education programs

FEASIBILITY OF INTRAORAL SCANNERS IN DIGITIZING MAXILLECTOMY DEFECTS: AN IN VIVO STUDY

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Keywords: Intraoral scanners, Maxillectomy defects, Feasibility

Purpose/Aim: Although the use of an intraoral scanner has usually been limited to digitize teeth, implants, and limited palatal area, to date, there are very limited reports focused on the feasibility of intraoral digital impressions for maxillectomy defects, especially for the soft tissue defect part. The purpose of this in vivo study was to evaluate the feasibility of digitizing maxillectomy defects using intraoral scanner as a digitization technique.

Materials and Methods: Eleven dentate and edentulous maxillectomy defect patients (mean age 66 years, 7 males and 4 females) were included to perform this study. Information about scanning approach was explained for each patient and consent form was also obtained. Two intraoral scanners were chosen based on necessity of opacization with powder, wand tip size, and ability to detect in-color impressions. Therefore, Trophy 3DI PRO and 3M True Definition were used in this study. In the case of Trophy 3DI PRO, the scanning procedures started directly without powdering. The final scans were saved as two different files, STL file format and Stanford Polygon file format (PLY). The initial scanned three-dimensional (3D) data were observed using Trophy mesh viewer, and color images were saved. In the case of 3M True Definition scanner, the defect area and the dentation of two patients were dusted by zinc oxide powder and then the scanning procedures started from posterior teeth in a zigzag manner followed by the defect area. After the scanning and preliminary evaluation of surface scanning quality, the scan files were sent to the scanner provider, as a post-processing cycle was needed to recalculate the recorded surfaces and compensate for potential errors. Ultimately, a high-resolution 3D models were obtained and saved as standard tessellation language (STL) files. In addition, intraoral two-dimensional (2D) photos of eleven patients were taken for comparison.

Results: All the dentation area and a part of maxillectomy defects were more feasible for scanning when the powder was applied and smaller wand tip was used. In comparison, the scanning was not possible in the maxillectomy defects when the powder was not necessary for opacization and larger scanning wand tip was used. The 2D images shows the parts that were not feasible for scanning.

Conclusions: Digitizing various maxillectomy defects with the use of two different intraoral scanning systems appears to be feasible with some limitations. Those limitations are mainly related to the necessity of opacization with powder and wand tip size.

EFFECT OF BONDING AND POST LENGTH TO THE DISLODGEMENT CHARACTERISTICS OF FIBER REINFORCED COMPOSITE POST

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Keywords: Fiber-reinforced composite post, individually formed FRC post, attachment

Purpose/Aim: The aim of this in vitro study was to investigate the forces needed to dislodge bonded and mechanically attached individually formed fiber-reinforced composite (FRC) posts from a simulated root canal.

Materials and Methods: Two different groups of FRC posts were made. The first group simulated bonded individually formed FRC posts and the second group simulated mechanically attached individually formed FRC posts to a root canal. The fiber post material in both groups (everStick Post, GC Corporation) consisted of unidirectional E-glass fiber reinforcement in a semi-interpenetrating polymer network (IPN) polymer matrix. The fiber material was formed into posts (diameter of 1.5-1.6 mm) by rolling it between two microscope glasses and light-polymerizing it. Different post lengths were made. Artificial root canals were made by drilling holes in polymethylmethacrylate (PMMA) blocks. The final post lengths inside the blocks in both groups were: 2, 3, 4 and 6 mm (n= 6/length). FRC posts in the blocks were tested with a 2-point bending test where the load was applied 0.5 mm from the end of the post.

Results: Both length and bonding had a significant effect on the dislodgement force ($p < 0.001$). The shortest posts differed statistically significantly from the other post lengths ($p< 0.05$). Greater force was needed to dislodge bonded FRC posts compared to not bonded FRC posts in every tested post length. The minimum post length inside the artificial root canal to achieve adequate mechanical retention, i.e. without bonding to simulated root was 3 mm.

Conclusions: This study highlighted the importance of good bonding of FRC posts to root canal.

EVALUATION OF PHASE TRANSFORMATION OF POSTERIOR THREE-UNIT MONOLITHIC ZIRCONIA RESTORATIONS AFTER CHEWING SIMULATION

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Keywords: monolithic zirconia. phase transformation, X ray diffraction

Purpose/Aim: The purpose of this study was to evaluate the influence of chewing simulation on tetragonal-monoclinic phase transformation of monolithic zirconia ceramics.

Materials and Methods: Thirty samples from tree type Y-TZP ceramics (BruxZir, Upcera, FireZr) were prepared and divided into tree group (n=10) according to their brand. Samples were prepared in the form three-unit partial fixed prosthesis. Tetragonal to monoclinic phase transformation was measured from three different point for all samples (mesial connector, pontic, distal connector) by using X-Ray Diffractometer. In order to age the zirconia samples thermomechanical cycle was applied to the samples by dual axle chewing simulator. Thermomechanical cyclin loading was performed under 50N 240,000 times at 1,7Hz. All of the specimens subjected to XRD analysis to determine phase transformation before and after chewing simulation. Statistical analysis was performed using repeated measures ANOVA and Tukey post hoc test. The significance was set at $p<0,05$.

Results: Corresponding to the XRD results; relative amount of transformed amount of zirconia significantly increased after chewing simulation regardless of region and brand. A statistically significant difference was observed between brands. There was no significant difference between site of measurement and phase transformation.

Conclusions: The thermomechanical cycle increases amount of monoclinic phase. However, this monoclinic phase amount is clinically acceptable.

TRANSLUCENCY OF MONOLITHIC ZIRCONIA AFTER AGING. A SYSTEMATIC REVIEW

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Keywords: Hydrothermal, aging, monolithic

Purpose/Aim: Recent modifications in composition, structure, and fabrication methods have led to monolithic zirconia ceramics of superior translucency. However, during aging, intrinsic microstructural features such as grain boundaries and pores, may affect light scattering and consequently the translucency of zirconia. The aim of this study was to systematically review if hydrothermal aging affects the translucency of monolithic zirconia.

Materials and Methods: An electronic search in Medline, Cochrane Library, and Scopus was conducted to identify the effect of hydrothermal aging on the translucency of zirconia. The search was limited to English-language publications and in vitro studies. The following search terms were used alone or in combination: “monolithic zirconia”, “aging”, “hydrothermal”, “translucency”. From the 108 titles found after search in electronic databases only 7 articles met the inclusion criteria, and were included in this review.

Results: Aging reduced the translucency of monolithic zirconia in most of the studies, however the differences varied according to the brand tested and the thickness of the specimens, with the thinner specimens presenting higher translucency alterations. To what extent the effect on the translucency is within the detection limit of the human eye remains unanswered.

Conclusions: There is lack of evidence regarding the effect of aging in the translucency of monolithic zirconia ceramics and to what an extent this is clinically important. More research is required on this field, in order to reach solid conclusions.

THE EFFECT OF DENTURE CLEANERS ON THE COLOR PARAMETERS OF ARTIFICIAL DENTURE TEETH

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Keywords: Artitificial denture teeth, Denture cleaners

Purpose/Aim: Chemical washing agents as denture cleaners have been commonly used for proper denture care. However, the effect of denture cleaners on color parameters of artificial denture teeth is uncertain. The aim of this study was to evaluate the effect of denture cleaners on the color parameters of different types of artificial denture teeth.

Materials and Methods: Four different types (Polymethylmethacrylate-PMMA, Isosit-ISO, Microfiller-reinforced polyacrylic-MRP, Resin teeth-based on polymethylmethacrylate-RBP) of artificial maxillary central incisor denture teeth were used in this study. Ten specimens with the same color (A2) and thickness (2 mm) were prepared for each group (n=10). Artificial aging was carried out in a coffee solution for 3 days. Then the samples were cleaned with soapy water and kept in a denture cleaner solution for 24 hours. A spectrophotometer was used to measure the color parameters of specimens under specific conditions (D65 Illumination and neutral gray background), and translucency parameter (TP) was calculated using the TP formula. Color parameters of the specimens (L*,a*,b*) were measured at each step respectively (Initial, Aging, Cleaned 1h,6h,12h, and 24h). The data were analyzed using Repeated Measures ANOVA and post hoc comparison test with Bonferroni correction at the significance level of 0.05.

Results: According to the result of the statistical analysis conducted, the type of artificial teeth and chemical washing, and interaction between these factors found to be significant for the color parameters of the groups. However, translucency parameters of the groups were not affected by these factors($p>0.05$). No significant differences were found in terms of color parameters and TP values for Group ISO. Differences between the initial and 1h were not statistically significant for all groups. After the 24 hours cleaning period, L* values of Group PMMA, MRP and RBP significantly increased ($p<0.05$).

Conclusions: Within the limitation of this study, it can be concluded that artificial aging and chemical washing have no significant effect on the color parameters of the Group ISO. Chemical washing for 1 hour was sufficient for artificial denture teeth in terms of color stability. Additionally, artificial denture teeth got brighter after 24 hours cleaning period.

RCT ON LITHIUM DISILICATE PARTIAL CROWNS USING A NOVEL PROSTHODONTIC FUNCTIONAL INDEX FOR TEETH (FIT)

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Purpose/Aim: The aim of this trial was to evaluate two lithium disilicate systems using a novel prosthodontic Functional Index for Teeth (FIT).

Materials and Methods: Thirty patients were restored with partial adhesive crowns on natural abutment posterior teeth, and were divided in two groups, Group 1 e.max press (Ivoclar) Group 2 LiSi press (GC Co) and annually followed-up for 3 years. Seven variables (Interproximal, Occlusion, Design, Mucosa, Bone, Biology and Margins) were defined by FIT for evaluation using a "0-1-2 scoring scheme", resulting in a maximum score of 14 per restoration. The patients' level of satisfaction was recorded and correlated with FIT.

Results: All crowns revealed survival rates of 100% without any biological or technical complications. At last recall the mean total FIT score was 13,26 and 13,66 respectively for Group 1 and 2. All seven variables were evaluated and scored with a media ranging from 1,73 to 2. No statistically significant differences were found between the two Groups. The patients expressed a high level of functional satisfaction at or above 80 on the VAS for both questions. A statistically significant positive correlation was found between total FIT score and Q1 (rho = 0,673; p = 0,006) and Q2 (rho = 0,809; p < 0,001).

Conclusions: The results show that it is possible to point out the clinical behavior of partial crowns using FIT. The FIT was an effective tool to evaluate the satisfactory outcome of the patient, know the possible risk of failures and monitorize at each recall the performances of restorations.

DIGITAL IMPLANT PLANNING AND GUIDED IMPLANT SURGERY: A CLINICAL CASE

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Keywords: digital, implants, prosthetics

Case Presentation: The digital implant planning and the implant surgery using a digital manufacturing of the surgical guide can significantly optimize the implant-prosthetic therapy. A patient with extended maxillary partial edentation, candidate to implant-prosthetic therapy, was treated by using digital planning and guided implant surgery. Software application DDS was used. The stages were as follows: the supply of the bone images and radiographic guide in relation to reference points (gutta percha markers in the radiographic guide); qualitative analysis of implant sites; selection of implants from database; virtual surgery (planning the implant position in implant sites); virtual positioning of implants in optimal positions for the future prosthetic restoration in relation to the optimal occlusal contacts: virtual reproduction of cavity creation sequence and the use of the reference points to move and to modify the orientation of the implants; checking instruments (tridimensional rotation, sections visualization) of the implant position in relation to the important anatomical; manufacturing of the surgical guide by CAD-CAM system. The postimplant CBCT analysis showed that the use of digital application DDS ensured accurate implants positioning, manufacturing of the surgical guide and was a valuable tool in the design of the future prosthetic restoration. The use of digital applications can optimize the alveolar bone rehabilitation, the implants positioning (associated to CAD-CAM manufacturing of the surgical guide), and the design of the future prosthetic structure.

FINDING OCCLUSAL PLANE ORIENTATION BASED ON SKULLS MORPHOLOGY, OCCLUSOMETRY AND VD-METER

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Keywords: Occlusal plane, skull, craniometry

Case Presentation: Background: Several points and planes have been settled in order to analyze, through angular and linear measurements, the mutual relation and harmony of the cranial structures. Among those, the occlusal plane (OP) and the occlusal vertical dimension (OVD) are essentials for oral rehabilitation.

Technique/Case Report: Aim: to describe an indirect technique to correctly align the OP in the context of the OVD, resorting to the following principles and devices: Occlusometry, (1) VD-Meter® (2) and the Otic reference plane that we formally validated by studies on Pre-Columbian civilizations skulls. (3) After an initial neuromuscular therapy, a lateral teleradiograph in Centric Relation should be taken. The theoretical OP orientation must be determined using Occlusometry, given that the OP has an average angulation of 9° with the cranial base plane. By mean of a VD-Meter®, a device which analyses the facial morphology using the left ear-eye distance, gender, and facial type data, we could determine the patient OVD. Finally, the sagittal OP findings should be transferred to a frontal view resorting to the Otic plane as frontal reference. An occlusal recording should assist the clinician in the final OP alignment.

Discussion: A patient with severe occlusal must to be rehabilitated under optimal conditions. A patients with this condition was enrolled to apply the described technique. First, the sagittal OP orientation was defined using the Occlusometry. Once the OVD was determined using the VD-Meter® and the orientation of the OP in the frontal view was settled, we were able to define the final alignment of the OP in parallel with the Otic plane. Adopting the described technique, we delivered temporary composite restorations at the correct OVD occluding in a correct OP orientation, prior to make major interventions. This technique seems to be easy and accurate to the management of vertical dimension and the occlusal plane orientation.

Conclusion: The presented technique is easy to reproduce and requires simple devices.

Clinical Implications: Given the importance of the OP orientation in oral rehabilitation, a scientific method has been developed to identify, project and restore the OP of patients with severe dental wear, after initial TMD treatment and identification of a diagnostic position.
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ACCURACY AND REPRODUCIBILITY OF ABUTMENT POSITION IN INTRAORAL AND EXTRAORAL SCANNING

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Keywords: Intraoral scanner, Extraoral scanner, Accuracy

Purpose/Aim: Recently, dental treatments have been digitalized with advance of information technology. Particularly, optical impression by intraoral scanners is the focus of a lot of attention as a new method to reproduce and measure three-dimensional shapes of oral tissue. We examined the accuracy, including trueness and precision, of the intraoral scanners comparing with laboratory scanners to clarify the error level of intraoral scanners.

Materials and Methods: Measurements were performed using a computer numerical control coordinate measuring machine (CNCCMM) of the reference models as a control. Subsequently, four intraoral scanners (3M™ true definition scanner (TDS), 3Shape TRIOS3 Color (TR3) and extraoral scanners (KaVo Arctica(KA), Identica Hybrid(IH) were used to capture the abutment position, and trueness and precision of the distance error were assessed by image analyzing software.

Results: In intraoral scanners, the error values of accuracy tended to increase when the distance between ball abutments was extended. Moreover, Intraoral scanners, the error tended to increase as it went to the posterior molar area. The error values of accuracy did not change in the extraoral scanners. The accuracy measured by TDS and TR3 was larger than the one by KA and IH. With regard to reference model, there was a significant difference between in the accuracy measured by Intraoral scanners that measured by extraoral scanners.

Conclusions: The results of this study indicated that optical impression method with an intraoral scanner could be applied to the implant therapy for not only single tooth but also multiple teeth missing.

A RANDOMIZED CONTROLLED TRIAL OF TWO LITHIUM DISILICATE PARTIAL CROWNS: 3-YEAR RESULTS

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Keywords: clinical trials, dental prosthesis, dental restorations

Purpose/Aim: The aim of this trial was to evaluate two lithium disilicate systems under clinical conditions for three years.

Materials and Methods: Sixty patients in need for a posterior partial crown were selected for this study. The sample vital teeth restored and were randomly divided in two groups: Group 1 e.max press (Ivoclar)and Group 2 LiSi press (GC Co) and annually followed-up for 3 years. The preparation of the abutments was made following the need of patients, hybridization of dentin was made using proprietary adhesive systems (Adhese and G-Premio Bond) and impression were made using traditional impression material (Ex'llance, GC). In the lab, the samples were made strictly following the manufacturers' instructions. The crowns were silanized and then luted using MultiLink Sprint and LinkForce respectively. At the baseline and each follow-up, Ryge criteria (Interproximal contact, anatomic form, marginal adaptation, marginal stain, secondary caries, post-op sensitivity) were defined and collected. The Cox regression analysis was applied in order to assess the influence on failure rate of all clinical parameters. The level of significance was set at a= 0.05, and statistical calculations were handled with SPSS software (SPSS Inc., Chicago, IL, USA).

Results: All crowns revealed survival rates of 100% without any biological or technical complications. Success rate was 100% for Group 2 whilst in Group 1 one restoration showed an occlusal fracture after 3 years of clinical service (success rate of 97,5%). No statistically significant differences were found between the two Groups for any clinical parameter.

Conclusions: The results show that the two lithium disilicate systems have very good and reliable clinical performances. The two systems were statistically equivalent after 3 years of clinical service.

MINIMALLY INVASIVE TOOTH PREPARATION WITH CUSTOMIZED 3D PRINTED GUIDE IN DIGITAL CERAMIC VENEER RESTORATION

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Keywords: Minimally invasive teeth preparation, tooth preparation guide, esthetic restoration

Case Presentation: This clinical report describes a 3-dimensional(3D) printed tooth preparation guide in laminate ceramic veneer restoration of dental fluorosis. This patient presented severe dental fluorosis. Performed digital aesthetic analysis on digital model and completing digital waxing up. Took virtual preparation on original model and explored 4mm outside from the virtual preparatory body, combing with a splint, a customized preparation guide were completed. With this guide, the distance of dental bur under the guide were all 4mm when approaching designed depth. This case report showed that a severe dental fluorosis can be corrected under 3D printed digital unequal thickness preparation guide with masticatory exercises.

CORRELATION BETWEEN THE STEEPNESS OF THE ARTICULAR EMINENCE AND OCCURENCE OF ANTERIOR DISC DISPLACEMENT

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Purpose/Aim: -The term "temporomandibular disorders (TMD)" represents a cluster of assorted pain and dysfunction conditions in the masticatory system. These conditions have been recognized since the 1930s and have been given various names. The articular eminence is a part of the temporal bone on which the condylar process slides during mandibular movements and forms the anterior limit of glenoid fossa. The articular eminence inclination is de?ned as the angle formed by the articular eminence and the axis orbital plane. The normal value of this angle in adults has been reported to be 30°–60° Articular eminences having inclination values smaller than 30° have been characterized as ?at, whereas those having values greater than 60° have been characterized as steep. Some studies have provided data suggesting that steeper articular eminence is a predisposing factor for TMD, while other investigations failed to confirm this issue. Furthermore, there are some studies demonstrating that the healthy control group has a steeper slope than patients with TMD. There are

various diagnostic imaging techniques for the evaluation of temporomandibular joint (TMJ) structures. However, computerized tomography (CT) and cone beam computed tomography (CBCT) are the primary techniques of choice for optimal imaging of the osseous components.CBCT has a high dimensional accuracy in measuring maxillofacial structures including TMJ. But in all previous studies , the measurements were made on static images and there is a huge lack of mandibular dynamics. OBJECTIVE: - In this study we evaluated if there is a relation between the occurrence of anterior disc displacement and the steepness or inclination of the articular eminence during the mandibular dynamics.

Materials and Methods: STUDY DESIGN: - Descriptive observational study with retrospective and prospective model. Condylography (CADIAX 4 Gamma Dental Klosterneuburg, Austria) of 38 patients with reducible joint luxations visiting department of Prosthetic dentistry, University Dental Clinic, Vienna, were compared to 20 healthy individuals (students of the University Dental Clinic, Vienna) as control group.

Results: RESULTS: - Analysis of variance and FLEISS test, confirmed highly statistical significance
($P < .05$) at all 1 to 8 mm of excursive versus incursive movements compared to healthy patients

Conclusions: CONCLUSION:- This study demonstrated that there is a strong significance in the dynamics of mandibular kinematic. The steepness of articular eminence is one of the contributing factors. Rather that the difference between excursive and incursive movements is of much more importance and closely related to the synchronized smooth mandibular movement.The tracings were coinciding in healthy individuals as compared to patients with reducible joint luxation there is a separation and the clicking phenomenon between the tracings. Therefore in our diagnostic procedures we should emphasize on the significance of the dynamic Condylographic data and combine them with the static findings in early diagnosis and treatment planning.

EFFECTS OF AN INTRAORAL STENT ON SIDE EFFECTS OF RADIATION THERAPY

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Keywords: Radiotherapy, Mucositis, QoL

Purpose/Aim: to evaluate changes in frequency and severity of some adverse effects of radiation therapy (mucositis, xerostomia, disgeusia) in patients wearing a custom intraoral stent during radiotherapy for oral tumors and others that doesn't. The most common sequelae of radiotherapy (mucositis and xerostomia) compromise quality of life of patients and sometimes they cause interruption of radiotherapy and worsen prognosis of patients affected by oral tumors.

Materials and Methods: Thirty-nine patients treated for oral tumors (33 squamous cell carcinomas and 6 mucoepidermoid carcinomas) between January 2016 and January 2017 in the department of radiotherapy of Città della Salute e della Scienza (Molinette hospital, Turin, Italy) were enlisted for this study. Exclusion criteria were: prescribed dose higher than 70 Gy or lower than 60Gy, limited mouth opening.
After extraction of compromised teeth an intraoral stent was made. One year after completion of radiotherapy a dental visit was performed. Variables analyzed were: presence and severity of mucositis according to World Health Organization's Oral Toxicity Scale, presence of xerostomia and dysgeusia.

Results: Five patients died, four didn't give consent to experimentation, 15 patients used the device and 15 patients that couldn't wear it for absence of enough dental support served as controls.
No interruption or delay was caused by complication related to the stent during radiotherapy sessions.
Test subjects presented lower incidence and severity of mucositis ($P<0.01$; test group:20% grade 0, 40% grade 1, 26,7% grade 2, 13,3% grade 3; control group:6,7% grade 1, 26,7% grade 2; 53,3 grade 3; 13,3% grade 4) and lower prevalence of xerostomia ($P=0.06$; test group 40%; contol group 66,67%), disfagia ($P=0.04$; test group 53%, control group 60%) and disgeusia (test group 60%, control group 71%).

Conclusions: Lower incidence of mucositis and xerostomia is probably due to exclusion from radiation field of maxilla and parotid glands obtained by mandible new position due to the stent. Limitations of this study include small sample size, sample selection bias (there were not enough patients to exclude smokers, chronic pathologies, etc), so we do not know if there were any protective factors besides the oral stent that caused these improvements.
Intraoral custom stents were introduced to keep mouth opened during treatment. They reduce extent of healthy tissues exposed and they keep lower jaw and tongue in the same position during all sessions.
Evidence on their effectiveness is low as in reducing frequency of mucositis. In accordance with several previous studies we found that

the stent wasn’t able to effectively reduce mucositis prevalence but it was able to reduce severity of mucositis
Therefore, according to these results, we presume that a intraoral stent reduces the incidence of post-radiotherapy sequelae and their severity.of radiotreated patients for cervico-facial neoplasia

IN VITRO STUDY ON DIGITAL SPLINT EFFECT TO THE ACCURACY OF DIGITAL DENTAL IMPLANT IMPRESSION

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Keywords: intraoral scanning, digital splint, digital implant impression

Purpose/Aim: Since IOS devices can only capture part of the object at a time, images have to be stitched together to form a 3D object and therefore it is the source of possible errors of the scan. The aim of this in vitro study was to compare the trueness and precision of three different IOS scanning partially and fully edentulous models with 2 or 4 implants with attached scan bodies and digital splints.

Materials and Methods: Two types of maxilla models were printed with AsigaMax 3D printer. The first model was missing both premolars and molars on the right side, so Straumann BL dental implants were inserted instead first premolar (straight) and second molar (tilted 20°mesially). Four implants were inserted in the second edentulous model symmetrically at second incisors (straight) and first molar areas (tilted 20° mesially). Scan bodies were attached to the implants and models were scanned with Nikon Altera 10.7.6. coordinate measurement machine (CMM) to form a reference scan. DII was taken with a Primescan (version 5.0.1), CS 3600 (version 3.1.0), Trios3 (version 1.18.2.10) IOS ten times each (n=10) without digital splint. After that, tablets of hardened Fuji Plus cement was glued in edentulous areas to form digital splint and all models were scanned with three different IOS. Scanning data was exported in standard tessellation language format for analysis. All scans were aligned on the reference scan precisely by applying best-fit alignment procedure. Distance and angulation between scan bodies were measured aligning CAD models of scan bodies to the scanned surfaces of scan bodies.

Results: Trueness of distance and angle in Carestream partially edentulous models was 185 μm in the group with splint and 280 μm without one and 0.22° in the group with splint and 0.29° in the group without respectively. Precision of distance and angle measurements in the splint groups were 87 μm and 0.13°, in the groups without-202 μm and 0.25°. In fully edentulous models trueness of distance varied 53-106 μm in the groups with splint and 67-8μm in the groups without.
Trueness of Primescan in partially edentulous models with splints was 21μm and 0.16° in distance and angular measurements. Without splints-27μm and 0.21°. For fully edentulous models trueness and precision of distance and angle was better n groups with splint than without.
Trueness of distance and angle of Trios3 in partially edentulous splinted models was 15 μm and 0.3°;53μm and 0.11° in unsplinted models respectively. For fully edentulous splinted models trueness of distance and angle varied 32-122μm and 0.19-0.51°, for unsplinted models-17-80μm and 0.1-0.45°.

Conclusions: Primescan showed the best results of trueness and precision of distance and angle measurements. Since digital splints improve the accuracy of DII, the impact of their forms and materials should be more researched.

BRUXISM ASSESSMENT QUESTIONNAIRE: A NEW VALIDATED QUESTIONNAIRE FOR BRUXISM DIAGNOSIS

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Keywords: Bruxism, Diagnosis, Questionnaire

Purpose/Aim: To develop a diagnostic questionnaire for bruxism, particularly for screening purposes

Materials and Methods: The Bruxism Assessment Questionnaire (BAQ) is a self-report questionnaire developed in Portuguese from the literature, translated into English, composed of 13 items within 5 diagnostic areas, and with a maximum (23 points) and minimum scores (0). The questionnaire has been compared with a portable electromyographic diagnostic device (BiteStrip®), which has already been validated against polysomnography (gold standard). The questionnaire was applied in 50 university students (18-30 years, 81.6% women) in the Faculty of Dentistry. This study was approved by the Research Ethics Committee of the Pontifical Catholic University of Rio Grande do Sul (PUCRS), Brazil

Results: The results have shown that BAQ is moderately correlated with the BiteStrip® with acceptable diagnostic results: accuracy (68%), sensitivity (69%), specificity (66.7%), receiver operation characteristic (67.8%), positive predictive value (74.1%), negative predictive value (60.9%), diagnostic odds ratio (4.4), positive likelihood ratio (2.1) and negative likelihood ratio (0.5%)..

Conclusions: The BAQ can be considered a valid diagnostic method with a probable diagnosis for both sleep and awake bruxism..

DOES SELECTION OF POST AND CORE MATERIAL INFLUENCE THE FRACTURE STRENGTH OF ENDODONTICALLY TREATED TEETH?

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Keywords: Endodontically Treated Teeth, Fracture Strength, NPG Alloy

Purpose/Aim: In order to determine the influence of post and core material in fracture resistance of endodontically treated teeth , this Invitro study compared cast nickel–chromium alloy (Ni–Cr), cast non-precious gold alloy (NPG), one-piece custom-made zirconia post and cores and fiber-composite post systems in premolars under all-ceramic crowns.

Materials and Methods: A total of 48 extracted human mandibular premolars, subjected to standard endodontic treatment, were divided to four groups (n=12) and treated with post and cores with the following materials: cast Ni–Cr and NPG post-and-core, one-piece custom-milled zirconia post-and-core, and prefabricated fiber-glass post with composite resin core. After restoring each specimen with a zirconia all-ceramic crown, they were loaded to failure via a universal testing machine at a cross-head speed of 0.5 mm/min, at an angle of 45 degrees to the long axis of the roots. Fracture resistance and modes of failure were analyzed. The significance of the results was assessed using analysis of variance (ANOVA) and Tukey honest significance difference (HSD) tests (?=0.05).

Results: Fiber-glass posts with composite cores showed the highest fracture resistance values (915.70±323 N), and the zirconia post system the lowest (435.34 ± 220 N). The differences among the groups were only statistically significant for the zirconia group ($p<0.05$).

Conclusions: The present study failed to demonstrate any statistically significant differences among the experimental post and cores material systems used to restore endodontically treated premolars, except for one piece zirconia post-and-core systems. Moreover, catastrophic and non-restorable fractures were more prevalent in teeth restored by zirconia posts.

RNA-SEQ ANALYSIS OF RBMMSCS ON TIO2 NANOTUBE ARRAYS

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Keywords: RNA-seq, TiO2 nanotubes

Purpose/Aim: To investigate genomic data of SD rats` bone marrow mesenchymal stem cells on TiO2 nanotube arrays

Materials and Methods: TiO2 nanotube arrays with a diameter of 70 nm were fabricated via anodization of titanium sheets at 20 V and 2 h. rBMMSCs were seeded on unmodified titanium sheets (Control group) and TiO2 nanotube arrays (NT group) for 24 h. The Hiseq X

ten platform (Illumina) was applied to acquire genomic data. The cytoskeleton was recorded via a fluorescent assay.

Results: The genomic profiling revealed that NT led to the transcriptional activation of genes encoding cytoskeletal proteins. And it was confirmed by a fluorescent assay staining F-actin and ?-tubulin proteins.

Conclusions: The micromorphological modification of TiO2 nanotube arrays may enhance MSCs` stiffness, which in a long-term may alter its differentiational trends and lead to its osteogenic effect.

EVALUATING THE COLOR STABILITY OF VARIOUS DENTURE LINERS: COMPARISION OF CIE AND CIEDE 2000 FORMULAS

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Keywords: soft denture liner, color stability, CIEDE2000

Purpose/Aim: The purpose of this study was to evaluate the effect of three herbal teas (black tea, rosehip tea, green tea) on the color stability of three soft denture liners.

Materials and Methods: 3 soft liner materials; Trusoft, Viscogel and Hydrocast were used for this study. 40 specimens per each soft liner material totally 120 specimens were prepared in dimensions of 10 mm diameter and 2 mm thickness. Specimens of each denture material were divided in to three subgroups (n=10) and then stored in one of following solutions for 14 days; distilled water, black tea, rosehip tea, green tea. Storage solutions were renewed daily. Color coordinates of each specimen was determined before and after storing in solutions by using a spectrophotometer. Color differences were calculated according to both CIE and CIEDE 2000 formulas. Two way Anova was performed to analyse the obtained data. LSD test was used to determine the difference of means, and $p < 0.05$ was considered to be statistically significant. Correlation of CIE and CIEDE 2000 formulas were evaluated by Pearson Correlation test.

Results: Statistically significant differences were observed beween the solutions ($F= 3.49$, $p=0,018$) and soft liner materials($F=50.82$, $p<0,001$). The interaction between the solutions and soft liners also revealed statistically significant difference ($F=4.81$, $p<0,001$). Correlation was observed between CIE and CIEDE 2000 formulas.

Conclusions: Herbal teas can effect the color stability of the soft liner materials. CIE and CIEDE 2000 formulas shows similar results when evaluating color stability of soft liners.

FUNCTIONAL AND ESTHETIC REHABILITATION OF A YOUNG PATIENT WITH AMELOGENESIS IMPERFECTA

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Keywords: amelogenesisimperfecta, oralrehabilitation, fullceramiccrown

Case Presentation:
Background: Amelogenesis Imperfecta (AI) is a hereditary disorder of enamel formation which affects the primary and permanent dentition. AI may present a variety of clinical forms and appearances, but its main characteristics are related to the loss of tooth structure, esthetic concerns, and dental sensitivity. This case report represents the treatment planning and oral rehabilitation procedures of a young patient with AI.

Case Report: 20 years old female patient was referred to Gazi University Faculty of Dentistry Department of Prosthodontics with the chief complaint of dental sensitivity and esthetic concerns associated with brown discoloration on her teeth. Medical, oral and radiological examinations showed occlusal and proximal surface wear and as a result dentin exposure, tooth loss, short clinic crowns especially on the posterior region, lack radiographic opacity caused by deficiency in the mineral content of the enamel layer. In the direction of both the patient's requests and clinical examinations full zirconium dioxide ceramic restorations were planned except the second molar teeth for protecting the present vertical occlusal dimension. Then gingivectomy procedures were done to increase the clinic crown length and teeth preparations were completed with the circumferential chamfer margins. Instantly acrylic temporary prostheses

were prepared from CAD-CAM acrylic resin blocks by using 3D printer for the purpose of soft tissue healing. A zirconia bridge framework was designed for maxillary posterior region because of the loss of second premolar. Single zirconia copings were designed for the remaining restorations to obtain optimal esthetics. Following the control of zirconia frameworks conventional layering was performed. All intraoral adjustments were done and restorations were cemented with self-adhesive resin cement. The patient was followed at 1 and 3 months, acknowledged about the importance of oral hygiene and the patient was pleased with the treatment result.

Discussion: Oral rehabilitation of a patient with AI is a challenge for the clinician. The treatment options vary considerably, depending mainly on the patient's age, AI type, disorder severity, and intraoral situation. Zirconium-oxide based ceramics are biocompatible restorations having acceptable mechanical and esthetic properties. As in this case, oral rehabilitation by using zirconia crowns and bridges can be acceptable and satisfied for both patient and clinician.

Conclusion: Young patients with esthetically compromised teeth usually have low self-confidence that often impacts their psychosocial health. In cases where the esthetics and function of teeth have been compromised as a result of amelogenesis imperfecta, treatment planning, the choice of restorative material are essential to achieve a satisfactory esthetic and functional result. Zirconia restorations can be suitable treatment option to obtain esthetic and function in such cases.
Clinical Implications. Use of zirconia restorations for the oral rehabilitation amelogenesis imperfecta patients provides function with acceptable esthetics.

OCCLUSAL FORCE PREDICT DECLINE IN COGNITIVE FUNCTION IN 3-YEAR

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Keywords: Occlusal force, Cognitive function

Purpose/Aim: Dementia is a growing health problem for countries with aging populations. Few effective treatments are available for dementia, and there is increasing interest in oral function as a modifiable risk factor in interventions to prevent cognitive decline. However, most of those studies were done by cross-sectional design. Therefore, this study aimed to investigate the impact of occlusal force on the decline of cognitive function over 3-year among Japanese people aged 70 and 80 years.

Materials and Methods: Participants were community-dwelling older adults who participated in baseline and follow-up surveys (n=1204: at baseline 69-71 years n=634; 79-81 years, n=570). Dental examinations including number of teeth, number of teeth with a periodontal pocket depth of 4 mm or more, and occlusal force were conducted by registered dentists. Cognitive function was assessed using the Japanese version of the Montreal Cognitive Assessment. Socioeconomic factors, medical history, drinking and smoking habits, physical performance, genetic factors, and C-reactive protein concentration in blood were examined. A generalized estimating equation (GEE) was used to examine how occlusal force at baseline influenced cognitive decline over 3-year. Missing values of factors were supplemented by multiple substitution method. P-values< 0.05 were considered as statistically significance.

Results: The median of MoCA-J score and occlusal force at baseline were 23.0 (points) and 383 (N). The GEE showed that occlusal force was associated with better cognitive function (non-standardized coefficient: B=0.084, p=0.019); participants who had 100 N more occlusal force than other participants had a MoCA-J score that was higher by 0.084 points at follow-up. The interaction of occlusal force and elapsed years was significant (B=0.058, p=0.031); for participants who had 100 N less occlusal force, the MoCA-J score decreased by 0.058 points in 3-year.

Conclusions: Occlusal force had a protective impact on the incidence of cognitive decline over the subsequent 3-year in Japanese older adults aged 70 and 80 years, after adjusting for possible risk factors.

EFFECT OF PRIMING AGENTS ON SHEAR BOND STRENGTH OF IPN FIBRE-REINFORCED-COMPOSITE

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Keywords: fibre-reinforced-composite, shear bond strength

Purpose/Aim: The purpose of this study was to evaluate the effect of surface treatments on bond strength of UDMA-based fibre-reiforced-composite (FRC) with interpenetrating-polymer-network (IPN).

Materials and Methods: Materials used in this study are based on urethanedimethacrylate (UDMA, Esschem) cross-linking monomer with diluting monomer of methylmethacrylate (MMA, Sigma) in ratio of 90:10 with photocuring initiator/activator of 0.7wt% camphorquinone and DMAEMA. IPN-forming polymer of IPN was PMMA or PMMA-copolymer. Prepared UDMA/MMA based resin was used for six main groups according to different quantities of IPN-forming polymer. PMMA (0.5%, 2%, 5%) and PMMA-copolymer (0.5%, 2%) were added to each group of UDMA-MMA based resin. Control group did not contain IPN polymer. Resin systems were used to impregnate silanated continuous unidirectional S2 and E glass fibres (tex2400, Owens Corning), and light cured to use as bonding substrate. Ceramic Primer 2 (CeP, GC) and Composite Primer (CoP, GC) were used for surface treatment of specimens of FRC. Application time for primer CeP and CoP was 5min, and CoP specimen was then light cured (Eliper, 3M) for 20s. No surface priming (NP) group was also prepared. Composite resin (GradiaCore, GC) was filled to plastic mold (3.6mm diameter and 2mm height) on the FRC specimens, and light cured for 40s. The mold was removed and all specimens (total 360, n=10/group) were stored in distilled water at 37? for 24 hours. After this process, specimen of shear bond strength (SBS) test was fixed to mounting jig of universal testing machine and load was applied at crosshead-speed of 1.0mm/min. The results were analyzed by two-way ANOVA ($p<0.01$).

Results: For S2-glass-FRC, maximum mean SBS was 23.31 MPa (2% PMMA-copolymer) and minimum one was 17.46 MPa (0.5% PMMA). For E-glass-FRC, maximum mean SBS was 28.09 MPa (0.5% PMMA-copolymer) and minimum one was 15.70 MPa (2% PMMA). ANOVA showed that there were significant differences of using priming agents: NP/CeP ($p<0.01$) and NP/CoP ($p<0.01$) in both of S2-and E-glass-FRC groups. By increased quantities of PMMA to matrix resin, SBS of all tested groups increased in S2-glass-FRC.

Conclusions: This study showed that increasing of IPN component with fibre-reinforcement effectively increased bonding strength when using both priming agents. However, the increased quantities of PMMA-copolymer were not influenced on the increasing of bonding strength in the same primer.

LONG-TERM PERFORMANCE OF ELECTROFORMING TELESCOPIC DOUBLE CROWN REMOVABLE PROSTHESES

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Keywords: Electroforming, Telescopic double crown, Implant removable prosthesis

Purpose/Aim: We report the clinical evaluation of electroforming telescopic double crown removable prostheses (EF-RP), consisting of implants and natural teeth (Group II) and EF-RP consisting of implants only (Group I).

Materials and Methods: Subjects were 286 implants of patients who received EF-RP (mean age: 63 years, 23 males and 34 females, 32 cases involving the maxilla and 25 cases involving the mandible): 20 patients in a mixed group with implants and natural teeth in whom electroforming telescopic double crown removable prostheses were supported by inner caps placed on 41 natural tooth abutments and 95 implant abutment inner caps, and 37 patients in an implant-supported group in whom electroforming telescopic double crown removable prostheses were supported only by 191 implant abutment inner caps. The Kaplan-Meier method was performed for these patients to evaluate complications of implant superstractures and natural teeth.

Results: During a mean follow-up period of 6.3 years (maximum, 16 years), superstructures became unrepairable in only 1 patient in Group II. The technical complication rates were 80% and 86.5% in Groups II and I, respectively. As complications, artificial tooth chipping and frame fracture were frequently observed, and tended to concentrate in 1 patient in Group II. The cumulative survival rate analyzed using the Kaplan-Meier method changed between 80 and 89% until the 11th year of follow up in both groups, but decreased thereafter, resulting in less than 50% in Group II. However, the log-rank test and generalized Wilcoxon test revealed no significant differences between the two groups.

Conclusions: The superstructures of implant-supported or mixed implant-natural tooth supported EF-RPD are removable and reliable. Unless the frame completely fractures, complications can be managed by simple repair. In terms of the running cost, treatment time, and the mean age of patients, these implant superstructures can be an option in elderly people.

COMBINING CONVENTIONAL IMPRESSIONS AND INTRAORAL SCANS FOR THE MANAGEMENT OF FLABBY TISSUE

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Keywords: flabby tissue, mucostatic impression, intraoral scanning

Case Presentation: The conventional method for impressions of flabby tissue uses modified trays and highly flowable materials, but mucostatic impressions are difficult to acheive due to the viscous and the elastic natures of impression materials. In this report, a technique in which conventional impression and intraoral scanning for fully edentulous patient with flabby tissue are combined. The definitive impression was obtained by applying appropriate pressure to each tissue area, and the denture can be maintained passively and stable at rest and during function.

REPEATED FRACTURES OF THE FIXED IMPLANT-SUPPORTED METAL-ACRYLIC PROSTHESES: A CASE REPORT

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Keywords: Repeated Fractures, Metal-acrylic, Implant-supported

Case Presentation: Background: Dental implants are a predictable treatment option for patients with complete?or partial edentulism. Implant success rate is high. However, prosthetic complications are frequent. One of the most common prosthetic complications with fixed full-arch implant-supported prostheses is fracture of the veneering material including acrylic.

Objectives: To describe and explain prosthodontic management of a patient with history of repeated fractures of fixed implant-supported metal-acrylic prostheses, and to review the benefits and limitations of different restorative materials.

Clinical Scenario: 60 year-old ASA II male presented seeking solution for repeated fractures of fixed implant-supported prostheses. The patient was completely edentulous in the maxilla and mandible and was restored with definitive implant-supported fixed full-arch metal-acrylic prostheses. The occlusal interface did not have optimal contact distribution and nightguard was not worn consistently. The patient had a history of significant wear of his original dentition and a history of multiple acrylic fractures of provisional fixed prostheses. Night-time bruxism was strongly suspected. Repairs were completed and occlusion adjustments were performed to achieve optimal occlusal contact and force distribution. The patient was educated in the force-medicated nature of the fractures and encouraged to use a nightguard. The patient's definitive treatment plan involves transition to a zirconia-based prosthesis design with the optimized metal-acrylic prosthesis design as the prototype.

Discussion: The risk factors causing the resin-related complications were extensively discussed in the 5-year report; briefly, mechanical factors such as occlusal load, force direction, and option of the restorative material play a major role. In this case, the etiologies for repeated fractures of acrylic portion of the prosthesis were identified as extensive occlusal force, suboptimal occlusion scheme of restorations, and inadequate material strength. Management of a patient with repeated fractures has to focus on eliminating or controlling etiologies, addressing the patient's chief complaint, and preventing further complications.

HIGH-PERFORMANCE THERAPEUTIC RESVERATROL-DOPED

ADHESIVE FOR ADHESIVE-DENTIN INTERFACES

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Keywords: resveratrol, dentin, adhesive

Purpose/Aim: Contemporary dentin adhesives should be modified to treat secondary caries and prevent the degradation of adhesive–dentin interfaces. The purpose of this study is to develop a versatile therapeutic adhesive by incorporating resveratrol, which is a naturally derived plant extract, into a commercial adhesive.

Materials and Methods: Resveratrol was dissolved in Scotchbond Universal adhesive at three concentrations (0.1, 1 and 10 mg/mL) to prepare experimental groups, an unmodified adhesive served as a control. After bonding and composite building, the microtensile bond strength (MTBS), failure modes and interfacial nanoleakage were separately determined after 24 h water storage, or 10,000 runs of thermocycling, or collagenase aging. The antibacterial ability on Streptococcus mutans biofilm, conversion degree, in situ zymography, and cytotoxicity were also evaluated.

Results: Results showed that the resveratrol-doped adhesive (10mg/mL) preserved its bonding properties against thermocycling and collagenase aging. The fracture frequency of cohesive failure in dentin decreased, efficient bonding interface sealing ability, matrix metalloproteinase inhibition and acceptable biocompatibility were also achieved. The staining of living/dead bacteria suggested that the formation of bacterial biofilm was obviously inhibited.

Conclusions: Resveratrol can be used as a simple, safe and workable ingredient for dentin adhesive modification, the resveratrol-doped adhesive has great potential for the extension of the service life of restorations.

EVALUATION THE STRAIN DISTRIBUTION BETWEEN MILLED, 3D PRINTING AND CONVENTIONAL DENTURE BASE

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Keywords: Maxillary denture base, Milled denture, 3D printing denture

Purpose/Aim: The purpose of this in vitro study was evaluation of strain distribution between denture base which were fabricated by different materials (I.e. conventional (pack and press), milling and 3D printing) after loading.

Materials and Methods: A PMMA resin edentulous maxillary model was fabricated with 2mm artificial gingiva (Monopren, Kettenbach) to simulate the oral mucosa. The following six different resin materiasl were used to fabricate testing denture bases on the edentulous model. Conventionally heat-cured (1) pack (Luciton 199, Dentsply, n=5) and (2) press (IvoBase, Ivoclar Vivadent, n=5) PMMA resin. Two kinds of CAD/CAM milled PMMA resin block [(3) Bilkim, n=5]; [(4) Yamahachi, n=5] and 3D printing by digital light processing [(5) BV-005, Miicraft, n=5]; [(6) Base, Nextdent, n=5]. Seven Strain gauges (KFG series Foil gauge, Kyowa) were then attached on the labial notch (Ch1) , 1st premolar(Ch2, Ch4), post-dam(Ch3) across denture midline and left buccal notch (Ch5), ridge crest around 1st premolar(Ch6) and tuberosity(Ch7) on each testing denture base. A static 50N axial load was applied with even contact on the reference point for 3 times on each specimen.

Results: In Ch1 to Ch3, compressive strain was observed in the group of conventional and milled denture base. Highest strain was shown in the Ch3 with decreasing tendency from posterior to Anterior. However, both 3D printing material present tensile strains without significant difference between Ch1 to Ch3. 3D printing group presented compressive strain in Ch4, while tensile strain was observed in conventional and CAD/CAM group. In Ch5 and Ch6, all specimen presented compressive strain without significant difference between six materials. Tensile strain could be observed in Ch7, and CAD/CAM group shows the lowest strains. Two specimens were fractured in the Ch1 when loading on BV005 group. When compare with conventional and milled groups, the performance of strain distribution were divergent in 3D printing group.

Conclusions: Within the limitation of the study, the conclusions were (1) CAD/CAM milled denture base had the identical strain distribution with conventional denture base under loading. (2) The strain distribution under loading in 3D printing denture bases were divergent and unpredictable

REPRODUCIBILITY OF SCANNED 4 SILICONE IMPRESSIONS

VIA A LABORATORY SCANNER

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Keywords: CAD/CAM, Impression Material, Dental scanner

Purpose/Aim: The development of digital technique made it possible to fabricate various types of dental prostheses through Computer aided design / Computer aided manufacturing (CAD/CAM) system, such as crown, bridge, and post and core. There are 3 techniques for scanning the post space with the CAD/CAM system as follows; direct scanning (DS), scanning of impression (IS), and scanning of a plaster model (PS). It was reported that the DS and PS were not suitable for the post space over 10 mm deep due to the depth of focus of scanner. Therefore, the reproducibility of IS was investigated for fabricating the post and core through the CAD/CAM system. In this study, the data of scanned 4 silicone impressions were compared, to reveal the influence of impression material on the scanning accuracy and precision.

Materials and Methods: Step Master SERIES516-499 (Mitsutoyo) was recruited as a master model. Step Master is a gauge providing 4 small increments in height (steps) constructed from an assembly of 5 highly accurate ceramic blocks. The impressions of Step Master were made with 4 silicone impression materials; Imprinsis (blue), Fusion II (pink), Fit Checker (white), and Imprint (yellow). The impressions were scanned with a laboratory scanner (D900). Scanned data was saved as Standard Triangulated Language (STL) file. The points of inquiry were as follows; 1. Advisability of 3D reconstruction, 2. Reproducibility of surface level, 3. Detectability of micro-step. A Tukey HSD test was performed to compare the surface level and among the 4 impressions, and to evaluate the differential of step levels in same impression. Statistical analysis was performed with IBM SPSS Statistics Ver.22 with a significance level set at $p<0.05$.

Results: The scanned data of Imprint could not reconstruct to 3D model. The reproducibility of surface level and the detectability of micro-step in the Fusion II were significantly better than in other impression materials. The D900 uses blue light to improve the accuracy. It was suggested that the decrease of scan accuracy in the Imprint was due to the material color.

Conclusions: Within the limitations of this study, it was suggested that the impression material influences to the scanning accuracy and precision.

DIGITAL AESTHETIC PREVIEW FOR EDENTULOUS PATIENTS. A CASE REPORT

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Case Presentation: Background. To evaluate the use of dental digital aesthetic smile design preview softwares for edentulous patients.

Technique. Case report. I.E., a female 57 years old patient, bimaxillary edentulous, with a satisfactory general status, according to her age, unsatisfied because of the aesthetics of her complete dentures, especially the form and size of her maxillary front teeth. The clinical technical steps for the new dentures were strictly followed, introducing the new aesthetic preview software during the intermaxillary relationship determination phase. Photos of the patient with the maxillary occlusal rim were taken and uploaded in the software. Visagismile application was chosen, due to complex association of facial and the patient? s personality data. All the steps required by the app were performed, including the facial map and personality test, which establishes the patient's temperament and appropriate teeth design.

Discussions. The software generated the ideal digital aesthetic template of the size, form and colour of the anterior teeth. This image was presented to the patient, who could better figure and validate the aesthetic outcome of the treatment. The new dentures reproduce the aesthetic aspect of the frontal maxillary teeth suggested by the app and approved by the patient.

Conclusions. Digital aesthetic applications can be a very useful instrument not only for dentate, but for edentulous too, helping also the dentist and the dental technician in their work. Further development and studies on this software applications will be useful in full edentulous patient treatment, both in conventional and implant overdenture.

Clinical Implications. The patient becomes the co projector of his own smile, being involved more than in the classic techniques. Adding confort and confidence through therapy, improving aesthetic results.

THE ORAL HEALTH-RELATED QUALITY OF LIFE IN PATIENTS

TREATED WITH IMPLANT PROSTHESES

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Purpose/Aim: Patient-based outcomes have been used as a popular method of evaluating treatments. The aim of this study was to assess oral health related quality of life (OHRQoL) in patients with implant treatment.

Materials and Methods: This study consists a total of 150 patients, who had been treated with implant at Istanbul University Dental Faculty Department of Prosthodontics and wearing implant supported fixed or removable prosthesis at least 3 months, Data on socio demographics and prosthetic status were gathered by interview and examination. OHRQoL was evaluated using the Geriatric Oral Health Assessment Index (GOHAI) and Oral Health Impact profile (OHIP 14). The data were analyzed using IBM SPSS Statistics for Windows, Version 21.0.

Results: According to results, 55.4 % of patients were female and 44.6% were male, 36% were older than 60 years old. The mean age was 52,76 ± 13,64. Of the participants, 28% were primary school graduates, 19% were secondary school graduates, 20% were high school graduates and 33% were university graduates. Seventy six percent of patients had fixed prosthesis and 24% of patients had removable prostheses. OHRQoL indexes were evaluated in three dimensions: physical (biting/chewing, speech, and swallowing), psychological/behavioural (care of oral health, dissatisfaction with appearance, oral health self-conscience, and avoidance of social contacts because of dental problems), and pain or discomfort. The result obtained in this study shows dissatisfaction with implant prosheses among female patients. Patients with implant prostheses in both jaw were less satisfied than patients with single maxillary implant prostheses. The most prevalently affected dimension was “functional limitation”, followed by “psychological discomfort” and “physical pain”

Conclusions: Oral health-related quality of life of is associated with socio demographics and prosthetic status. The functional limitation, the psychological dissatisfaction and physical pain are important factors for patients with implant treatment.

IMPLANT-SUPPORTED OVERDENTURE TREATMENT COMPLICATIONS

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Purpose/Aim: Today implant-supported overdenture is a common treatment option for fully edentulous patients. Besides having advantages like slowing alveolar resorption, improving stability-retention of prosthesis, improving chewing function and supporting patient psychology implant-supported overdenture also has some mechanical complications. The purpose of this study is to determine the mechanical complications of implant supported overdenture and the relationship between demographic/prosthetic data’s and mechanical complications.

Materials and Methods: A hundred patients complaining about their implant supported overdenture in the Faculty of Dentistry of Istanbul University were asked to join our research. Every patients had taken consent form with signature. With the help of questions prepared before, patient’s personal information, patient’s prostheses information and complications have been noted. These reports have been statistically analyzed by using SPSS software.

Results: The patients who have took part in our research is 57% female and 43% male. The average of the patient’s age is 62,720±10, 66. All of the prostheses in the mandibular area and %75 have 2 implants. %48 of patients have ball attachment which is most widely encountered type of the attachment. The useful life of prostheses is in the average of 3, 65±2, 75 years. Total of 244 implants have been examined. Eighty five percent of prostheses has acrylic denture base. Opposing jaw with the percentage of 59 has complete denture.

Conclusions: Mechanical complications associated with implant-supported removable overdentures are loss of retention of attachment systems, the need to replace retention elements and to reline or repair the resin portion of the denture, and implant fracture.

COMPLICATIONS OF IMMEDIATE LOADING OF TWO-IMPLANT

MANDIBULAR OVERDENTURES: 5-YEAR PROSPECTIVE STUDY

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Keywords: two Implant over denture, immediate loading, complication

Purpose/Aim: The purpose of this study was to treat the mandibular edentulous patients by immediate loading of two-implant overdentures with surgical guided flapless surgery and evaluate the implant survival rate, marginal bone loss, and complications at 5-year follow-up after surgery.

Materials and Methods: Nineteen patients who had edentulous mandible with a mean age of 69.8 years (range, 60 to 85 years) at Dental Hospital, Tokyo Medical and Dental University enrolled in this study. A newly fabricated complete denture was used for radiographic guides. The computer planning followed the design procedure, and the surgical guide was fabricated for each patient. Flapless surgery was performed with this surgical guide, and two implants were placed in canine positions. At the same day as the operation day, a removable overdenture supported by two ball attachments was delivered. The survival of each implant was evaluated clinically and radiographically. The panoramic radiographs were taken immediately after surgery and at 1, 2, 3, 4 and 5 years after placement for the record of the marginal bone loss. In addition, biological and mechanical complications were recorded during the observation period. The Tukey HSD post-hoc test was used to evaluate changes in the marginal bone loss (?=0.05).

Results: Five patients including two patients with one failed implant dropped out prior to completion of the study. The failed implants were included in the evaluation of cumulative implant survival. The cumulative implant survival rate at 5 years was 94.7% (36/38). The marginal bone was decreased from the baseline with time. There was no significant difference between mesial bone loss and distal bone loss in 5 years follow-up. During the observation period, the biological and mechanical complications were observed and they included the following items: loosening/ elimination/ fracture of gold cap (39%); build up of plaque/ calculus (18%); gingival inflammation/ hyperplasia (16%); abrasion/ loosening of abutment (12%); fracture of overdenture (12%); decreasing retention of overdenture (3%); implant loss (1%).

Conclusions: In this 5-year prospective study, the immediate loading of two-implants mandibular overdentures with ball attachments resulted in favorable implant survival. The most frequent complication was related to the gold cap.

SPEECH IMPROVEMENT USING PALATAL LIFT PROSTHESIS IN MYOPATHY PATIENTS

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Keywords: palatal lift, velopharyngeal incompetence, myopathy

Case Presentation Background:
Palatal lift prosthesis was first proposed by Gibbons and Bloomer in 1958. This device is used to improve the pronunciation of patients with velopharyngeal incompetence. Velopharyngeal incompetence is an anatomical problem. It does not separate the nasal cavity from the oral cavity due to nerve and muscle function of soft palate and pharynx. It is distinguished from the velopharyngeal insufficiency caused by anatomical problems. If velopharyngeal closure fails when speaking, the sound exits simultaneously through the nose and mouth. It makes nasal sound. Palatal lift prosthesis lifts the soft palate of patients with velopharyngeal incompetence to help the velopharyngeal closure and improves pronunciation by reducing nasalance in patients with hypernasality.

Technique/Case Report: Case I:A patient, 47-year man with myopathy and bulbar palsy diagnosed in 2012, was referred from the department of rehabilitation medicine. At first visit, drooping of lip and overall muscle tension drop was visible. In intra oral examination, soft palate had been seen downward position due to insufficient muscle tension. Provisional prosthesis was fabricated with posterior wire insertion in purpose of control soft palate elevation. After nasometry check, definitive prosthesis was fabricated and delivered. Nasopharyngeal endoscopic examination revealed the improvement in velopharyngeal incompetence.

Case II: A patient, 36-Year man with myopathy diagnosed in 2014, had visited with drooping of eye lids and overall muscle tension drop was visible. With intra oral examination, soft palate had been seen downward position due to insufficient muscle tension. The palatal lift device was fabricated and delivered to patient. This device design was based on Greene et al. proposed in 2014. After nasometry check, pronounced decrease in hypernasality at ‘A’ ‘U’ ‘Ya’ vowel.

Discussion: Both cases were addressed with speech disorders due to muscular dystrophy and treated with a palatal lift prosthesis. The

first case showed a pronounced improvement in pronunciation by nasometry, but the second case was relatively less improved. Nasopharyngeal endoscopic examination revealed that the second patient had a significant reduction in function of surrounding muscles of the palate. In order for the device to be effective, help from the surrounding muscles is essential. Surgery is not indicated because the patient's muscular disease is a progressive one. Prosthetic devices had a good retention, we decided to check regularly the current devices through periodic re-visit.

Conclusion: Palatal lift prostheses were delivered to two myopathy patients with velopharyngeal incompetence. Nasometry was used to confirm the reduction of nasal sound and improvement of pronunciation. In addition, nasal endoscopy confirmed the improvement of velopharyngeal closure.

Clinical Implications:Palatal lift prostheses can help patients who have velopharyngeal incompetence to improve pronunciation.

KNOWLEDGE OF REMOVABLE PARTIAL DENTURE DESIGN AMONG DENTISTS, DENTAL TECHNICIANS AND STUDENTS IN TURKEY

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Keywords: removable partial denture, removable partial denture design, removable prosthodontics

Purpose/Aim: The current study was conducted to investigate the knowledge of dental technicians, general dental practitioners and dental students regarding to removable partial denture design.

Materials and Methods: A total of 100 participants including general dental practitioners, prosthodontics postgraduate students, fourth grade undergraduate dentistry students, fifth grade undergraduate dentistry students and dental technicians were included in the study. The participants were asked to examine eight different partially edentulous clinic scenarios on the prepared forms. The participants then designed the RPD framework design on prepared forms of the partially edentulous arches. The accuracy of the major connectors, indirect retainer, rest and clasp designing were evaluated by two experienced academicians.

Results: Concerning the planning of clasp number, localization and type, there was statistically significant difference among the participants ($p<0.05$) both on upper and lower partially edentulous clinic scenarios except planning of the type of clasp on upper jaw ($p=0.153$). Concerning the major connector design there was statistically significant difference both on upper and lower jaws ($p<0.05$). Concerning the planning of rest number, localization and design, there was statistically significant difference among the participants ($p<0.05$) both on upper and lower jaws except localization of the occlusal rest on upper jaw ($p= 0.211$) and design of the occlusal rest on lower jaw ($p= 0.987$). Concerning the indirect retainer design there was statistically significant difference among the participants both on upper and lower jaws ($p<0.05$).

Conclusions: Dental technicians were found to be successful in planning the major connectors and clasps but were inadequate to planning indirect retainers and rests. It is recommended that the removable partial denture design should be performed by dentist and

dental technician together and more importance should be given to removable partial denture design in dental education.

A STEM CELL-LADEN PHOTOCROSSLINKABLE ADHESIVE HYDROGEL FOR TREATMENT OF PERI-IMPLANTITIS

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Purpose/Aim: Peri-implantitis is one of the most common inflammatory complications in craniofacial implantology. Similar to periodontitis, in peri-implantitis, destructive inflammatory changes take place in the tissues surrounding a dental implant. Currently, there is a lack of effective therapy to treatment peri-implantitis. Mesenchymal stem cells (MSCs) (e.g. gingival mesenchymal stem cells (GMSCs)) present an advantageous therapeutic option for bone tissue engineering. The major drawbacks of the current cell-laden biomaterials for bone tissue engineering are low adhesion to the surrounding tissues, lack of suitable mechanical strength, fast/uncontrolled degradation rate, and absence of osteoconductivity. Therefore, the purpose of this study was to develop an adhesive osteoconductive hydrogel system for human GMSCs delivery for guided bone regeneration around ailing dental implants.

Materials and Methods: An adhesive photocrosslinkable dopamine-modified alginate hydrogel containing hydroxyapatite microparticles (HAMPs) was synthesized and characterized. The in vitro cytocompatibility and ex vivo adhesive properties of the engineered adhesives were evaluated. Moreover, we assessed the in vitro osteogenic differentiation of encapsulated GMSCs in the adhesive hydrogel. A rat biofilm mediated osteolytic infection (BMOI) implant model was utilized to evaluate in vivo functionality of GMSCs-laden adhesive hydrogel for bone tissue regeneration. Titanium mini screws (Ace) were inoculated with Aa in vitro and were placed in the maxilla of rats (n=5 for each group). Three weeks post-surgery GMSC-laden adhesive hydrogel delivery system were injected around the periphery of implants and photopolymerized. Sterile implants were used as positive control while Aa inoculated implants with no treatment were used as negative ones. Eight weeks post-treatment animals were sacrificed and ?- CT analysis was used to examine the amount of bone volume around the implants.

Results: Our NMR data confirmed that we have successfully synthesized the adhesive hydrogel delivery system with shear thinning properties. Moreover, our results showed that our adhesive hydrogels had favorable mechanical properties and strongly adhered to native craniofacial tissues/ Titanium substrate with adhesion strength higher than that of a commercially available adhesive. Also, our in vitro osteoinduction assay confirmed high osteo-differentiation of encapsulated GMSCs within engineered bioadhesive. Micro-CT analysis of our animal data confirmed the bone regenerative potential of the stem cell-laden photocrosslinkable adhesive hydrogel around ailing dental implants, while all the implants in the negative control group failed.

Conclusions: An adhesive photocrosslinkable dopamine-modified alginate hydrogel containing hydroxyapatite microparticles (HAMPs) as a delivery vehicle for GMSCs is a promising candidate for the treatment of peri-implantitis. The delivery system is injectable, biodegradable and osteoconductive.

TUNABLE NANOLAYERED TITANIUM DENTAL IMPLANTS COATINGS FOR ENHANCED OSSEOINTEGRATION

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Purpose/Aim: Dental implants have evolved into a routine and reliable method of replacing teeth for completely or partially edentulous patients. A major clinical issue that limits the success of dental implants is failure due to suboptimal integration with the host tissue. Surface modifications of titanium dental implants have been assessed to improve osseointegration. The purpose of this study was to develop a tunable polydopamine (PDA) modified multi nano-layered Ti implant surface growth factor with a releasing capacity to promote bone regeneration at the implant surface, enhancing osseointegration.

Materials and Methods: The surface of titanium disks were coated with PDA. A layer-by-layer (LBL) assembly approach was used to deposit a polymer-based multilayered coating based on Poly (l-Lysine) and Hyaluronic acid containing BMP-2 Mimicking Peptide. The thickness and chemical composition of Ti disks before and after polydopamine deposition of LBL coating was characterized using XPS. Viability of gingiva mesenchymal stem cells (GMSCs) cultured on the engineered surfaces were checked using Live/Dead fluorescence assay. Osteogenic differentiation capacity of the modified surfaces was studied using histochemical, immunofluorescence staining and gene expression analysis (qPCR). To assesses the degree of osseointegration, the surface of machined or acid etched mini implants (Ace)

were coated and the implants were used in a push-in test in rats. Static load at the implant bone interface also performed.

Results: XPS analysis confirmed the presence of PDA and crosslinked poly(L-lysine)/hyaluronan LBL coating with up to 50 nm thickness. Additionally, our data confirmed that the coating can act as a reservoir for growth factors providing a sustained release of BMP-2 Mimicking Peptide inducing GMSCs osteo-differentiation in a dose-dependent manner as confirmed by histochemical, immunofluorescence staining and PCR analysis for osteogenic related markers (Runx2 and OCN). Our animal push-in test data exhibited that surface modified implant tolerated significantly greater amounts ($P<0.05$) of load to breakpoint at the interface showing improved osseointegration.

Conclusions: Data demonstrated that the multi-nanolayered LBL assembled coating system promotes osteogenesis at the implant surface leading to enhanced degrees of osseointegration. This novel approach might provide implant surfaces with lower failure rates.

PARTIAL LAMINATE VENEERS IN BROKEN TEETH - CASE SERIES

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Keywords: Cad/Cam, Partial Laminate Veneer, Anterior Restorations

Case Presentation: Incisor and canine teeth are located on anterior area. Although they have soft tissue protection provided by the lip area, they tend to be exposed to harmful forces. Accordingly, they might have distrucuve effects. Broken anterior incicors generally cause aesthetic and cosmetic problems. Also the aesthetic problems in anterior area can be caused by the bruxism; worn incisors.
This case series presents the usage of partial laminate veneers to treat broken incisors and canines. Similarly to standard preparation technique of laminate veneers were used to only broken region. After the preparations, CAD/CAM techniques were preferred to conventional impression techniques.
Preparing only the identified broken area is more conservative than preparing for traditional laminate veneers. Additionally, necessity of anesthesia can be eliminated by preparation of only broken incisal area. This case report sorts out the advantages of restoring broken incisors and canines with partial laminate veneers using minimal invaziv preparation technique.

CLINICAL EVALUATION OF SHORT-FIBER REINFORCED COMPOSITE RESIN RESTORATIONS AND GLASS-CERAMIC ENDOCROWNS IN ENDODONTICALLY TREATED MOLARS

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Keywords: Leucite, endocrown, fiber-reinforced composite

Purpose/Aim: The advances in adhesive dentistry have brought new treatment approaches for restoring endodontically treated teeth. The aim of this study was to compare the clinical outcome of direct short-fiber reinforced composite (SFC) restorations and indirect ceramic onlays (endocrowns) in restoring endodontically treated molars (ETM). On average, the follow up time was 4 years.

Materials and Methods: Eighteen ETM were randomly divided into two groups, first group received direct composite resin restorations with a SFC base (everX posterior, GC Corporation) (n=11) and second group received indirect glass-ceramic endocrowns (IPS Empress CAD, Ivoclar Vivadent AG) (n=7). Restorations were prepared in the student clinic of the Turku City Welfare division between November 2012 and January 2016. The restorations were evaluated at baseline and after 4.0 years for anatomical form, marginal adaptation, color match, surface texture, gingival inflammation, secondary caries, occlusal contacts and patient satisfaction. Plaque index and bleeding on probing were recorded and probing pocket depth measured.

Results: One endocrown was lost due to endodontic complications and one SFC restorations due to secondary caries, resulting in a 4-year survival rate of 85.7% and 90.9% for endocrown and SFC restorations respectively. None of the endocrowns in this study showed technical complications, whereas four (36.4%) SFC restorations showed technical or biological complications needing maintenance. The causes for these complications were fractures of the veneering composite and secondary caries. Endocrowns showed better surface texture and anatomic morphology than SFC restorations. Although SFC restorations needed more maintenance, they still required less chair-time than endocrown restorations.

Conclusions: In general, both restoration types showed acceptable results. When compared to endocrowns, direct restorations with SFC base provide inexpensive and widely available alternative for restoring ETM. Even though SFC restorations might require more

maintenance, they are simple to produce, need usually only one visit and repairs are usually minor and easy to perform.

EFFECT OF STEREOLITHOGRAPHY POST-CURING IN DIFFERENT CONDITIONS ON THE FITTING ACCURACY OF PHOTOPOLYMER 3D RESINS

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Keywords: 3D Printing, Stereolithography, Post-curing

Purpose/Aim: The aim of this study was to investigate the fitting accuracy of stereolithography (SL) post-curing in different conditions (time and temperature) of photopolymer 3D resins.

Materials and Methods: The specimens were designed by computer-aided design (CAD) software that simulated the shape of the maxillary edentulous alveolar ridge. Specimens were made using Standard Tessellation Language (STL) file and printed by 3D printer (Form2; Formlabs, Inc., USA) with a thickness of 1.5 mm. The methacrylate based clear photopolymer resin was used in this study. The specimens were equally divided into 6 groups with 10 specimens on each group. Six conditions were used during the post-curing process. For condition 1 and 2, the temperature was set at 40°C at different times (15 and 30 minutes, respectively). In condition 3 and 4, the temperature was set at 60°C with 15 and 30 minutes, respectively. In condition 5 and 6, the temperature was set at 80°C with 15 and 30 minutes, respectively. Both Pre-curing and post-curing gap sizes for each specimen was measured in five different locations (the right buccal vestibule, V1; the crest of right alveolar ridge, R1; the palatal midline, P; the crest of left alveolar ridge, R2 and the left buccal vestibule, V2) with a stereomicroscope. The Kruskal-Wallis test and Mann-Whitney test were used to calculate the different value of the gap between pre-curing and post-curing with a significance level of 0.05.

Results: Although there was no significant change in gap sizes at points V1, R1 and P, considering all reference points, condition 1 had the least average change in gap sizes post-curing, and condition 6 had the highest change in gap sizes. At reference point R2, condition 6 had a significantly higher mean difference in gap sizes at least 2 folds than condition 1,2 and 4. At point V2, condition 6 had a significantly higher mean difference in gap sizes than condition 3.

Conclusions: Within the limitation of this in vitro study, the consideration of curing time and temperature of SL dentures should offer the highest accuracy for definitive restorations. The post-curing condition of 15 minutes and 40°C showed the minimum deformation.

FULL-DIGITAL PROTOCOL FOR THE DESIGN-FABRICATION OF MONOLITHIC FELDSPATHIC CERAMIC ENDOCROWNS LUTED SEMI-ERUPTING PERMANENT FIRST MOLARS

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Keywords: Endocrown1, PartiallyEruptedMolar2, G-Ceram3

Case Presentation: Introduction: Post-endodontic restorations are both important and challenging for clinical success in endodontically treated posterior teeth with more than one cusp missing and thin remaining walls. Several options have been proposed to restore endodontically treated molars. The use of posts combined with full coverage restorations is a well-established approach, yet not following the minimal invasive principles of adhesive dentistry. In pediatric dentistry, permanent molars in the partially erupting stage of children and adolescents are often treated with endodontic restorations requiring root-canal theraphy. Partially erupted first permanent molars with insufficient retentive tooth structure, has proven to be difficult. However, the endocrown presents a conservative, minimal

invasive, and esthetic restorative alternative to conventional crowns with post-and-core, as it acquires additional retention within the pulp chamber in adhesive and digital dentistry.
Materials and Methods: In this study, a technique will be described where tooth preparation consists of a circular preparation supragingivally except for healthy remaining walls in contact with adjacent primary tooth and bevelled chamfer margins (witdth: max. 0.5 mm) for reliability of glass ceramic and a central retention cavity in the pulp chamber that helps to construct both the crown and core as a single unit. Endo-crowns were fabricated using feldspathic glass ceramic blocks (G-Ceram, Gulsa, Izmir, Turkey) in three patients (9-10 years old) on erupting permanent first molars with extensive coronal destruction. Endocrowns were luted adhesively (Variolink Esthetic, Ivoclar Vivadent, Schaan, Liechtenstein) after conditioning feldspathic ceramic endocrowns for 120 s using 9.6% Hydrolfuoric acid followed by silanization (Monobond Plus). Clinical performance was evaluated up to 1 year.
Results and Conclusions: In this preliminary study, the success and adaptation of feldspathic glass ceramic blocks in endocrown cases acorrding to the protocol proposed, showed no complications up to 1 year.

ARE SYSTEMATIC REVIEWS THE PANACEA FOR EVIDENCE BASED DENTISTRY?

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Keywords: AMSTAR evaluation, clinical implementation, prosthodontic concepts

Purpose/Aim: To conduct an overview of Systematic Reviews (SRs) related to different aspects in prosthodontics reviewed and appraised by prosthodontic clinical assistants

Materials and Methods: All SRs relating to prosthodontic concepts, procedures and interventions for adults reviewed by the prosthodontic clinical assistants as part of their training were included and evaluated. Clinical assistants were requested to send all their SRs to the researcher. Two review authors (SK and QI) independently screened the results of the request for SRs emailed to the primary researcher. They then independently evaluated these SRs using the AMSTAR checklist and / or AMSTAR 2 tool, where applicable. Where eligibility for inclusion was unclear, clarification was sought from the prosthodontic clinical assistants. The differences regarding study inclusion eligibility was resolved by consultation between the review authors. The two review authors independently extracted information on prosthodontic topics, methods, participants, interventions, outcomes, and conclusions from each included SR using a specially designed pre-piloted data extraction form.

Results: Clinical assistants forwarded 37 articles including 35 reviews published in accredited prosthodontic journals to the primary researcher. Of these, only 17 were actually SRs as stated in their titles. The other 18 reviews received from the clinical assistants were either non-structured and biased literature reviews or critical reviews. SRs topics discussed were from a varied range including: Tempero-mandibular disorders, implant –retained dentures, tooth wear and all ceramic-resin bonded fixed appliances, amongst others. AMSTAR (used to evaluate SR where randomized controlled trials were included) and AMSTAR 2 (used to evaluate SRs where non-randomized controlled trials were included) scores were low for most SRs as a structured methodological approach was limited.

Conclusions: Included studies per SR were mostly of mixed designs and quality, which reduced the value of the evidence. Students' misconceptions regarding what constitutes good SRs and appraisal skills are highlighted.

ACCURACY OF IMPLANT IMPRESSION TECHNIQUES: COMPARISON BETWEEN CONVENTIONAL AND DIGITAL METHOD

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Purpose/Aim: Accurate impression of implant locations is required for passively fitting prosthesis. To date, several implant impression techniques, such as the open tray and closed tray, and digital impression have been investigated regarding their accuracy. Angulated implants may result in inaccurate impressions, and the impression technique may affect the accuracy of the definitive restoration. The purpose of this study was to evaluate the accuracy of different impression techniques, two conventional and one digital, for implants with various angulation.

Materials and Methods: We used a 3D printed cast with guided access hole for accurate implant installation, and internal connection

type implants were placed on #34, 36, 45, 46 teeth position. Six groups were divided by three impression technique (open tray with pick-up impression coping, closed tray with bite impression coping, and intraoral scanning with scan body) and two types of implant angulation, all parallel and angulated (buccally angulation of 10° on #34, 45 and lingually angulated of 10° on #36, 46). The accuracy of experimental groups were compared with reference group (scanning with scanbody using desktop scanner). In pick-up impression coping and bite impression coping group, casts were fabricated after impression, scanbodies were attached to the casts, and data were collected using desktop scanner. Data of experimental and reference groups were superimposed, and the distances between each scanbody of same implant position of experimental group and reference group were measured.

Results: In parallel placed implant groups, there were no statistically significant difference between all three impression technique groups on #36, 45, 46 ($p < 0.05$).
In parallel placed implant groups, bite impression coping technique group was statistically significant lower than intraoral scanning and pick-up impression coping technique groups in accuracy on #34 ($p < 0.05$).
In angulated placed implant groups, bite impression coping technique group was statistically significant lower than intraoral scanning and pick-up impression coping technique groups in accuracy on #34, 36, 45, 46 ($p < 0.05$).

Conclusions: Within limitation of this study, accuracy of implant impression using intraoral scanning and pick-up impression coping technique showed comparable, and bite coping impression technique showed lower accuracy than above two technique, especially in angulated implant position.

CLINICAL EVALUATION OF LITHIUM DISILICATE PRESSED ZIRCONIA AND MONOLITHIC ZIRCONIA IN POSTERIOR IMPLANT-SUPPORTED PROSTHESES

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Purpose/Aim: The purpose of this study was to compare the clinical outcomes of lithium disilicate pressed zirconia prostheses and monolithic zirconia prostheses, which are widely used as posterior implant restorations, after 12 months of follow-up.

Materials and Methods: A total of 17 patients were treated with 60 implant-supported prostheses. After examination of implant survival rate, marginal bone loss, probing depth, plaque index, bleeding index, calculus index, and complications, independent T-test and chi-square test were performed to compare each group (Lithium disilicate pressed zirconia prostheses: n=30, Monolithic zirconia prostheses: n=30).

Results: The implant survival rate was 100%. Marginal bone resorption was higher in the monolithic zirconia prostheses group ($p<0.05$). Probing depth, plaque index, calculus index, and bleeding index were higher in the lithium disilicate pressed zirconia prostheses group ($p<0.05$). Complications occurred in the monolithic zirconia prostheses group as connector fracture, and in the lithium disilicate pressed zirconia prostheses group as chipping.

Conclusions: The periodontal index of lithium disilicate pressed zirconia was slightly worse, but the bone resorption was lower and only one chipping occurred on veneered layer. Therefore, lithium disilicate pressed zirconia is considered as a promising treatment option as much as monolithic zirconia in posterior implant-supported prostheses. However, long-term clinical studies are needed for reliable results (IRB No. PNUDH- 2014-001-MD).

COMPLETE DENTURE REHABILITATION OF EDENTULOUS PATIENTS USING SUCTION DENTURE: A CLINICAL REPORT

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Keywords: completedenture, mandibulardenture, retention

Case Presentation: Support, stability, and retention are the three main factors for a successful complete denture. There are several factors that affect retention and “suction denture”, a concept introduced by Jiro Abe, emphasizes the negative pressure by sealing the entire border around the denture. Closed mouth impression technique is used to take the impression with patient’s functional pressure.
For successful sealing, sealing of retromolar pad and sublingual area are important. Negative pressure is attained when buccal mucosa and tongue side wall make a contact(BTC point) at the retromolar pad area when mouth is closed. To perfectly seal the sublingual area,

denture should fully enclose the area and sponge-like tissue in sublingual fold should seal the denture border. In this case, 4 patients visited the clinic for new dentures and decided to fabricate the suction dentures using the BPS system®. Patients were diagnosed at their first visit. Preliminary impressions were taken without applying pressure on retromolar pad area and diagnostic casts were fabricated. Afterwards, individual trays were made and final impressions were taken followed by gothic arch tracing. Artificial teeth were arranged and dentures were cured with SR Ivocap Injection system®. When final dentures were delivered, posterior side of the denture was examined with the bronchoscope to check the BTC point.
Patient A had none of difficulty factors for suction denture and successful retention was attained.
Patient B had poor ridges but had enough space under retromylohyoid area. While in the try-in of the wax denture, retention seemed to be weak. So the bite sitting impression was taken with the tissue conditioner. Retention was better than before, but the sealing was broken in the sublingual area. On the final denture, modeling compound was added in sublingual border for the full coverage of the sublingual area. Laboratory relining was done and patient was successful with the retention.
Patient C had fair ridges but he had lack of space under retromylohyoid area. Final impression was carefully taken to make the best use of his space under retromylohyoid area. Final denture showed satisfying retention.
Patient D had poor ridges, stiff tissue in the sublingual fold area, and retruded tongue position. Even though BTC point was attained and sublingual area was fully covered, retention was still weak. This can be due to her retruded tongue position and stiff tissue in the sublingual fold area. Retruded tongue position lets the air to break into the sublingual area and her stiff tissue could not compensate the sealing in the sublingual area.
In conclusion, for successful suction denture, case selection is important. Difficulty factors should be diagnosed carefully. Patient prognosed to unsatisfying retention with the suction denture, should consider other impression methods like piezography or neutral zone technique.

MANDIBULAR ALL-ON-4 IMPLANT RESTORATION CONSIDERING MAINTENANCE

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Keywords: all-on-4; mandibular edentulous patient; tilted implant

Case Presentation: In the case of edentulous patients, the total amount of occlusal force is dispersed by the keratinized gingiva during mastication, in result, causing lower masticatory and chewing efficiency. In particular, the mandibular area has more side effects such as pain than the maxilla has. It gets worse when the patient has more absorption of alveolar bone, but the implant treatment is often interrupted due to the existence of the inferior alveolar nerve. In these patients, the all-on-4 concept can be useful. This implies that only four implants are placed at the anterior sites of the superior and inferior jaw which are easy to treat and have a good success rate.
The state of the oppositional jaw is one of the important considerations. In the present case, the antagonist of mandibular cantilever fixed prosthesis is the maxillary complete denture, in which the entire palatal support area distributes the load from the mandibular fixed prosthesis, while at the same time the load transmitted by the maxilla to the mandibular cantilever is not excessive. At this time, optimal denture fitting, the uniform stress distribution of the denture, bilateral balancing of the bite can prevent the loss of the maxillary edentulous alveolar bone in the long term.
Because the patient wanted to be treated at a minimal cost, the treatment plan was built to achieve maximum efficiency within a limited cost range. The mandibular bone resorption had more progressed than maxilla and it was thought that it would be difficult to ensure stability the use of the complete denture. So the implants were placed only in the mandible and cantilever prostheses were planned. Considering the maintenance of the prosthesis, two screw-retained implant restorations were used for the anterior sites and two cement-retained implant restorations were used at the posterior sites. All screw holes were designed to be accessible in the mouth and the temporary cement was used for posterior two abutments so that it can be easily removed when the dislodging force is applied.
The patient treated with the all-on-4 method by placing the implant in the anterior part of the mandible and with the conventional complete denture for the maxilla has maintained for 3 years without complications and was satisfied with the restoration both functionally and esthetically.

POSTERIOR MAXILLARY OSTEONECROSIS OF JAW RELATED DENTAL IMPLANTS : A RETROSPECTIVE STUDY

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Keywords: necrosis, Maxillary sinusitis, jaw

Purpose/Aim: It has been established that there is a direct relationship between conditions such as odontogenic apical infection and degenerative changes in the antral mucosa, leading to sinusitis. Medication-related osteonecrosis of the jaw (MRONJ), a side-effect of long-term bisphosphonates and antiresortive drug administration, has been reported to be one of the predisposing factors for sinusitis. This study aims to investigate the treatment and prognosis of MRONJ in patients with Maxillary sinusitis .

Materials and Methods: IRB approved Patients with MRONJ with or without concomitant maxillary sinusitis in Ewha Womans University Mokdong Hospital from January 2006 to July 2017 were included in the study. Patients were randomly assigned to a control (CG - sequestrectomy alone) or a test group (TG - sequestrectomy and regeneration using PRF+rhBMP2). CT scans and panoramic radiographs were performed as diagnostic tools. Age, sex, primary diagnosis, type, duration and route of medication, MRONJ stage, presence of maxillary sinusitis, oro-antral fistula closure, management protocols, resolution and recurrence were evaluated. The influence of different local factors on the observed outcomes was analyzed.

Results: Out of 144 patients diagnosed with MRONJ, 31 (22%) patients presented involvement of the maxilla wherein severity was classified under stage 2 and 3. Of which 31 (15 in CG and 16 in TG) completed the study. Chronic maxillary sinusitis was seen in 18 (58%) patients and an oro-antral fistula was detected in 16 (52%) patients. The mean length of drug exposure was 64 months with Alendronate, as the most frequently associated with the disease progression, followed by Ibandronate. Treatment protocols included sequestrectomy and debridement followed by leukocyte-rich, platelet-rich fibrin (PRF) and rhBMP-2 insertion(TG) (n=16, 94%) which yielded successful treatment outcomes for MRONJ resolution rather than sequestrectomy alone(CG)(n=15,86%). Oro-antral fistula was managed surgically with palatal rotational flap, buccal releasing flap and membrane insertion. Twelve out of 18 (66%) patients with concomitant chronic maxillary sinusitis underwent functional endoscopic sinus surgery wherein 83% presented resolution compared to those who did not (n=6, 67%).

Conclusions: This study demonstrated that PRF and rhBMP2 combined treatment protocols provides a promising treatment outcomes by bone regeneration and fast soft tissue healing.

IMPACT OF ORAL HYGIENE INSTRUCTION ON MAXILLOFACIAL PROSTHETIC PATIENTS

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Keywords: Maxillofacial Prostheses, Oral Hygiene Instruction, Plaque Control Record

Purpose/Aim: Maxillofacial prosthetic patients often have difficulty in maintaining their oral conditions and hygiene. In addition, the residual teeth can contribute to supporting prostheses and better mastication, namely that residual teeth must be prevented from further troubles such as caries and periodontitis. For these reasons, we work on oral hygiene instruction and oral care for maxillofacial prosthetic patients. The purpose of this study was to explore the effects of our intervention on oral hygiene conditions.

Materials and Methods: Patients were divided into 3 groups; Group-1 includes 38 maxillofacial prosthetic patients with continuous oral hygiene instruction by dental hygienists, Group-2 includes 16 maxillofacial prosthetic patients who didn't receive oral hygiene instruction but have continuous maintenance, Group-3 includes 35 non-maxillofacial defects patients with continuous oral hygiene instruction. Their gender, age, the number of residual teeth and occlusal supports, and occlusal units (OUs) were abstracted from medical records. Oral hygiene condition was calculated by O'Leary's Plaque Control Record (PCR). Statistical analyses were performed using Kruskal-Wallis test and Spearman's rank correlation coefficient, and significance level was set at 0.05.

Results: Statistical analyses of patients' factors showed that there was no significant difference in age among all groups. However, Group-3 patients had significantly more residual teeth, occlusal supports and OUs compared to Group-1 and Group-2, implying that Group-3 patients had better oral conditions than maxillofacial prosthetic patients.
There were significant differences in PCR scores among all groups, Group-3 showed lowest PCR scores, and Group-1 showed significantly lower PCR scores than Group-2.
In Group-1, significant correlations were found between PCR scores and residual teeth, PCR scores and occlusal supports, while there

were no significant correlations between PCR scores and the factors in Group-2 and Group-3. This suggests that, in maxillofacial prosthetic patients with oral hygiene instruction, PCR scores might be influenced by the number of residual teeth and occlusal supports, which imply better conditions.

Conclusions: Our intervention such as oral hygiene instruction and oral care could improve maxillofacial prosthetic patients' oral hygiene conditions. However, it seems to be hard to reach the level of non-maxillofacial defects patients.

ELUCIDATION OF PATHOPHYSIOLOGY WITH A LONGITUDINAL STUDY OF SUBCHONDRAL CYST UTILIZING MRI IN TMD PATIENTS

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Keywords: Temporomandibular disorders, Subchondral cyst, MRI

Purpose/Aim: Subchondral cyst (SC) is rare, but one of the important imaging findings which is defined as a osteoarthritis of the temporomandibular joint (TMJ). However, there are no reports that have clarified the pathophysiology of SC. Therefore the purpose of this study was to elucidate the pathophysiology of SC by investigating longitudinal changes of SC and the difference between the condyles with SC and the contralateral condyles as the control side.

Materials and Methods: Study samples were 682 consecutive patients who visited Osaka University Dental Hospital with symptoms of temporomandibular disorders (TMDs) and underwent a MRI examination. Of those, 41 patients had SC and letters requesting recall were mailed to them. Twenty six patients agreed to participate in this research and the second MRI examination was taken more than 4 years after the initial MRI. The temporal changes of the size and the number of SC in the affected condyles were examined by comparing the first and the second MRIs. In addition, temporal changes of joint space (JS), angulation of posterior wall of the articular tubercle (Angle) and antero-posterior width of the condyle (WiC) were compared between the condyles with SC (Csc) and contralateral condyles (Ccon) by utilizing t-test and Wilcoxon signed ranks test. These variables were also compared between the group with condyles whose SC were vanished in the second MRI (SCv) and the group with the condyles whose SC remained (SCr) by using Mann-Whitney U test.

Results: Seventeen condyles were classified into SCv and 10 condyles were classified into SCr. In 2 condyles of SCv group, concavity was discovered by the second MRI in the region where SC was present in the first MRI. JSs in both Csc and Ccon groups were significantly decreased ($P < 0.05$). While WiC in the Ccon group had no significant change from 8.1 ± 1.3 mm to 8.1 ± 1.6 mm ($P = 0.70$), WiC in Csc group was significantly increased from 8.6 ± 1.7 mm to 9.5 ± 2.0 mm ($P < 0.05$). Angle in both SCv and SCr groups were significantly decreased over time. Comparing to SCr group, SCv group showed a significant high temporal change of JS, Angle and WiC ($P < 0.05$).

Conclusions: Since the degenerative changes of the condyles in SCv group were more remarkably progressed than in SCr group, it is suggested that SC might be vanished due to the resorption of condylar head. According to the result of the comparison between Csc and Ccon, it is also suggested that the condyle with SC might have a risk of progressing degenerative bone change and that the formations of osteophyte and concavity could be progressed in the process of the elimination of SC.

RESIN BONDED BRIDGES AS A TREATMENT OF CHOICE: CLINICAL BEHAVIOR AND UPDATED CONSIDERATIONS

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Keywords: Resin - bonded fixed partial dental prostheses

Case Presentation: Introduction
Resin - bonded fixed partial dental prostheses (RBFDPs) represent a conservative treatment plan in cases where anterior or posterior teeth are missing. In many cases, insufficient bone, medical or anatomical reasons to avoid augmentation procedures or financial limitations, exclude the use of dental implants for the replacement of missing teeth. Furthermore, the age of the patient, especially when young, is a consideration in implant placement, particularly in the esthetic zone. RBFDPs provide an alternative option to restore these

cases. They can also be fabricated as an interim restoration during the osseointegration period. These prostheses show a high survival rate, which variates according to the type of the selected material and design. Their advantages include the simplified clinical and laboratory procedures and the non or minimal tooth preparation. RBFDPs can be metal-ceramic, a gold standard for many years, all ceramic, zirconia or lithium disilicate with single or double retainer. All ceramic RBFDPs show improved esthetic outcomes, avoiding the gray shade at thin incisal third of the teeth. The high rate of debonding still remains an issue.

Aim: At this poster different cases restored with RBFDPs will be presented and the clinical behavior of alternative materials will be discussed.

Materials and methods: Four different patients with partial edentulism restored with different types of RBFDPs. Metal acrylic was the material of choice for an interim restoration during osseointegration. Two maryland lithium disilicate bridges with a single retainer replaced the missing upper laterals at a young girl after the orthodontic treatment. The other two cases restored with zirconia and metal ceramic bridges respectively.

Results: All ceramic RBFDPs showed a different clinical behavior. Lithium disilicate fractured at the connector after one year intraorally. Zirconia RBFDPs illustrated an excellent clinical behavior, with stability at the bond after 3 years. Metal-ceramic can be utilized as final restoration with favorable clinical results.

Conclusion: Cantilevered zirconia RBFDPs , remain the best treatment option for cases with missing teeth. They have low rate of debonding and fractures and the desired esthetic outcome. Due to the high fracture rate of lithium disilicate RBFDPs, we have to pay special attention at the connector design. Metal ceramic RBFDPs demonstrate promising clinical long term results, although esthetic outcome is under consideration.

MASTICATORY EFFICIENCY AND BITE FORCE CHANGES IN COMPLETE DENTURE WITH OR WITHOUT SOFT LINER

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Keywords: complete denture , soft liner, bite force

Purpose/Aim: Fabrication of functional complete denture is difficult for pateints with badly resorbed or compromised ridges. Addition of soft liner to the denture enhances the functional capabilities of complete denture The soft liners are resilient in nature and provide cushion under surface of the complete denture. The soft liner can influence the masticatory efficiency and bite force in complete edentulous patients as they affect the functional capability of complete denture and causes stress distribution over denture bearing area.

Materials and Methods: Twenty-four completely edentulous patients with age range of 45-65 years, irrespective of gender were selected following the inclusion and exclusion criteria. One maxillary conventional complete denture and two set of mandibular complete denture was fabricated for each patients , one without soft liner (conventional complete denture - CCD) and other with soft liner (acrylic soft liner lined complete denture -ASLCD) . The sequence of both mandibular denture deliveries was based on computer generated randomization table. Each patient after delivery of first mandibular denture was recalled at 3weeks and 6 weeks adaptaion for measuring the Masticatory efficiency and bite force after that second mandibular lower denture was delivered. Patients were recalled for another set of reading with second mandibular denture at 3weeks and 6 weeks.

Results: The statistical analysis showed masticatory efficiency and bite force increases with time with CCD as well as ASLCD ($P<0.001$). ASLCD showed significantly higher masticatory efficiency at both the time intervals as compare to CCD. While ASLCD showed significantly higher bite force as compared to CCD at 6 weeks.

Conclusions: Mandibular complete denture lined with 2mm thickness of soft liner shows improved masticatory efficiency and bite force

MARGINAL BONE LOSS IN SHORT MINI-DENTAL IMPLANTS AS COMPLETE MANDIBULAR OVERDENTURE RETAINERS:

1-YEAR COHORT STUDY

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Keywords: mini dental implants, complete mandibular overdenture, marginal bone loss

Purpose/Aim: To study clinical performance of 4 short mini-dental implants (MDIs) (6 or 8 mm long) for complete mandibular overdenture (OD) retention in patients with extremely atrophied alveolar ridges (interforaminal height < 10 mm).

Materials and Methods: The study included 28 patients with extremely atrophied mandibular alveolar ridges. Each patient received 4 short MDIs (6 or 8 mm long, 2 or 2.5 mm wide). New mandibular ODs were reinforced with CoCr framework. MDIs were early loaded using matrices with O-rings mounted in mandibular ODs. Clinical and radiological parameters: marginal bone loss (MBL), Modified Plaque Index (MPI), Modified Bleeding Index (MBI) and prosthodontic complications were assessed after 1-year in function.

Results: Mean MBL in short MDIs was 0.26 ± 0.35 mm after the first year. Only two MDIs broke during insertion (surgical complication) and none of the MDI was lost in function (100% survival and success). Most of the patients had very good oral hygiene (64,28% had no plaque and 89,28% patients was without bleeding) and only one patient was scored 3 for the MPI and MBI, respectively at the 1-year follow-up control examination. One O-ring was lost and changed.

Conclusions: Within the limitations of this study, insertion of 4 short MDIs in extremely atrophied mandibles (interforaminal height < 10 mm) retaining complete mandibular ODs showed very good results in the first year of function.
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MICROLEAKAGE WITH THE ELEVATED MARGIN TECHNIQUE OF FULL CERAMIC CROWNS

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Purpose/Aim: The concept of adhesion might change our ideas about ferrule of a crown. This not only applies to mechanical retention but also to sealing capacity by the margin. If ferrule is omitted by using an elevated margin, the composite build-up material that comes from under the crown should provide a proper marginal seal. However, little is known about cervical leakage of the elevated margin reconstruction.

The aim of this study was to evaluate the microleakage after mechanical loading of cervical margins of elevated margin reconstructions in comparison to traditional ferrules with ceramic full crowns. Two crown materials were tested: zirconiumdioxide and lithiumdisilicate.

Materials and Methods: MOD composite (APX, Kuraray) build-up restorations were made in 40 extracted mandibular molars. Full crown preparations were made with the outline according (Group 1) to the elevated margin design at one approximal side (cervical 1 mm of the build-up restoration was not covered by crown material) and (Group 2) to the ferrule principle at the other approximal side (crown preparation exceeding the build-up restoration by 1 mm).
The samples were randomly assigned to 20 lithiumdisilicate crowns (e-max Press, Ivoclar) and 20 zirconiumdioxide crowns (Procera, Nobel Biocare). The crowns were placed with composite cement (Panavia SA cement, Kuraray). The samples were submitted to dynamic occlusal loading (50 N, 0.2 Hz) for 60 days. Microleakage at the cervical interface was evaluated using a methylene blue dye penetration test. Statistics were Wilcoxon Signed Rank tests (SPSS).

Results: About 13% of the cervical composite margins in dentin (Group 1) and about 50% of the cervical crown margins in dentin (Group 2) showed some dye penetration to a maximum of just reaching the axial wall. This difference between Group 1 (elevated margin) and Group 2 (ferrule) was statistically significant for both the lithiumdisilicate crowns (P=0.031) and the zirconiumdioxide crowns (P=0.011). No differences were observed for crown margins in dentin (Group 2) or in composite (Group 1) (P>0.05).

Conclusions: The composite-dentin interface of a ceramic crown reconstruction with an elevated margin design showed less microleakage than the ceramic-dentin interface of a ceramic crown reconstruction with traditional ferrule.

IMPACT OF PAIN-RELATED DISABILITY ON TREATMENT OUTCOME IN TMD PATIENTS

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Purpose/Aim: The most common symptoms of temporomandibular disorders (TMD) are pain in temporomandibular joint (TMJ) and masticatory muscles, TMJ sounds, and restricted mouth opening. Treatment of TMD aims to reduce pain and restore function. Psychosocial factors exist in the background of TMD and may effect on treatment response.
The aim of the study was to evaluate the effect of pain-related disability on treatment response in TMD patients.

Materials and Methods: Patients referred to Oulu University Hospital Oral and Maxillofacial Department due to TMD pain were included in the study. The study group comprised of 80 patients (mean 44 yrs , range 22-70), who had clinically diagnosed TMD, based on the Research Criteria for TMD (RCD/TMD), at least 20 years of age, and had no long-term illnesses that may affect TMJs or the masticatory muscles.
The sample was divided in two groups: splint group and control group. Information was gathered on a clinical examination and a questionnaire. Patients in the splint therapy group were given counselling and guidance for masticatory muscle exercises and were treated with a stabilisation splint, patients in the control group were given the same counselling and guidance but not splint therapy. The follow-ups after treatment were performed one month, three months, six months and a year after the first examination. Graded Chronic Pain Scale 1.0 (GCPS 1.0) of the RDC/TMD was used to determine the pain-related disability at baseline. Pain intensity was inquired at baseline and at follow-ups using VAS (Visual Analogue Scale). Patients' subjective estimates of the severity of symptoms and effects of the treatment were evaluated with a questionnaire.

Results: Patients with a severe degree of disability reported significantly more often poor treatment response compared to others, and they also reported less pain relief, although not significantly.

Conclusions: Based on this pilot study, it can be suggested that high pain-related disability impairs treatment response of conservative treatment of TMD. Consequently it can be suggested that GCPS can be utilized in treatment plan and assessing the prognosis of the treatment of TMD patients.

EFFECTS OF TYPES OF IMPLANT PROSTHESES ON ORAL HEALTH-RELATED QUALITY OF LIFE IN EDENTULOUS PATIENTS

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Keywords: treatment outcome, edentulous patient, Oral Health Impact Profile

Purpose/Aim: It has been well documented that implant-supported fixed prosthetic treatments are highly predictable, which allow excellent treatment outcomes. When they are applied to edentulous patients, however, they require invasive surgical procedures, which are associated with high expenditure. The implant-supported removable dentures, implant overdenture (IOD), is another treatment option for the edentulism, which allows reasonable treatment outcome with less surgical invasion and expenditure. The aim of this study was to compare the treatment outcomes as evaluated by oral health-related quality of life (OHRQoL) between the implant-supported fixed complete denture (IFCD) and IOD.

Materials and Methods: This study was conducted at the Department of Prosthodontics and Implant Center at Showa University Dental Hospital and two private practices. Edentulous patients, who received implant prostheses, were recruited consecutively between May 2018 and May 2019. In total, 63 patients participated in this study. Thirty-one patients (67.5 ± 7.3 years old, female rate 48.4%) received IFCDs for upper and lower jaws, while 32 patients (76.1 ± 6.2 years old, female rate 68.9%) received IOD for the lower jaw and complete denture for the upper jaw or IODs for upper and lower jaws. OHRQoL was evaluated by Japanese version of Oral Health Impact Profile (OHIP) during maintenance phase. After adjusting confounding factors, the OHIP summary score as well as four dimension scores, which represented "Oral Function", "Orofacial Pain", "Orofacial Appearance", and "Psychosocial Impact", were calculated. These OHIP scores were compared between two groups using paired t-test ($p<0.05$). The study protocol was approved by the ethics committee of Showa University (#2007?29).

Results: After adjusting confounding factors with the propensity score, 26 patients (IFCD: 13, 72.1 ± 5.7 years old, female rate 46.2%, IOD: 13, 71.5 ± 5.7 years old, female rate 53.8%) remained and the data from these patients were compared. The average OHIP summary score for IFCD (21.0 ± 22.7) tended to be lower, which indicates better OHRQoL, than that for IOD (29.3 ± 25.3), but this trend was not statistically significant ($p=0.39$). The same trend was also found in the four dimension scores. When each questionnaire item was investigated, "Avoid eating", "Diet unsatisfactory", and "Interrupted meals" item scores in the "Oral Function" dimension resulted to be significantly higher for IOD than IFCD ($p<0.05$).

Conclusions: While general OHRQoL status, as evaluated by the summery and four dimension scores, of the IOD group was not significantly different from that of the IFCD group, there was a general tread that IFCD allows better OHRQoL than IOD, especially in specific items related to eating.

CEMENTLESS FIXATION(CL.F) SYSTEM: A NOVEL TYPE OF DENTAL IMPLANT PROSTHESIS

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Keywords: implant-supported prosthesis, cementless fixation system, positive pressure system

Purpose/Aim: Cementless Fixation (CL.F) system is similar to the cement type, but retaining of crown part is obtained by a unique positive pressure system instead of cementation. The positive pressure system is based on Boyle-Charles's law of increasing pressure in proportion to the temperature increases when the volume of the gas is constant. The positive pressure retains the crown by the static frictional force. The aim of this study is to find out the effect of cyclic loading on retentive force of CL.F system and to compare the stress distribution, bacterial penetration, and cell viability of CL.F system with cement type prosthesis.

Materials and Methods:
Experiment1
Fifty vertical compressive load cycles from 5N to 50N was applied on the crown along the long axis using a cyclic loading instrument. After that, the retentive force was measured using universal test machine with custom made zig and screw. Additional retention force was measured after 100, 200, 600, and 10,000 load cycles are applied to the specimens with same procedure.

Experiment2
Implant fixture, attached with strain gauge were installed in the resin block. The vertical force of 250N (0.5mm/min) and 30 degree oblique force of 200N (0.5mm/min) were applied on CL.F system and cement type using universal testing machine. Strain value and stress pattern were analyzed using strain gauge and analyzer.

Experiment3
Prevotella intermedia ATCC49046 was grown in brucella broth. The bacterial culture adjusted to an optical density at 600 nm (OD600) of approximately 0.5 was added to the tube containing the samples. Prosthesis removed from the bacterial culture was washed with PBS before separating the crown and abutment. The bacterial cells penetrating into the abutment-crown interface were washed with 500 ?l of 0.85% NaCl and suspended. The number of bacterial cells was determined using LIVE/DEAD BacLight Bacterial Viability Kit (Invitrogen) and expressed by colony forming unit (CFU). ATP-bioluminescence was also quantified using the BacTiter-GloTM Microbial Cell Viability Assay Kit (Promega) and expressed in relative light unit (RLU).

Results:
Experiment1
The retention force after 50, 100, 200, 600 and 10,000 cyclic loading was 20.47 ± 5.78 N, 19.79 ± 6.61 N, 18.46 ± 5.23 N, 19.60 ± 6.93 N and 21.75 ± 5.03 N. All groups showed no statistical significance.

Experiment2
CL.F system showed lower in the maximum strain value than cement type, and in the graph showing the degree of stress increase, the slope of CL.F system was smaller than that of cement type.

Experiment3
The number of bacteria penetrating into the abutment-crown interface were lower in CL.F system than cement type.

Conclusions: Within limitation of this study, CL.F system maintains retention force after function, prevents excessive stress on implant fixture, and has precise fit and less susceptible to bacterial adhesion and penetration.

3D ACCURACY ANALYSIS BETWEEN HEAT-PRESSED AND CAD-CAM POLYETHERETHERKETONE (PEEK) POST AND CORE RESTORATIONS

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Keywords: polyetheretherketone, peek

Purpose/Aim: To evaluate the accuracy of PEEK-based post-core restorations using heat-pressed and CAD-CAM manufacturing methods.

Materials and Methods: Post-core patterns (n=10) were fabricated using an acrylic pattern resin (GC Pattern Resin; Gc America Inc.) and each pattern was scanned using a 3D laboratory scanner (Ceramill Map400; Amann Girrbach AG). The laboratory scan generated an STL file (STL-R) for each specimen used as the standard control group for the 3D profilometric analysis. The STL-R file of each resin pattern was loaded into a CAM machine (Ceramill Motion 2; Amann Girrbach AG) and a milling disk made of a modified PEEK-based polymer with 20% ceramic fillers (breCAM.BioHPP; Bredent GmbH & Co. KG) was milled into post-core restorations. Each of the original post-core resin patterns were sprued, invested and pressed using pellets made of a modified PEEK-based polymer with 20% ceramic fillers (BioHPP; Bredent GmbH & Co. KG) and a PEEK pressing unit (for2press 2; Bredent GmbH & Co. KG). The resulted post-core restorations from the CAD-CAM and heat-pressed methods were scanned using the same 3D scanner generating the STL-M and STL-P files, respectively. The STL-M and STL-P files were digitally aligned and compared to the STL-R using a 3D analysis software (Geomagic Control X; 3D systems Inc.). The 3D spatial distribution deviation was exported and the statistical analysis was performed using the 95% CI deviation distribution from the gaussian function subtraction. The statistical outcome for each group was merged and a 3D color-coded map was created showing the average deviation (??=0.05).

Results: The heat-pressed post-core restoration showed 79±6 % of the areas within ±50 µm while the CAD-CAM post-core restoration showed 66±9 %. Besides that, the CAD-CAM post-core restorations show 65 % of the areas above of the ideal for marginal adaptation limit threshold of 200µm, while only 0.7±0.7 % was found for the heat-pressed. A qualitative analysis showed that the CAD-CAM post-core restoration had a significant positive discrepancy from the original pattern on the buccal part of the post, as well as, on the adaptation over the cervical area. The heat-pressed had a significant negative discrepancy on the apical part of the post.

Conclusions: The heat-pressed method to manufacture PEEK-based post and core restorations showed higher accuracy than the CAD-CAM method.

DESIGN OF SUBSTRUCTURE AND SUPRASTRUCTURE FOR EXCESSIVE VERTICAL RESTORATION SPACE: A CASE REPORT

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Keywords: implant, substructure, mandibulectomy

Case Presentation: Background:
Patients with segmental mandibulectomy usually need complicated rehabilitation. To keep the continuity of mandible and to provide adequate soft and hard tissue volume are two key factors for good outcomes. Besides, excessive vertical restoration space is a common problem. This case report demonstrated a patient with gingival cancer going through a journey from extensive surgical excision to final rehabilitation

Technique/Case Report:
• Segmental mandibulectomy for totally tumor excision and reconstruction plate for continuity of resected mandible was performed.
• After disease control, iliac bone graft was used to replace reconstruction plate and to provide the soft and hard tissue volume. Then 3 dental implants were placed in the maturated iliac bone graft.
• Six months after implant surgery, free gingival graft was transferred and stabilized by a customized surgical stentduring second stage implant surgery.
• After soft tissue was fully healed, an implant supported hybrid denture was fabricated. Because of excessive vertical restoration space, a two-layer prosthesis was designed for ease of placement of prosthetic screws, including a titanium metal substructure and a screw retained metal-resin hybrid suprastructure.
• Routine periodic follow-ups and monitoring patient's oral hygiene were arranged . Through patient's tremendous hygiene care, the bone level of implants keep stable and the hybrid denture functioned well in nine months of observation. The patient's facial profile and mastication was restored successfully.

Discussion: For screw-retained implant prosthesis, an one piece restoration cannot be placed into an excessive vertical space due to the limitation of length of screw driver. Double layer design of prosthesis, with a substructure and suprastructure, is considered in such condition. The vertical dimension of substructure is limited between 6mm to the maximum length of screw driver, including soft tissue height, hygiene space, material minimal thickness and suprastructure screw hole. The vertical dimension of suprastructure is limited between 6mm to the maximum length of screw driver, including the material minimal thickness and space for sealing material.

Conclusion: This case report demonstrated a novel design of substructure and suprastructure for patient with excessive vertical restoration space

Clinical Implications: A design of substructure and suprastructure could be used for excessive vertical restoration space after mandibulectomy

A DIGITALLY OPTIMIZED OCCLUSION CONCEPT ON IMPLANT PROSTHESES

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Keywords: Digital dentistry,occlusion, lever effect

Purpose/Aim: There are various factors which influence the stress of implant. Among them, the stress level of implant components is highly influenced by the direction of an occlusal loading. Designing a digitally optimized occlusion of implant prosthesis can be performed by analyzing the mean of vectors from occlusal contact points during a CAD process. The purpose of this study is to analyze the stress of implant based on the various directions of loading and to prove the digitally optimized occlusion concept and integrating it in daily practice.

Materials and Methods: Four different connections of implants were modeled in 3D for finite element analysis under vertical and 30-degree oblique loading on a mandibular first molar to prove the relationship between the type of connection and stress level of implants. Then five different direction of load (0, 15, 30, 45, 60-degree) were applied on an internal bone level and tissue level connection to evaluate stress level and direction of loads. Based on these finite element analyses, the concept of digitally optimized occlusion was developed using 3D vectorized analysis.

Results: The stress value of bone-level implant showed twice than that of the tissue-level implant. The stress value based on the direction of loading, which was vertical and 30-degree oblique, showed 3.5 times difference. The direction of loading was one of the most important factor of stress. The mean vector from multiple occlusal contacts was analyzed with disigned STL file for implant crown through the software of digitally optimized occlusal concept.

Conclusions: Stress value was the least when mean vector from multiple occlusal contact points headed to the center of implant connection. It seems to be expected to significantly decrease and control the stress value of implant, using the digitally optimized occlusion concept,

COMPLETE DENTURE FABRICATION USING NON-DENTAL CAD

SOFTWARE WITH CUSTOMIZED RESIN BLOCKS

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Keywords: digital dentistry, complete denture, digitally fabricated removable complete denture

Case Presentation: CAD/CAM technology has already been used in most areas of removable prosthetics. However, in most cases, dental software is used, and it is often operated only within a limited range, which can be made even more highly using open software. In the case of existing resin blocks, it was troublesome to use exclusive cement when attaching to artificial teeth. The resin block produced in this paper has the merit that special cement is not needed because it is made using existing thermal polymerization resin. In this paper, we propose an esthetic and functional dental prosthesis.

SHEAR BOND STRENGTH BETWEEN CAD/CAM DENTURE BASE AND ARTIFICIAL TEETH USING RESIN CEMENT

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Keywords: CAD/CAM denture base resin, denture artificial tooth, shear bond strength

Purpose/Aim: Dentures fabricated by CAD-CAM method are becoming popular. However, the interface between denture base and artificial teeth is still relying on bonding materials. The purpose of this study was to evaluate bond strengths between resin teeth and several denture base resins including conventional and CAD-CAM purposed materials.

Materials and Methods: Resin teeth from three different company (VITA MTF® (VITA Zahnfabrik), Endura Posterio® (SHOFU Dental), Duracross physio® (Nissin)) were prepared as resin blocks embedded in self-curing resin (Ortho-Jet (Lang Denal Mfg, Co)) to expose basal surfaces. The surfaces were bonded to denture base materials according to the following methods. In Group C, the teeth blocks were bonded to conventional heat-curing denture PMMA resin (Vertex™ Rapid Simplified (Vertex-Dental B.V. Co)) through flasking and heat curing. This group was subdivided into CV, CE, and CD according to the tooth brands. Rods from denture resin blocks for CAD-CAM denture base (PMMA Block-pink (Huge Dental Material) and Vipi Block-pink (Shin Dental)) were bonded to the tooth blocks with resin cement (Super-Bond C&B (SUN MEDICAL)), and they were allocated as Group P and V respectively. These gourps were further subdivided according to the brands of resin tooth (PV, PE, PD, VV, VE, and VD). All specimens were stored in 37? distilled water for 24 hours. Shear bond strength of all specimens were measured by universal testing machine at a crosshead speed of 0.5 mm/min. Using a flatbed digital scanner(EPSON Perfection V500 Photo scanner, Epson)and a scanning electron microscope, fractured surfaces were observed and analysed. Shear bond strengths of each group were compared using one-way ANOVA test. Tukey HSD test was used to confirm significance of each group (?=0.05).

Results: There was no statistically significant difference in shear bond strengths between conventional heat-curing denture PMMA resin group and CAD/CAM denture base resin groups. The groups using Vita MTF® tooth showed stable and high shear bond strength among the groups ($P<0.05$). Interfacial failure was the most dominant failure mode of all specimens, and partial cohesive failures were only occurred in Endura Posterio® tooth group among the Group P and V.

Conclusions: The CAD/CAM denture base resin can be considered as suitable material in terms of bonding strength between denture material and artificial resin tooth. Resin teeth bonded to denture materials using resin cement did not show inferiority to the conventional method. However, there were some discrepancies between resin teeth from different companies. When selecting resin teeth for CAD-CAM dentures, this influence should be considered carefully.

IMPLANT-ASSISTED REMOVABLE PROSTHESIS DESIGN FOR A PATIENT WITH RECURRENT AMELOBLASTOMA: A CLINICAL REPORT

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Keywords: ameloblastoma, denture, mandibulotomy

Case Presentation: Background: A resected mandibular edentulous ridge resulting from an ameloblastoma and marginal mandibulectomy is a restorative challenge.
Case report: A 28-year-old Asian man was referred for evaluation of a radiolucent area on the right side of the mandible. The right mandibular area had increasingly enlarged over a period of ? 5 months. Histopathological examination revealed benign ameloblastoma in the mandible. This clinical study describes the oral rehabilitation procedure in a patient with a recurrent ameloblastoma on the right side of the mandible. Marginal resection and the inferior alveolar nerve repositioning of the mandible were performed, followed by reconstruction of the resected mandible with distraction osteogenesis. Although adequate implants were installed, a treatment plan using removable dental prosthesis instead of a fixed prosthesis was formulated.
Discussion: To maintain oral hygiene, recurrent examinations, and for long-term maintenance, a removable dental prosthesis is preferred to an implant-supported fixed dental prosthesis.
Conclusion: The type of denture design used in this study is novel for implant-assisted removable partial denture rehabilitation. Clinical Implication: In recurrent ameloblastoma cases, a removable dental prosthesis may be an effective treatment option for oral rehabilitation.

TREATMENT OUTCOMES OF MANDIBULAR ISRPD IN KENNEDY CLASS I PATIENTS: A SYSTEMATIC REVIEW AND META-ANALYSIS

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Keywords: Mandible, implant assisted removable partial dentures, Kennedy Class I partially edentulous patient

Purpose/Aim: The aim of this study was to evaluate treatment outcomes of the conversion from conventional removable partial denture (CRPD) to implant-assisted removable partial denture (IARPD) on mandibular Kennedy class I partial edentulous patients through a systematic review and meta-analysis.

Materials and Methods: We used multiple comprehensive databases to find literature. This study is based on the Cochrane Review Methods. The focus question was "Do converting CRPD to IARPD influence the clinical outcomes in mandibular Kennedy class I partial edentulous patients?" We searched MEDLINE, EMBASE, the Cochrane Central Register of Controlled Trials (CENTRAL), Web of Science and Scopus up to April 3, 2019. The included outcome parameters were patient reported outcome measures (PROMs), objective parameters for the evaluation of functional performance, and biological and mechanical complication in clinical trial. For statistical analyses, we used RevMan version 5.2.1.

Results: In total, 6544 non-duplicate articles were identified from database searches. Of which 31 were eligible for full-text searching, and we identified 19 relevant studies. In 8 of the 19 studies, PROMs was evaluated comparing before and after conversion from CRPD to IARPD. In the 6 of the 19 studies, the functional performance was presented using objective methods. There were 11 studies reporting biological and mechanical complications including failure of implants and peri-implant marginal bone loss. As a result of meta-analysis, patient satisfaction and the oral health-related quality of life showed significantly higher, and maximum bite force, active occlusal contact area, and mandibular jaw movement was improved after conversion from CRPD to IARPD ($p<.05$).

Conclusions: Within the limitation of this study, treatment outcomes were significantly improved after conversion from CRPD to IARPD in mandibular Kennedy class I partial edentulous patient, covering a wide range of aspects that reflect the effect of the dental implant treatment.

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DIGITAL-CONVENTIONAL METHODS FOR ORAL REHABILITATION OF DEFECTIVE AND SEVERELY WORN DENTITION: A CASE REPORT

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Keywords: rehabilitation, tooth wear, digital

Case Presentation: The oral rehabilitation of the worn dentition presents an increasing challenge that is encountered more frequently in daily dental practice. For some elderly patients with severely worn dentition and no insufficient posterior occlusal support, it is a quite complicated procedure to rehabilitate oral function and esthetics by using fixed or removable prostheses. The present clinical case report describes the full mouth rehabilitation of an old patient with severe tooth wear, defective dentition and occlusion trauma, by using digital-conventional methods, including different kinds of removable partial denture (RPD) for increase the vertical dimension of occlusion (VDO) and restoring the defected dentition, computer-aided design/computer-aided manufacturing- (CAD/CAM-) lingual and occlusal veneers, 3D printed framework for try-in and cementation of lingual veneers, fixed prosthesis for restoring severely defected lower teeth. Under the combination of digital technologies and conventional methods, the results are satisfactory during 24 months of follow-up.
In this case, digital smile analysis and design were applied and T-scan and articulators were used for digital occlusal analysis and assessment, and a personalized anterior guide for finding out CR. After increasing VDO based on CR position, some available apace for restoration has been got and then we try to apply minimally invasive approaches to rebuild the stable occlusion and oral function. According to digital esthetic analysis and available space between upper and lower dentition, non-prepared lingual veneers were considered to be a reasonable option for upper jaw. The application of CAD/CAM technology may be useful to improve the adaptation of veneers without tooth preparation. Moreover, an innovative 3D printed framework with personalized design should be very helpful for try-in and cementation of lingual veneers, and also be meaningful to improve the accuracy of clinical practice and simplify the cementation procedures. Finally, a satisfactory result of functional and aesthetic rehabilitation for severely worn and defective dentition is achieved under conventional restorative management combined digital technologies, such as CAD/CAM, 3D print, digital occlusal examination and analysis, and digital smile design.

SWING-LOCK REMOVABLE PARTIAL DENTURE IN MANDIBLE WITH FEW REMAINING TEETH: A CASE REPORT

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Keywords: Swing-lock removable partial denture

Case Presentation: Background:
It is difficult to have ideal retention and stability with denture design when patient had few remaining teeth or unfavorable abutment teeth distribution. In this situation, a special denture design-"Swing-lock" might provide better retention and stability. In this case report, swing-lock removable partial denture was performed in a patient with few remaining mandibular teeth, and improved chewing function, obtained retention and stability of the prosthesis.

Case Report: A 65 year-old female with remaining left mandibular canine to right mandibular lateral incisor, which were severely lingual tilting, distributed straightly and severe ridge resorption, requested a removable prosthesis to improve chewing function. Based on clinical examination, "Swing-lock" removable partial denture was indicated for prosthetic rehabilitation.
Prosthetic treatment began with border molding and selective pressure impression technique. After survey of the cast, the hinge of swing-lock was placed at right side (behind right mandibular lateral incisor) and lock was designed at left side (behind left mandibular canine). Then, framework of "swing-lock" was performed and confirmed the fit in the mandibular edentulous ridge. After a trial with wax denture, definitive denture was fabricated by packing, laboratory remounting and polishing. Finally, the "swing-lock" removable partial prosthesis was placed at mandible after adjustment. The stability and retention were good. The occlusal scheme was designed as bilateral group function. In the follow-up period, the patient came to our clinic every six months, and oral hygiene instruction, prosthesis care were reinforced.

Discussion: In patient with few remaining natural teeth and unfavorable abutment teeth distribution, the design of "Swing-lock" removable partial denture might provide better stability and retention by the labial bar and lingual plate. When patient has the esthetic need, the pink resin can be added furtherly to cover the metal parts.

Conclusion: According to the appropriate impression technique and denture design of removal partial prosthesis, good retention and stability were achieved by "swing-lock" design.

APPROACHING THE PARTIALLY EDENTULOUS MANDIBLE THROUGH GUIDED IMPLANT PLACEMENT AND IMMEDIATE LOADING

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Keywords: guided implant placement, immediate loading

Case Presentation:

Background: Technological innovation in the dental field has facilitated a list of procedures with an increased degree of complexity such as immediate implant placement and immediate loading of them. The use of high precision equipment requires great financial and educational investment and additional benefits must be precisely calculated. Intraoral and laboratory scanners, 3D printers, milling machines and designing programs are recruited to add accuracy and predictability to oral rehabilitation.

Case Report: A sixty-year old female patient proceeded to our clinic seeking for the rehabilitation of her partially edentulous mandible with fixed restorations. Treatment plan included the placement and immediate loading of four implants. Impressions were taken after the preparation of the abutment teeth and the mold was scanned. A digital diagnostic set up was developed using Exocad Dental CAD software (BEGO). A PMMA radiographic splint was fabricated and CBCT was obtained. The Dicom file was combined with the STL Exocad File and a surgical guide teeth supported was designed using Co Diagnostix of Dental Wings Software. Two SKY (Bredent Medical Germany) implants were immediately placed in the lateral incisors and two more implants in the first molars bilaterally. Sky fast and fixed abutments were fixed in the implants, occlusal screwed prosthetic copings were fixed to the abutments by means of a screw and the prefabricated PMMA provisional was attached to the copings using composite material.

Discussion: Implants were placed in the desired sites with small discrepancy of the planned positioning. Minor inclinations led to modifications of the provisional prosthesis and the prosthetic copings. The depth, angulation and medial-distal and buccal-lingual location of the implants' osteotomy were quite precisely controlled by the titanium sleeves situated within the surgical template. Chair time was decreased to former similar procedures (freehand surgery using a surgical stent based on a diagnostic wax up) and patient was in comfort through the operation.

Conclusions: Guided surgery can lead to safe, predictable and efficient results in the hands of experienced surgeons. However, it still remains a concept not embraced by the majority of practitioners. Future seems promising for the fully digital collaborative planning, maximizing treatment outcomes thanks to prosthetically-driven implant placement.

Clinical Implications: Guided surgery for immediate placement and immediate loading of implants with prefabricated CAD/CAM PMMA provisional prosthesis, has more predictable outcomes shortening both surgical and loading time, minimizing patient discomfort

and assuring implants are placed in the best restorative position.

EVALUATION OF THE EFFECTIVENESS OF TEACHING TMD EXAMINATION USING THE RDC/TMD AXIS I

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Keywords: TMD, teaching, RDC/TMD

Purpose/Aim: In line with the Polish national curriculum for practical teaching in the fifth year of dental studies, we were interested in enhancing students' skills in TMJ examination in order to improve their ability to give TMD diagnoses. The aim of the study was to evaluate the effectiveness of teaching TMD examination using the RDC/TMD axis I questionnaire in the group of final-year dental students.

Materials and Methods: All fifth-year students in academic year 2018/19 were invited to participate in the study. The study protocol, which was accepted by the Jagiellonian University Bioethical Committee (ref. 1072.6120.314.2018), contained theoretical information on RDC/TMD examination axis I clinical procedures. This was presented to all students during a lecture, along with the Polish version of the questionnaire. During a seminar, the examination rules were shown to students. Groups of about four students were then presented the practical manual procedure. These groups were then examined using the RDC/TMD procedure by a teaching dentist and a student.The examination results were compared one by one by both the dentist and the student, with statistics calculated using the R program.

Results: Three trained dentists and 47 students participated in the study (having given their consent); 34 students were female and 13 were male. The examination results in qualitative variables were generally similar (from 85% to 100% repeatability), except for the identification of pain during maximum opening of the mouth and midline shift identification, which had 78% and 74% agreement, respectively. Quantitative variables were analyzed using interclass correlation coefficients (ICC). The greatest agreement (very good) was obtained when measuring the maximal mouth opening and interincisal distance (ICC = 0.937), while the poorest agreement was seen in the measurements of sounds during mouth movements (ICC < 0.4).

Conclusions: To correctly teach TMD examination, some additional instruments should be considered to help measuring subjective symptoms (like pain) and in identify pathologies (such as sounds).

SCREWED FRAMEWORK WITH ABUTMENTS FOR CEMENTED PROSTHESIS IN COMPLEX IMPLANT CASES

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Keywords: Implants, Prosthesis

Purpose/Aim: Background: Hybrid screwed prosthesis over implants is a valid approach, especially in extremely atrophic maxillaries. However, the screws channel access could, in some cases, affect the occlusal stability. In the other hand, cemented prosthesis usually compromise aesthetics in these cases, where a severely affected ridge is present, with long unnatural crowns, resulting in patient discontent.

Aim: To develop an alternative option for extremely atrophic maxillaries, combining the benefits of both hybrid screwed and cemented

prosthesis

Materials and Methods: Ten patients, with an extremely atrophic upper maxilla, were selected to try this approach. Six to nine implants were placed in each case. Following the osseointegration period, impressions were made and models were placed in an articulator. A metal substructure was made to fit over the implants by means of screws. This structure is like a bar, joining all implants, but also includes abutments for cemented crowns in the coronal part. After a clinical try in of this structure to confirm an adequate fitting, pink porcelain was added in the buccal aspect, to give better aesthetics, and conventional crowns were made to be placed over the abutments. After completing the laboratory work, prosthesis was delivered to the patient. First, the bar structure was screwed over the implants and the screws were tightened at 32 Ncm. Then the screws access holes were sealed with a temporary cement. Finally, crowns were cemented over the abutments included in the bar, using a specific implant cement.

Results: There were not complications during the fabrication process.
Patients are, up to date, highly satisfied with the functional aspects and the aesthetics.
All cases are in adequate function for periods ranging from 12 to 66 months.

Conclusions: Within the limitations of this pilot study, the proposed approach seems to be adequate, combining the benefits of the two prosthetic options. A rigid structure splinting all the implants, with pink ceramic to improve aesthetics, and with cemented crowns to avoid access holes. The mid term follow up is showing good results regarding function and aesthetics. However, more cases and longer follow up periods are needed.

ARE DIGITAL IMPRESSIONS AS ACCURATE AS TRADITIONAL DENTAL IMPRESSIONS?

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Keywords: intraoral scanners, trueness, precision

Purpose/Aim: The aim of this in-vitro study was to investigate the accuracy of complete- and partial-arch impressions when using intraoral scanners compared to traditional impression making protocol.

Materials and Methods: A set of maxillary and mandibular models with 28 permanent teeth (200; Nissin Dental Products, Inc, Kyoto Japan) was used as a reference. The reference data was constructed as a stereolithography (STL) format by scanning the models using a high-accuracy non-contact three-dimensional (3D) coordinate measuring machine (inEos X5, Dentsply Sirona). Six test groups were included in this study, each with 20 sets of maxillary and mandibular arches: irreversible hydrocolloid or polyvinylsiloxane impressions either poured in type III stone or scanned using a laboratory scanner; two intraoral scanners (CEREC Omnicam, Dentsply Sirona and TRIOS 3, 3Shape). The scanning strategy for each intraoral scanner was determined as suggested by the manufacturers. The STL files

were then exported into a 3D modelling software (Geomagic Control X, 3D Systems). Each STL file was compared with the master STL file using a best-fit alignment method after excluding unnecessary part of the images such as soft tissues. Deviations were viewed by means of a colour-coded render. An independent-samples Kruskal-Wallis test was performed to compare the difference between the groups, with the significant set at $P < 0.05$. Wilcoxon Signed tests were performed to assess the precision of each group.

Results: The average trueness of complete maxillary arch scans done using Cerec Omnicam (-25.2 μm ± 17.0) was significantly better than the maxillary alginate impressions scanned using the laboratory scanner (-96.8 μm ± 27.9). The average trueness of the two intraoral scanners (CEREC Omnicam (-25.2 μm ± 17.0); TRIOS 3 (-26.2 μm ± 6.8)) did not differ significantly. While the partial scans had lower mean deviation compared to the complete arch scan, this was not statistically significant. Intraoral scanners had the highest level of precision compared to the other test groups.

Conclusions: Within the limitations of this study, intraoral scanners can be recommended as a good alternative way of taking impressions considering their performance in trueness and precision.

EVALUATION OF THE COMPLIANCE OF TWO TYPES OF ORAL APPLIANCES FOR FIVE PATIENTS WITH OSA

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Keywords: OSA, OA, compliance

Purpose/Aim: The purpose of this study was to improve oral appliances (OA) to achieve high-level compliance in patients with obstructive sleep apnea (OSA).

Materials and Methods: Five female patients who had been referred by sleep physicians to Kyushu Dental University Hospital for therapy of OSA with an OA were enrolled in this study. Inclusion criteria was the diagnosis of OSA without other sleep disorders based on overnight polysomnography (PSG) lasting at least 5 hours. Any patient with exhibiting sign and symptom of temporomandibular disorders, and/or a history of psychological problems, and/or occlusal dysfunction was excluded from this study. All patients were answered questionnaire of Epworth sleepiness scale (ESS) before OA therapy.
This study was approved by the ethics committee at Kyushu Dental University (No.12-18). All patients read and signed an informed consent. Two types of OAs were fabricated based on the same therapeutic jaw position of patients. Patient responses regarding sensation and sleeping conditions when each appliance was fitted were compared.

Results: Complication with soft-type appliance was greater than with hard-type appliance in the following patient-assessed variables: Ill-fitting; Difficulty closing lips; Excessive salivation; Pain in the oral tissue; and Difficulty sleeping. On the contrary, complication with hard-type appliance was greater than with soft-type appliance in the following variables: Dry mouth; Discomfort; Difficulty wearing; Occlusal change; Increased in bruxism; Discomfort in TMJ area; Pain in the TMJ area; TMJ noise and Pain in the teeth. Sleep data from one patient wasn't recorded completely. Two patients exhibited a complete match between results of sleep data and the type of OA that the patient wanted to continue using.

Conclusions: This study was conducted on a small population of five patients, so future research needs to target more patients and to collect sleep data prior to fitting the OA in order to clarify the properties of each of these two types of experimental OAs.

A CASE OF LOWER REMOVABLE PARTIAL DENTURE WITH STUD, INTRACORONAL AND EXTRACORONAL DENTAL MAGNETIC ATTACHMENT

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Keywords: removable partial denture, dental magnetic attachment, functional evaluation

Case Presentation: The patient was a 67-year-old female who had visited our clinic on April 17, 2014. She had complaint of her lower removable partial denture. In 2013, she was provided with a non-metal clasp lower partial denture for the edentulous region of Nos. 34, 35, 36, 46, and 47 from a certain dental clinic. However, she could not wear it because the gingival inflammation caused by the non-metal clasps (Nos.33, 37,44, and 45) of the denture cut into her gingiva. Her complaint was the gingival inflammation by the clasps regions of the non-metal clasp lower partial denture. She hoped another type of esthetical partial denture without clasps. No.45 was

designed as a root cap with a stud attachment and No.37 was designed as magno-telescopic crown. As No.33 of direct abutment tooth was vital, this tooth was designed as a resin-facing crown with an extracoronal dental magnetic attachment. Dental magnetic attachment (GIGAUS C600?; GC Corporation, Tokyo, Japan) was used as retainer in all three abutments. Finished partial denture was set on March 10, 2015 (Fig.8~10). As for patient education after wearing the denture, in addition to explanation of cautionary circumstances concerning dental magnetic attachment, we instructed about cleaning method of extracorporeal attachment region of No. 33 in particular. Because the new denture was good esthetically and putting on and taking off and the cleaning were easy, it went to the satisfaction to a patient. The results of evaluation of various functions before and after treatment were as follows. Maximum occlusal force using the Dental Prescale? was 221.5 N before Tx, 424.2 N after Tx. Mastication score for chewing ability by the amount of glucose elution using Gumi-jelly? was 47 mg / dl before Tx, 228 mg / dl after Tx. Mastication score was 39.7 before Tx, 49.7 after Tx. In Oral QOL evaluation, OHIP-J14 score showed 30 before Tx, 18 after Tx and GOHAI score showed 29 before Tx, 51 after Tx. It was suggested that all items of functional evaluation were found an improvement tendency.

ABUTMENT SCREW LOOSENING IN ANGULATED IMPLANTS AT VARYING DEGREES: AN IN VITRO STUDY

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Keywords: Angulated implants, screw loosening, southern co-axis

Purpose/Aim: To assess abutment screw loosening in axial and angulated implants at 12°, 24°, 36° subjected to non-axial directed simulated load and thermal cycling.

Materials and Methods: The following components will be ordered:
1 x straight implant external connection (4.2 x 12mm)
1 x 12° External hex connection (4.2 x 12mm)
1 x 24° External hex connection (4.2 x 12mm)
1 x 36° External hex connection (4.2 x 12mm)
32 x fatigue/test abutments
32 x abutment screws
4 x acrylic blocks 20x20mm
Digital torque driver
Specimen preparation
An implant positioning device will be used to ensure consistent placement of each implant fixture into an acrylic block measuring 20x20mm. Encased within a metal periphery. 2-4.2mm twist drills will be used for the fixture preparation.
An implant mount/dental surveyor will be used to correct the angulation at which the fixtures will placed for the angulated implants. This needn't apply for the axial implant specimen.
A fatigue test abutment will be torqued with an abutment screw the recommended manufacturer's instructions (32N.cm). The abutment screw will be retorqued after 10 minutes to account for the settling effect due to screw mechanics.

Simulated load
Each specimen will be subjected to a year's worth of functional and thermal load to mimic the oral cavity according to ISO standards. Although this can not be standardised to ever mimic an in vivo environmental capacity, an insight into biomechanical demands that dental implants are subjected to can be ascertained.
At the end of each interval of set cycles for a specimen, abutment screw loosening torques will be measured with a digital torque driver and recorded. A new fatigue/test abutment will be torqued to the fixture with a new abutment screw. At the same value previously mentioned (32N.cm). Each fixture sample will have the same test as above repeated to a total of 8 times.
Statistical analysis will be undertaken to deduce and compare results.

Results: To be announced

Conclusions: To be announced

AESTHETIC MANAGEMENT OF PATIENTS WITH CONGENITAL ANOMALIES–CASE REPORT

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Keywords: hipodontia, treatment, aesthetic

Case Presentation: Rehabilitation of patients with congenital anomalies such as cleft lip and palate (CLP), anodontia and hipodontia is a prosthetic challenge. The oral rehabilitation of patients with congenital anomalies is directly related to the severity of anatomical and functional alterations that are determined by the malformation. The dentures may be fixed or removable, tooth or implant-supported. The aim of rehabilitation is to reestablish the aesthetics, phonetics and function. Their indication depends on the dental, periodontal and bone conditions and the maxillamandibular relationship. The treatment of choice should be the least invasive solution that satisfies the expected esthetic and functional objectives. The most conservative fixed restoration is the resin-bonded bridge. Its indication is primarily for small edentulous spaces. The bridge design and material selection depends on size, shape, location of the edentulous space, malocclusion, the anterior relationship, condition of the adjacent teeth and patients expectations. This clinical report describes the prosthetic rehabilitation of two patients: First one is 20-year-old girl with the cleft lip and palate and second one is 17-year-old boy with congenital missing lateral incisors.
The 20 year-old girl with the cleft lip and palate, had a missing incisor at the cleft site and diastemas between lower incisors. She was treated with all-ceramic resin-bonded bridge in upper jaw and diastemas closure using porcelain laminate veneers
The 17-year-old boy with congenital missing lateral incisor in upper and lower jaw and microdontia of the adjacent teeth. He was treated with resin-bonded bridges in conjunction with veneers on labial surface of adjacent teeth. These restorations have been made of PMMA (TelioCAD; Ivoclar Vivadent, Schaan, Liechtenstein).
Resin-bonded bridges and veneers are considered beneficial because of several reasons. First of all is the low risk of damaging the pulp, than, easier impression-taking, teeth can be prepared without anesthesia, a better control of finish line during preparation, adhesive fixation, and less interference with the marginal gingiva.
This type of minimally invasive restoration can satisfy high aesthetic demands while requiring relatively little treatment time. These two case reports demonstrate that resin-bonded bridges appear to be a viable option for the treatment of adolescent specific tooth missing.

A CASE OF IMPLANT RESTORATION IN AESTHETIC AREA OF ANTERIOR TEETH

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Keywords: Implant, aesthetic area, anterior teeth

Case Presentation: Four years ago, a young female patient underwent restorations of bilateral upper anterior teeth with post-core PFM crowns. In recent years, the post-core PFM crowns have repeatedly fallen off. One week ago, the root of left upper anterior tooth was split. Now bilateral upper anterior teeth are required to be implanted. Examination showed that 21 tooth post-core PFM crown fell off, root splitting, tapping (+), loosening degree I, no gingival swelling. 11 tooth post-core PFM crown was in place, tapping (-), no loosening, no gingival swelling. The occlusion was normal. The patient has high laughing line and tetracycline stained teeth. CBCT showed 21 tooth had split and the root was short. Buccopalatal bone width was 4.1 mm. The root of 11 tooth was also short. Buccopalatal bone width was 4.3 mm. Diagnosis was 11, 21 tooth defect. The patient was a high aesthetic risk implant case. Treatment process and analysis: Minimally invasive extraction of 11, 21 tooth as far as possible to retain the labial bone plate. After extraction, 21 labial bone plate defects were found, 11 and 21 GBR operation were performed, and soft tissue matrix was implanted to restore the fullness of the labial side to the greatest extent. Six months later, sides of the lip of 11 and 21 tooth were found to have good fullness and bone formation. The first stage of implantation was performed. Two Nobel CC 3.5 x 11.5mm implants were implanted step by step, and covered screw were placed and sutured tightly. Six months later, X-ray films were taken to check that the bone healed well. Phase II operation was performed and temporary crowns were used to form gingiva shape. The temporary crowns were regularly adjusted to form a good shape of gingival cuff after 3 months and began to be formally restored. All-ceramic crowns with zirconia and decorative porcelain were repaired. The patients were satisfied with the results. A year later, the gingival was examined again and the lip fullness was still good. Minimally invasive tooth extraction, GBR operation and soft tissue matrix implantation were used to preserve the shape and fullness of soft and hard tissues to the maximum extent, and temporary crowns were used to shape gingiva, which finally achieved good aesthetic results.

COMPARISON OF DIFFERENT METHODS FOR REHABILITATION OF MAXILLARY DEFECTS

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Keywords: Maxillectomy, Obturation

Case Presentation: Background: Patients with maxillary tumours may be exposed to post-surgical defects that have a profound impact on speech, mastication, deglutition, aesthetics and psychosocial functioning. This effect on patients' quality of life may not only influence their nutrition (and therefore health) but may also impact on their integration in society. Due to the unique nature of each patient, the presenting pathology, and the subsequent defect, an "Appropriatech" approach for management is required for each patient. Multiple options for dental rehabilitation and obturation of maxillary defects have been described without any solution having definitively better outcomes in varying presenting scenarios.
Case Report: This case series explores the different techniques in palatal obturation from removable obturators, implant-retained removable obturators, implant-retained fixed dental prosthetics with removable obturators, implant-retained fixed dental prosthetics with free soft-tissue flap obturation to free fibular flap with fixed implant-retained prosthetics.
Discussion and Conclusion: Multiple factors require consideration before a patient-specific approach can be formulated. The extent and position of the maxillary defect has an impact on the outcomes each treatment modality. This is specifically noticeable when comparing prosthetic obturation with surgical obturation.
Clinical Implications: An insight into various options may help in determining appropriate patient management.

THE IMPACT OF NEW DENTURES ON SALIVARY STRESS MARKERS VALUES IN COMPLETE DENTURES WEARERS

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Keywords: Salivary stress markers, complete dentures, elders

Purpose/Aim: First time complete denture wearers may be subjected to stress as a consequence of usual transitory problems arising after the insertion of new complete dentures (CDs). Introducing new CDs may also be a predisposing factor for the onset of salivary changes that affect oral homeostasis and oral mucosal health. We hypothesized that insertion of new CDs may present an overall stressfull environment for patients receiving CDs for the first time. Particularly associated with more or less sensory and motor deterioration in older people some inevitable level of stress during the first period of coping with the new CDs may be expected. To test the hypothesis, we conducted a pilot study with the aims: 1) to determine values and analyse the changes of salivary stress markers sAA and pH in saliva in older people receiving their first pair of CDs. 2) to compare them with the sAA and pH values of experienced CD wearers in order to determine whether CDs are causative factor for stress in older people receiving first pair of CDs.

Materials and Methods: Study plan included evaluation of salivary stress biomarkers sAA and pH values in unstimulated saliva collected from participants of both study group (SG) and control group (CG). Measurements were performed before, along with the insertion of CDs, and after the initial adaptation period. Values of pH in saliva were measured immediately after sampling using pH meter (Martini Instruments, USA). While sAA values were determined using colorimetric method and commercial kit (Roche Diagnostics). Statistical analysis was performed using commercial statistical software (SPSS 18.0, Inc., Chicago, IL, USA).

Results: Values of sAA values changed during the evaluation period, baseline sAA values were higher than follow up points values, but no statistical significance ($p=0.464$, $p=0.365$) was found. On the other hand, pH values increased during the evaluation period in all three follow up points. Especially between the baseline and first follow up point ($p=0.046$). Also, It was found that pH values in SG participants during all evaluation period were higher than measured pH in CG, with statistical significance ($p=0.037$; $p= 0.000$; $p=0.001$)

Conclusions: 1) Inserting new dentures influenced changes of the sAA values in time during the observation period, but no significant statistical differences were found;
2) The mean value of salivary pH in SG changed during the observation period, but statistical significance was observed between baseline and first follow up;
3) Considerable differences in pH values were determined in patients with new CDs with statistically significant differences compared to CG.

Furthermore, according to the results the adaptation to new CDs depends on the quality of dentures fabrication, as well as biological and physical factors. Thus, psychological and emotional issues could not be correlated with measured stress level biomarkers.

A STUDY TO EVALUATE THE EFFICACY OF CERROBEND SHIELDING STENTS IN PREVENTING ADVERSE RADIOTHERAPEUTIC EFFECTS

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Keywords: Oral cancer, radiation therapy, stent

Purpose/Aim: To evaluate the efficacy of cerrobend shielding stents in minimizing the potential adverse effects of radiation on oral tissues in buccal carcinoma patients.

Materials and Methods: Twenty?eight participants were selected for the study based on predetermined inclusion criteria, out ofwhich four participants were lost to follow-up. Half of the remaining participants (N = 12) were randomly given cerrobend shielding stent and the remaining 12 formed the control group. The effects of radiotherapy were evaluated by using Radiation Therapy Oncology Group (RTOG) 0435 Head and Neck adverse effects grading tool. All participants were evaluated for xerostomia, mucositis, dysphagia, salivary changes, dysguesia, pain, trismus and radiation caries at baseline and 1 and 3 months post?radiotherapy.

Results: All adverse effects were higher in control compared to study group, with post therapy difference for pain in swallowing, salivary changes, mucositis, dysphagia, dry mouth and caries being statistically significant.

Conclusions: Cerrobend alloy can be used effectively as shielding stent to reduce the adverse effects associated with external beam radiation therapy in unilateral buccal carcinoma patients.

EVALUATION OF ABUTMENT TOOTH COLOR, CEMENT COLOR, AND DIFFERENT THICKNESS OF COMPUTER-AIDED DESIGN/COMPUTER-AIDED MANUFACTURING BLOCKS

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Keywords: Veneer, Color difference, Color matching

Purpose/Aim: Shade selection is an important esthetic factor, and its accurate communication leads to successful esthetic restorations. However, studies on the color of recently introduced computer-aided design/computer-aided manufacturing (CAD/CAM) blocks as functions of the abutment tooth color and ceramic thickness are insufficient. The purpose of this study was to evaluate the effects of CAD/CAM material thickness and cement color on the shade matching of CAD/CAM materials for different abutment teeth shades.

Materials and Methods: The study used composite resin blocks (Estelite, A3-LT, Tokuyama Dental Corp.) and zirconia reinforced glass-ceramic blocks (VITA Suprinity PC, A3-HT, VITA Zahnfabrik), which were prepared in two thicknesses (0.5 and 1.0 mm). Each type of specimen was seated on five differently colored abutment tooth materials (5.0×15.0×15.0 mm: IPS Natural Die Material; ND1, ND2, ND3, ND8 and ND9; Ivoclar Vivadent). Two try-in pastes with different lightness (H-Value and L-Value) as the cement color (BeautiCem Veneer, Shofu Inc.) were used. The color of the resulting specimen was evaluated using a non-contact type dental spectrophotometric device (Crystaleye Spectrophotometer, Olympus) for the measurement of the color parameters at the center of the specimen. Color data were expressed as CIE L*a*b* system coordinates, and the color difference (?E), relative to the specimen, before seating with try-in paste was calculated. Statistical analysis was performed using statistical software (JMP Pro 14.3.0, SAS Institute Inc.). The mean for each group was analyzed with one-way ANOVA. For post-hoc test, Tukey-Kramer’s honest significance difference test was used to determine the significant differences.

Results: The L* value tended to decrease with the L-value, for all samples, when the H-value and L-value of the try-in pastes were compared. As L* value of the abutment tooth color decreased, ?E values tended to increase regardless of the difference in thickness and cement color. The results of one-way ANOVA indicated that the ?E values of specimen before seating with try-in paste were significantly different for each abutment tooth color, irrespective of the thickness and cement color. There were significant differences for ND9, which exhibited higher ?E values compared with ND1, ND2, and ND3 for the composite resin specimen. In the zirconia reinforced glass-ceramic specimen, ND9 had significantly higher ?E values, compared with ND1 and ND2 ($p<0.05$).

Conclusions: The ?E values of ND9 was higher, relative to the specimens before seating with try-in paste. The color matching of the specimen was influenced by the abutment tooth color. The influence of different materials and different cement colors should be further considered in future research.

EFFECTS OF DIFFERENT TYPES OF INTRAORAL SCANNERS AND SCANNING RANGES ON DIGITAL IMPRESSION PRECISION

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Keywords: digital dentistry, optical impression, dental implant

Purpose/Aim: The aim of this study was to evaluate the impact of the types of digital scanners and the ranges of scanning on precision of digital impression made for multiple implants.

Materials and Methods: A reference model of an edentulous maxilla with six implant analogues was fabricated. Scan bodies were connected to the implant analogues and they were named A to F in alphabetical order from right to left. They were scanned by five kinds of IOSs (3M True Definition Scanner; TDS, CS 3600; CCS, Cerec Omnicam; OMN, TRIOS Scanner 2; TR2, TRIOS Scanner 3; TR3) and a laboratory scanner (D810). Scans were repeated five times by each scanner and stereolithography (STL) data were captured. In order to evaluate precision, every possible pairs out of the five STL datasets in each impression method, in total ten pairs, were extracted and compared by best fit-algorithm method. Furthermore, in order to evaluate the effects of the scanning range on precision of digital impression, nine different ranges of interest (ROIs) were defined as follows: AB, AC, AD, AE, AF, ABC, ABCD, ABCDE, ABCDEF. The average discrepancies in absolute values for each ROI were calculated and the effects of "type of scanner" and "ROI" on precision, as evaluated by the averaged discrepancy, were tested by two-way analysis of variance ($p < 0.05$).

Results: The effect of “type of scanner” and “ROI” and their interactions were statistically significant ($p<0.05$).
Precision of the laboratory scanner tended be better than those of other IOSs. This trend was found consistently independent upon the ROI (“AB” ; 3.9±0.57?m - “ABCDEF”; 3.9±0.18?m). Precision of the 3 IOSs was comparable with that of the laboratory scanner when ROI was limited to “AB” (TDS; 6.0±1.2?m , CCS; 9.6±2.3?m , OMN; 10±2.5?m) but as the ROI increased, it was deteriorated significantly [ROI “ABCDEF” (TDS; 16±5.3?m , CCS; 21±6.1mm, OMN; 19±1.4?m , TR2; 29±10?m , TR3; 27±8.2?m)].

Conclusions: Within the limitation of this in vitro study, it can be concluded that the precision of digital implant impressions by IOSs would be reliable provided that the scan range is confined to two neighboring implants, such as in 3-unit supra-structure supported by two implants.

FIT AND MICROLEAKAGE OF IMPLANT-SUPPORTED ABUTMENTS

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Keywords: Implant prosthodontics, marginal fit, microleakage

Purpose/Aim: The objective of this preliminary study is to compare the degree of microleakage and fit at the abutment-implant interface of different cobalt-chrome abutments, depending on their manufacturing technique, against zirconia abutments.

Materials and Methods: In this transversal in vitro study, we compared the fit and microleakage of a total of 60 titanium implants, screwed to 45 cobalt-chrome abutments (15 cast, 15 sintered and 15 milled abutments) and 15 zirconia abutments. A standardized methacrylate cylinder block contained the implants and abutments.
The blocks were put under occlusal load cycles in an axial direction towards the implants by means of a dynamic fatigue system. The number of occlusal cycles was 300.000 per sample, under a 200kg load, at a speed of 1 cycle per 0,5 seconds. The blocks were also placed in a thermal cycler, where two sessions of 10.000 underwater cycles at 5 ºC, at 1 cycle every 5 seconds, and afterwards at 50ºC, for another 5 seconds.
Following two processes, the marginal fit was assessed under Scanning Electron Microscopy (SEM). After SEM, all samples were stored in distilled water for 24 hours, followed by submersion in a 0.2% methylene blue (methylthioninium chloride) solution, at 37ºC for 24 hours, which was used as the staining agent for this study.

Results: Descriptive statistics of marginal fit and microleakage values will be presented.

Conclusions: Within the limitations of this preliminary in vitro study, we can conclude that the least fit was associated with sintered and cast cobalt-chrome abutments.

RETROSPECTIVE ANALYSIS OF IMPLANT PROSTHETIC REHABILITATIONS OVER A PERIOD OF 25 YEARS

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Purpose/Aim: The aim of the study is to investigate the implant survival and bone resorption of prosthetic implant rehabilitations, in a period between 2 and 27 years of follow-up, performed at the C.I.R Dental School University of Turin, Italy

Materials and Methods: 431 patients were contacted by telephone for a total of 1107 implants, of which 185 patients were visited for a total of 712 implants. All the recruited patients were performed: complete periodontal chart, intraoral radiographs of the implant sites and photographs. The crestal bone loss was calculated on the radiographic documentation with a dedicated software. Patients were divided by type of rehabilitation in maxillary, mandible anterior and posterior zone: single crown, partial and total bridge and overdenture. A further division was made in relation to the period elapsed since the implant placement: less than 10 years and more than 10 years

Results: Average implant survival for the entire follow-up period: single crowns 94%, partial bridges 94%, total bridges 95%, overdenture 98%. Average crestal bone loss of single crowns 1,43 mm, partial bridges 2,68 mm, total bridges 3,12 mm and overdenture 1,96 mm

Conclusions: Implant prosthetic rehabilitations performed at the University of Turin seem to have a good medium and long-term survival rate and radiographic bone resorption according to the data reported in the literature for the different types of rehabilitations

PROPOSAL FOR FABRICATION OF MODELS NEXT GENERATION MATERIAL

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Keywords: Shake, mix, Stone

Purpose/Aim: Newly developed super-fast setting stone, Shake! Mix STONE (S!MS ,GC Corp) was introduced to the Japanese market in Feb 2018. The unique features of S!MS are extremely fast setting, super fluidity and shaker mixing. The purpose of this study was to evaluate the physical properties between conventional diestone and next generation material S!MS.

Materials and Methods: Products: Fujirock EP(EP) (Setting time 10-13 minutes), Shake!Mix Stone(S!MS) (Setting time 2minutes 20seconds) were used for this study.
Fluidity were measured every 15 seconds until 120 seconds from the start of mixing.
Compressive strengths were measured from time period of 5 minutes to 60 minutes.
The EP was mixed by Vacuum mixer(GC corp, VM-2) for 30 seconds to measure fluidity and 60 seconds to measure the compressive strength. The S!MS was mixed with shaker for 20 seconds.
Fluidities were measured in accordance with ISO 15912. Compressive Strengths were measured in accordance with ISO 6873.
Student's t-test was used to compare the results.

Results: Fluidity (mm)

	30 seconds	45 seconds	60 seconds	75 seconds	90 seconds
S!MS	129.2±0.7	117.4±0.6	86.8±0.9	46.9±0.5	38.9±0.2
EP	N/A	49.3±0.5	48.1±0.7	47.5±0.7	46.4±0.6

Fluidity of S!MS showed significantly higher than that of EP at 30 seconds, 45 seconds and 60 seconds.
No significant difference was observed at 75 seconds.
Fluidity of S!MS showed significantly lower than that of EP at 90 sec.
S!MS showed superior fluidity to pour the impression without air bubbles at 30 seconds, 45 seconds, 60 seconds. And suitable fluidity to build up at 75 seconds and 90 seconds.

Compressive strength(MPa)

	5 minutes	7 minutes	15 minutes	20 minutes	30 minutes	60 minutes
S!MS	9.74±1.0	15.6±2.3	27.7±3.4	35.8±1.7	37.4±2.3	41.0±1.9
EP	N/A	N/A	N/A	8.51±3.08	30.38±1.78	55.54±0.8

Compressive strengths of EP could not be measured at 5,7,15 minutes because of incomplete setting.
No significant difference were observed between S!MS at 5 minutes and EP at 20 minutes and between S!MS at 15 minutes and EP at 30 minutes.
Compressive strength of S!MS showed higher strength than that of EP in early stage.

Conclusions: Despite a super high fluidity, S!MS showed higher compressive strength in early stage.
In other word, S!MS enables to be fabricate an accurate model in a few minutes.
Applying S!MS for chair-side application such as bleaching tray, mouth guard, CAD/CAM and so on will bring about great benefit in clinical situation.

COMPARISON OF MANDIBULAR MOVEMENTS BETWEEN CAD AND CONVENTIONAL ARTICULATOR

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Keywords: CAD, Mandibular Movements, Articulator

Purpose/Aim: It remains unknown whether conventional articulators or Computer-Aided Design (CAD) is preferable for fabricating accurate prosthesis. Fabricated prostheses procedure influences reproduction of mandibular movement. The aim of this study was to compare the accuracy of the two kinds of CAD and conventional articulators in reproducing mandibular movements.

Materials and Methods: Six participants who did not exhibit temporomandibular disorders were selected for this study. Gypsum models and interocclusal records were collected for each participant. The interocclusal record was considered as the control group. Three types of mandibular movements were performed using two digital and one conventional articulators. (Lab CAD SW,version 1.62, Sirona) and (Ceramill mind version, Amanngirrbach), conventional articulator was (Artex, Amanngirrbach).The subjects were divided into three groups as follows ; group 1: anterior guidance; group 2: lateral mandibular movement of the working side; and group 3: non-working side. We attempted to measure the distance of the disocclusion as the vertical distance from the mesial cusp of the first molar to the pairing tooth with each of the three articulators. The results were calculated using mean ± SD and median and analyzed using one-way ANOVA with Tukey's (HSD), Fisher(LSD), Bonferroni, REGWQ, and two-sided Dunnett's test, $P < 0.05$. (XLSTAT 2019)

Results: Anterior guidance of mean±S.D showed very similar values in all test and control groups. $p>0.05$, no significant difference. The lateral mandibular movement working side and non-working side exhibited approximately simillar value in all test and control groups as mean±S.D. In addition, $p>0.05$.

Conclusions: There were no significant differences between the analog and digital articulators and interocclusal record as regards mandibular movements.

A REVIEW ON MONOLITHIC TRANSLUCENT ZIRCONIA

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Keywords: Monolithic translucent zirconia, Optical properties, Mechanical properties

Purpose/Aim: The aim of this review was to briefly explain the manufacturing process which affect the opacity of conventional zirconia and light transmission. The effect of sintering conditions and alteration of sintering additives on translucency and mechanical properties are presented. Clinical aspects such as tooth preparation guidelines, surface polishing and clinical indications are discussed

Materials and Methods: An electronic search for articles with no limitation in time or language was performed with the PubMed, google scholar and Scopus search engines. The keywords used were monolithic translucent zirconia, optical properties, mechanical properties, physical properties, tooth preparation and clinical indication. The relevant articles were included.

Results: Based on 62 number of relevant and valid articles, following results presented. The literatures show that different commercial monolithic translucent zirconia systems are available. Their translucency and mechanical properties depend on the grain size and their composition. Monolithic translucent zirconia systems are indicated for full anatomical crowns and bridges in anterior and posterior regions depending on the ceramic system. They need less tooth reduction in comparison to conventional zirconia. Surface polishing according to the manufacturer's instruction can reduce wear of the opposing enamel. Although in vitro studies reveal promising results, long term clinical trials and more in vitro studies for assessment of low temperature degradation with consequent effect of mechanical and optical properties are required.

Conclusions: Translucent zirconia could be a conservative treatment option especially in areas with limited occlusal space meanwhile providing aesthetic as well. However, long term follow-up regarding its mechanical properties is required before its recommendation in routine clinical practice.

IS THERE A PLACE FOR THE REMOVABLE PARTIAL DENTURES IN THE POST IMPLANT ERA?

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Keywords: removable partial dentures, partially dentate, rehabilitation

Purpose/Aim: An increase in life expectancy in populations around the world is expected to result in an increase in partially dentate individuals as people retain their teeth for a longer period of time. These individuals will continue to require management/rehabilitation by the dental profession.

Materials and Methods: Removable partial dentures (RPDs) are one of the earliest treatment options for partially dentate rehabilitation and are still used to this day. The first published description of a removable partial denture prosthesis was in 1711.

Results: Unfortunately over the years RPDs have also been known for perhaps creating more problems or challenges than solutions. These include lack of retention, comfort, function and aesthetics amongst others. The introduction of implant dentistry changed the way both completely edentulous and partially dentate patients have been rehabilitated. Prostheses which offered improved retention, function, comfort, and aesthetics became possible with implant supported prostheses.

Conclusions: However, implant dentistry has reached only about 1% of the population worldwide, and the vast majority of partially dentate individuals have no option but to resort to a removable partial denture. This presentation will look at the role of RPDs in modern dentistry, and what methods can be used to improve their function, even with less costly options such as acrylic resin based dentures.

FIBRONECTIN ADSORPTION AND OSTEOBLASTIC RESPONSE OF A ROUGH TITANIUM SURFACE COMPARED TO MACHINED TITANIUM

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Keywords: Implant surface1, fibronectin2, cell adhesion3

Purpose/Aim: Dental implants and osseointegration are paramount in nowadays dentistry, where rough surfaces are the preferred option. Osseointegration is based on the interaction between a delicate bone-fixture interface, which has its key factor in the protein adsorbed on the surfaces like fibronectin. The present research aims to compare one the most diffused surface to machined titanium, in terms of fibronectin (FN) adsorption, early cell adhesion and osteogenic potential.

Materials and Methods: Commercially pure titanium samples were treated to generate a machined surface (MS) and a sand blasted (biomedical corindone) and acid etched (HF and HCl/H2SO4 solutions) surface (SBAES). A qualitative characterization of the surfaces was obtained through Scanning Electron Microscope, as well as surface roughness. The optical contact angle (OCA) with water (dH2O) and diiodomethane (CH2I2) was used to assess Surface Free Energy, according to the Owens Wendt method.
To quantify FN adsorption, a 2% solution in Posphate Buffered Saline (PBS) was incubated at 37°C, for 30 minutes, as reported elsewhere (REF), while the pre-osteoblastic murine cell line MC3T3-E1 (ECACC, Salisbury, UK) was employed to test cell adhesion and viability. To test cell adhesion in presence of saturating values of FN 5% solution were prepared. Further osteogenic assays were performed by quantification of Alkaline Phosphate Activity and Alizarin Red Staining.

Results: MS displayed the typical marks produced by the milling process and SBAES appeared as roughened surfaces with a stochastic presence of peaks and valleys.
Based on Sa values, MS was smooth while SBAES was moderately rough. Skewness (Ssk) values measured on SBAES were negative,

while MS resulted proximal to zero. According to kurtosis values, SBAES was bumpier than MS.
As for the wetting properties of the surfaces, MS showed a quite hydrophilic behavior, while SBAES resulted slightly less hydrophilic than MS. The Contact Angle of SBAES in presence of CH2I2 reached a value of 40°. The surface free energy (SFE) as determined according to the Owens-Wendt theory was the higher for MS and lower for SBAES.
Fibronectin adsorption resulted higher on SBAES than on MS in a statistically significant way; also a fibronectin coating on the surfaces was capable of reducing this effect dramatically.
At 10 minutes, there were twice as many MC3T3 cells adherent on SBAES than on MS. At 1day, both surfaces sustained cell viability, but SBAES behaved better as for cell proliferation.
The difference between SBAES and MS progressively were reduced along osteogenic differentiation.

Conclusions: The capability of biomaterials to osseointegrate can be predicted based on in vitro behavior of osteoblasts. The authors characterized one of the most relevant and commercially representative surface configuration attainable subtractively. SBAES promoted higher fibronectin adsorption, more efficient cell adhesion and proliferation than MS, but this difference resulted almost absent after a longer period of osteogenic induction.

FABRICATION OF OBTURATOR PROSTHESIS BY USING DIGITAL TECNOLOGY

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Keywords: CBCT, Intraoral scanner, 3D printing

Case Presentation: Background: This clinical report describes a digital workflow using an intraoral digital impression and cone beam tomography (CBCT) volumetric data to create a 3D virtual model remaining dentition, defect area, and soft/hard tissue of patient who had undergone a hemi-maxillectomy.
Case report: The stl files of 3D volumetric data of craniofacial tissues and remaining dentition from CBCT images and intraoral scanned data were geometrically superimposed by applying best-fit algorithms using dentition and defect boundary as reference structures. The stl file was then imported to Materialize 3-matic software to compose a virtual solid model from which a master model was produced by SLA technology to fabricate the prosthesis. SLA 3D printing technology was used to manufacture the resin positive mold from which an obturator prosthesis was fabricated through conventional technique. After processing, adjusting, finishing, and polishing, the definitive obturator prosthesis was placed and adjusted for comfort and function.
Conclusion: Digitization of edentulous maxillectomy defect models by a chairside intraoral scanner and CBCT was found to be accurate and feasible.

MECHANICAL PROPERTIES AND MICROSTRUCTURE OF NOVEL LITHIUM DISILICATE GLASS CERAMIC BLOCK FOR CAD/CAM

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Keywords: Digital dentistry, Lithium disilicate, Single-visit treatment

Purpose/Aim: Lithium disilicate (LDS) glass ceramics are known as clinically useful dental materials from the viewpoint of aesthetics and mechanical property. Initial LiSi Block, Lithium disilicate glass ceramic block for CAD/CAM, is developed with focusing on single-visit treatment (No heat treatment required after milling) in addition to LDS advantage.
The objective of this study was to evaluate the mechanical property and microstructure of the novel LDS glass ceramic block for CAD/CAM.

Materials and Methods: The specimens (diameter:12 mm, thickness:1.2±0.2 mm) of "Initial LiSi Block" (GC), Celtra Duo (Dentsply Sirona), VITA Enamic (VITA) and VITA MarkII (VITA) were prepared and polished with #1000 SiC paper. The bi-axial flexural strength of them were evaluated according to ISO6872:2015 (n=10). The results were analyzed by Tukey's test after one-way ANOVA.
To analyze micro structure of each material, SEM observation was carried out after 5N NaOH aq. etching.

Results: In bi-axial flexural strength test, Initial LiSi Block showed significantly higher mechanical property than other products

($p<0.05$). SEM observation confirmed high density and fine crystal smaller than 1 ?m precipitation in Initial LiSi Block glass matrix and revealed that LDS crystals of Initial LiSi Block were smaller than crystals of other products.

Conclusions: Initial LiSi Block has the highest mechanical property. This superior mechanical property would be achieved unique micro structure, fine and high density crystals. These results suggest that Initial LiSi Block is a useful restorative dental material for single-visit treatment and long-term success.

ORAL HEALTH-RELATED QOL OF NON-METAL CLASP DENTURES AND SDA WITH UNILATERAL MANDIBULAR DISTAL-EXTENSION EDENTULISM

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Keywords: oral health-related QOL, non-metal clasp dentures, SDA

Purpose/Aim: ?The aim of this clinical trial was to investigate the Oral health-related Quality of Life (OHRQoL) in patients to whom Non-metal clasp dentures (NMCDs), Conventional removable partial dentures (CRPDs) and Shortened dental arch (SDA) were applied in a private practice. The null hypothesis to be tested was that those options, NMCDs, CRPDs and SDA, for unilateral mandibular distal-extension edentulism do not lead to different OHRQoL outcomes.

Materials and Methods: The trial included twenty-four participants with a mean age of 59.0 years old (male 62.6, female 57.5; 24-85 years old).
?This study employed crossover design, a within-subject controlled clinical trial, for three treatment options (A: NMCDs, B: CRPDs, C: SDA). All experimental procedures were approved by the Ethics Committee of Nagasaki University Hospital (ref: 15022313) and was registered in the ISRCTN registry (TRIAL ID: ISRCTN49105064). All patients were fully dentate in maxilla and 2-3 teeth-unilateral mandibular distal-extension edentulism in mandible.
?The differences of QHRQoL scores between the three treatment options were estimated using the mixed effects model. In this study, a Japanese version of OHIP (OHIP-J49) was used.

Results: There was a mean (standard deviation) of total QHRQoL score was 48.83 (±35.76) for SDA, 60.63 (±28.91) for CRPDs, 42.67 (±21.23) for NMCDs, respectively. CRPDs were larger than SDA and NMCDs and these differences were statistically significant(Fig). The null hypothesis was rejected.
?Similarly, CRPDs were larger than SDA and NMCDs in the oral function dimension and these differences were also statistically significant. In the oro-facial appearance dimension, CRPD and SDA scores were larger than NMCD, but no statistical significance was observed between CRPD and SDA treatment options. In the oro-facial pain dimension, CRPDs and NMCDs showed larger scores than SDA; however, these differences were not statistically significant. There were no statistically significant differences in the psychological impact dimension.
?The mixed effect model investigated the effect of other factors. The Gender and Gender Treatment option interaction were statistically significant, and gender was considered to have some effects on the total QHRQoL score. Regarding the SDA treatment option, there was a significant difference between males and females. The total QHRQoL score of SDA in males was significantly lower than that in

females.

Conclusions: In conclusion, NMCDs and SDA with unilateral mandibular distal-extension edentulism were superior to CRPDs concerning OHRQoL, particularly, in the oral function dimension. However, gender had a significant effect on the score.

INHIBITORY EFFECTS OF VIBRATORY STIMULUS VIA AN OCCLUSAL SPLINT ON SLEEP BRUXISM

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Keywords: biofeedback, masseter EMG activity, stabilization splint

Purpose/Aim: Although sleep bruxism (SB) is one the most important clinical problems in dental practice, there is no definitive method for controlling it. We previously investigated the immediate effects of vibratory stimulation via the occlusal splint (OS) on SB and sleep structure, which was evaluated by using a portable polysomnography (PSG) recording device, and reported significant reduction in SB duration without causing substantial sleep disturbance (Nakamura et al., Sleep Breath. 2019); however, the short-term inhibitory effects of the OS may have confounded the found association. Therefore, this study aimed to elucidate the effects of vibratory stimulation on SB when the inhibitory effects of the OS diminished after having the subjects use the OS for 2 weeks for adaptation.

Materials and Methods: Fourteen SB subjects participated in the study after providing informed consent. A force-based SB detection system, which used a piezoelectric film embedded in the OS, was utilized to trigger vibration feedback stimuli. The SB level and sleep structure were evaluated using portable PSG recordings in the subjects' home environment. The subjects were asked to wear the OS for 20 nights. During the first 16 nights, which was regarded as the adaptation period, no vibration stimulus was applied. Vibration stimuli were applied on the 17th to 20th nights, wherein vibration feedback stimuli were applied intermittently for 30 minutes, with 30 minute-intervals.
The sleep variables and the two SB variables (the number of SB episodes per hour and the total SB duration per hour) were compared among the nights by Friedman's test. The effects of vibration stimuli on the two SB variables were tested using a Wilcoxon signed-rank test.

Results: No significant difference was found in the sleep variables throughout the experiment.
The two SB variables were statistically different depending on the experimental nights ($p < 0.05$, $p < 0.05$, respectively). For the changes over the time using the OS, both SB variables decreased significantly on the 1st night of OS usage ($p = 0.009$, $p = 0.002$) and then significantly increased to a level comparable with the baseline on the 15th night.
Regarding the effect of the vibratory stimuli applied on the 17–20th nights, both the number and total duration of SB episodes per hour were significantly decreased by vibratory stimuli (without stimuli: median = 5.2, with stimuli: median = 3.9, $p = 0.001$, without: median = 35.3, with: median = 15.1, $p = 0.002$).

Conclusions: These results indicated that the SB inhibition system might suppress the number and duration of SB episodes without substantial sleep disturbance even after adaptation to the OS and be an effective for the management of SB.

EPITHELIAL AND CONNECTIVE TISSUE SEALING AROUND TITANIUM IMPLANTS WITH VARIOUS TYPICAL SURFACE FINISHES

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Keywords: Implant surface, Epithelial attachment, Connective tissue binding

Purpose/Aim: The success of dental implants dependents on a soft tissue barrier that protects underlying hard tissue structures. Numerous surface modification techniques have been introduced to enhance bone contact on the implant surface, but there has been little research on the peri-implant soft-tissue (PIS) seal. This study aimed to investigate the "biologic width" of epithelial and connective tissues seals around implants with various surface finishes.

Materials and Methods: Testing surfaces had been machined (Ms), roughened by sandblasting and acid etching (Rs), treated hydrothermally with CaCl2 (Cs), or anodized (As). (1) For the in vitro study, rat oral epithelial cells (OECs) and fibroblasts were cultured on Ms, Rs, Cs, and As titanium plates. (2) For the in vivo study, implants with Ms, Rs, Cs, and As surfaces were placed in the rat's oral cavity.

Results: (1) There was less cell adherence of OECs and more collagen expression when cultured on Rs and As plates than when cultured on Ms and Cs plates. (2) Although the PIS structure including the epithelial attachment and connective tissue binding was similar to that around natural teeth (Nt), there was divergence in the ratio of the lengths of each component. In addition, a horseradish peroxide assay revealed that the sealing ability around the Ms and Rs implants was weaker than that around Cs implants, which was almost identical to Nt. After 16 weeks, Rs implants exhibited peri-implant epithelial apical down-growth and had lost bone support, presumably because their resistance to penetration by epithelial attachment was low with this surface type.

Conclusions: In conclusion, although a smooth surface (Ms, Cs) showed better epithelial attachment, rough surfaces (Rs, As) are more suitable for binding to connective tissue. Strong epithelial attachment to the implant surface seems to be a fundamental first-line of defense against foreign body penetration. Thus selecting suitable surfaces to ensure strong sealing is important for implant success.

3D-PRINTING OFFERS NEW IMPRESSION PROCEDURES TO OVERCOME SEVERELY LIMITED MOUTH OPENING: ABOUT TWO CASES

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Keywords: maxillofacial prosthetics, limited mouth opening, scleroderma

Case Presentation: BACKGROUND: Some limited mouth opening do not respond to common treatments with exercise and stretching movements of facial muscles. For the prosthodontist, this restriction leads to ill-fitting prostheses, as the loaded tray is not properly inserted and aligned during the dental impression. This poster presents two customized impression procedures using 3D-printing for overcoming severely reduced mouth opening.
FIRST CASE: Surgery and radiation for head and neck cancer therapy left the patient with a palatal defect and a reduced mouth opening. A dental prosthesis could not be anatomically considered, but a palatal obturator could still improve the patient's quality of life. The soft tissues of the maxillary defect were segmented from the CBCT data and 3D-printed with resin. A palatal obturator prototype was made in silicone for try-in, and converted in resin after adjustments for insertion and retention.
SECOND CASE: The patient suffered from a severe diffuse systemic sclerosis resulting in a facial soft tissue fibrosis and limited mouth opening. For the rehabilitation with immediate complete dentures, the maxillary custom tray was sagitally split in two pieces. Two small hinges were 3D-printed and bonded to each side of the tray. This procedure allowed to insert the loaded half-trays successively into the mouth, and their assembly once inside.
DISCUSSION: Standard 3D-printing procedures can be helpful to accomplish the fundamental impression step and participate in the fabrication of a successful prosthesis.
CONCLUSION: Advances in 3D printing have resulted in new customized tools available for the treatment of challenging oral and

maxillofacial disorders, at an affordable cost.
CLINICAL IMPLICATIONS: Enhanced accuracy and accessibility of 3D printing technology offers new tools for impression procedures to overcome severely limited mouth opening.

DESIGN AND FABRICATION OF A FACIAL PROSTHESIS WITH IMMEDIATE LOADING FOLLOWING RHINECTOMY

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Case Presentation: The case presentation outlines the design and fabrication of a facial prosthesis loaded immediately following rhinectomy

REDUCED BONE MINERAL DENSITY ASSOCIATION WITH RADIOGRAPHIC SIGNS OF DEGENERATIVE JOINT DISEASE IN THE TMJ

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Keywords: temporomandibular joints (TMJ), degenerative joint disease (DJD), bone mineral density

Purpose/Aim: The aim was to detect the relationship between bone mineral density (BMD) and radiographic signs of degenerative joint disease (DJD) of the temporomandibular joints (TMJ) in elderly edentulous females.

Materials and Methods: In the present study 84 edentulous females aged 65-91 years (average age 75.0 ± 6.3y) were included. All patients underwent cone beam computed tomography (CBCT) (Next generation i-CAT, Kavo eXam vision) examinations due to implant planning.
BMD measurements of lumbar spine L2-L4 and both femoral necks by dual energy X-ray absorptiometry (DXA) (Lunar DEXA DPX-NT, GE Medical Systems) were made. From DXA analysis the T-score reading was used.
The CBCT images were analysed with I-Cat Vision software and axially corrected sagittal and coronal images of each joint were obtain. All females were divided in two groups by two independent examiners for presence of absence of DJD according the criteria used for radiographic diagnosis by the DC/TMD Validation Project (Schiffman et al, 2014). Inter-observer and intra-observer agreement were assessed by calculation of weighted kappa statistic. The differences of mean values were tested using t-test.

Results: According to the CBCT results all females were divided into 2 groups: females with normal TMJ – 64 (mean age 74.44 ± 6.0 y), females with DJD in the TMJ -20 (mean age 77.1± 7.0 y). The age differences between groups were not statistically significant (p=0.10). Lower BMD were observed among edentulous females with DJD of the TMJ in lumbar spine (mean T-score= -1.73±1.3) and in femoral neck (mean T-score= -1.66±1.1) comparison to females with normal TMJ in lumbar spine (mean T-score= -0.74±1.6) and in femoral neck (mean T-score=-0.99±1.1). There was statistically significant difference between groups according BMD in lumbar spine (p=0.023) and femoral neck (p=0.026). The intra-observer and inter-observer agreement for DJD diagnosis detection was good.

Conclusions: Elderly edentulous females with DJD in the TMJ have lower BMD in lumbar spine and femoral neck than females with normal TMJ.

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FABRICATION OF REMOVABLE PARTIAL DENTURES BY FULLY DIGITALIZED WORKFLOW: A CASE REPORT

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Keywords: CAD/CAM, IOS, Denture

Case Presentation:
Background: Over the last decade, the fabrication procedure for removable partial dentures (RPDs) has been changed by a variety of digital technologies. This clinical report introduces a newly developed fully digitalized workflow for RPD fabrication, which utilize intra-oral scanner (IOS), computer-aided design and computer-aided manufacturing (CAD/CAM), and rapid prototyping (RP) technologies.

Technique / Case Report: A 62-year-old female, who receive a fixed partial denture (FPD) for the missing maxillary left first molar (#26) 5 years ago, was referred to the Department of Prosthodontics, Showa University for the prosthodontic treatment because abutment of the FPD (#25: maxillary left second premolar) suffered from root fracture. A full-arch digital impression of the maxilla and mandible and bite registration were taken by an IOS (TRIOS3, 3Shape) at her first visit. From the stereolithography (STL) data of the maxilla, the data of the #25 and #26 crown was removed in order to design immediate RPD. Using this STL data, the denture base was designed by CAD software and then molded by the 3D printer using polymethyl methacrylate (PMMA). The clasps and artificial teeth were designed by CAD software. The clasps were milled from polyetheretherketone (PEEK) blanks and the artificial teeth were from composite resin blanks, respectively. Finally, all of these components were assembled by bonding using the adhesive material after surface conditioning and the immediate RPD for missing teeth (#25 and #26) was fabricated. This RPD was delivered immediately after the extraction of the tooth #25.
After two months healing period, the mucosa of edentulous region (#25 and #26 region) was exclusively scanned by IOS. This partial STL data replaced the corresponding regional data of the original full arch STL data. Each component including clasps, artificial teeth and denture base were fabricated as the same manner as the immediate RPD. The framework of the major and minor connectors were designed by CAD software and milled from ceria stabilized zirconia and alumina composite (Ce/TZP-A) blanks. Finally, all of these components were assembled and the definitive RPD was constructed and then successfully delivered to the patient.

Discussion / Clinical Implications: The development of the fully digital workflow for RPD fabrication procedure changes the clinical and laboratory workflow significantly. Especially, conventional complicated laboratory procedures, such as casting of frameworks, arrangement of artificial teeth, or resin polymerization, were replaced with digital workflow, which simplified the manufacturing process significantly. Besides, since all data, which were utilized through the treatment processes, were digitized, these data can be stored without spatial limitations and utilized for the maintenance after the prosthodontic treatments.

Conclusion: Within the limitations of this clinical case report, the reported techniques have a potential to changes clinical and laboratory workflow for RPD fabrication from analogue to digital.

CORROSION BEHAVIOR OF PASSIVE FILMS ON VITALLIUM CASTING ALLOY IN SIMULATED ORAL ENVIRONMENT WITH FLUORIDE

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Keywords: Vitallium 2000; artificial saliva; prosthodontics; passive film; corrosion

Purpose/Aim: The purpose of this study was to evaluate the influence of fluoride irons on the corrosion behavior of passive films on Vitallium 2000 CoCrMo casting alloy in simulated oral environment.

Materials and Methods: There was only one material choosed in this experiment, Vitallium 2000 CoCrMo casting alloy, which was made into different shape samples according to different test requirement. Methods adopted in this experiment are electrochemical techniques including open circuit potential(OCP), potentiodynamic polarization and electrochemical impedance spectroscopy(EIS), and surface characterization observation with scanning electron microscopy(SEM) and X-ray energy dispersive spectroscopy(EDS) after Vitallium 2000 CoCrMo casting alloy samples had been immersed in fluoride-containing artificial saliva with different NaF concentrations (0.05wt.% and 0.1wt.%) at 37? for different time(10,20,and 30 days), separately.

Results: The results from electrochemical measures showed that the OCP of Vitallium 2000 casting alloys moved to the negative direction and the thermodynamic stability of the alloy decreased with the concentration of fluoride increased in artificial saliva. The polarization curves of Vitallium 2000 casting alloys in artificial saliva show typical characteristics of metal passivation polarization. With the concentration of fluoride increased, the polarization curves move to the lower right, the self-corrosion potential (Ecorr) moves downward, and the self-corrosion current density (icorr) increases, the Nyquist capacitive arc radius and polarization resistance (Rp) of

alloys decrease gradually. Obvious pitting pits can be seen in SEM images, meanwhile the longer the immersing time, the higher the fluorine iron concentration and the more pitting pits. From the results of EDS, there were no significant differences in the types and contents of elements inside and outside pitting pits with different fluorine ion concentrations. By comparing the differences of element types and contents inside and outside pitting pits, it can be found that inside of pitting pit contains mainly Si, Cr and Co, whereas outside Cr, Co and Mo; the content of Cr and Co inside is much less than outside.

Conclusions: To a conclusion, the presence of fluorine ion weakens the protective effect of passivation film and decreases the corrosion resistance of Vitallium 2000 CoCrMo casting alloy, and it will be worse with the fluoride concentration increased. For patients who have Vitallium 2000 CoCrMo casting alloy prostheses clinically, we should give some instruction when they use fluoride products, such as fluoride mouthwash, fluoride gelatum, fluoride denture cleaning products and so on, to avoid adverse effects of fluoride ions on the prosthesis.

CHANGE IN THE CONCENTRATION OF VOLATILE SULFUR COMPOUNDS IN PATIENTS USING REMOVABLE DENTURES.

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Keywords: dentures, volatile sulfurs compounds, hygiene

Purpose/Aim: The aim of the study was to examine the dependence or long-term use of complete dentures and the hygiene status of the restorations causes an increase in the level of volatile sulfur compounds (VSC) in the exhaled air.

Materials and Methods: The study included a group of 100 patients aged 33-84, using complete (upper and lower) dentures, in 3 years, 5 years and over 5 years. The patients came to the Clinic of Prosthodontics of the Medical University of Poznan in order to perform new prosthetic restorations. A portable monitor for testing volatile sulfur compounds - Halimeter, which determined their level in parts per billion (ppb), was used in the study. The measurement of the breath composition in the oral cavity was performed twice - with old dentures and after insertion of the new dentures. The study was supplemented by an assessment of health of prosthetic field according to Newton classification and an assessment of the amount of plaque based on the modified index of the plaque for total dentures according to Ambjörnsen and ImageJ programm. A questionnaire was also used that included questions about general health, co-occurring systemic diseases, eating habits and the hygiene of used dentures.

Results: In the studied group of patients it was found that prosthetic restorations used for more than 5 years cause a noticeable change in the level of exhaled breath VSC expressed in ppb, compared to the results obtained after the insertion of the new denture and patients properly caring for both oral hygiene and prosthetic restorations.

Conclusions: Long-term use of removable prosthetic restorations is associated with an increase in the concentration of volatile sulfur compounds (VSC).
Patient's education regarding the proper hygiene of dentures and oral mucosa, and especially the tongue, is of great importance in the prevention of halitosis.

ELECTROMYOGRAPHIC ANALYSIS OF MASSETER MOTOR UNIT

ACTIVITY USING MULTI-CHANNEL SURFACE ARRAY-ELECTRODES WITH MODIFIED SPIKE TRIGGERED AVERAGING

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Keywords: masseter muscle, motor unit, electromyogram

Purpose/Aim: Electromyography is widely used for evaluating stomatognathic functions for both research and clinical purposes. Surface electromyography records mass muscle activity on the body surface, but does not easily allow direct observation of motor unit (MU) activities inside the muscle. This study aimed to investigate how the masseter MU action potentials (MUAPs) are modified by passing through the muscle tissues to the body surface.

Materials and Methods: Teflon-coated needle and surface multichannel array electrodes were used to record the electromyographic activity of the right masseter muscle in five subjects. The surface array electrode comprised 12 linear array electrodes (diameter: 1 mm; length: 10 mm) fixed in parallel at 5 mm intervals on the silicone rubber and attached to the masseter surface. The needle electrode was vertically inserted through the hole in the center of the surface array electrode. A disposable surface electrode was placed as a reference electrode in front of the surface array electrode, and bipolar derivation was performed between the needle and the reference electrodes. The depth of the needle electrode tip was estimated by measuring the remaining needle length protruding from the skin surface. Single MU waveforms were extracted from the surface electromyographic signal via modified spike-triggered averaging processing (i.e., the MUAP obtained from the needle electrode was used as a trigger). The following parameters of the signal-processed MUAP signals were evaluated and compared among the channels: phase, amplitude, interval time between positive and negative peaks, and peak power frequency.

Results: Sixty-three single MUs were extracted from the surface electromyogram as signals synchronized with the needle electromyogram. Forty-nine MUs displayed biphasic waveforms, while 14 MUs exhibited multiple-phase composite waveforms. Thirty-nine of the biphasic MUs exhibited phase reversal across the surface electrode array, while 10 exhibited no phase reversal. Larger numbers of MUs with phase reversal were recorded as the MU recording site became more superficial ($p < 0.05$; chi-square test).

Conclusions: As phase reversal is considered to occur at the neuromuscular junction, the present results indicate that the structural properties of MUs (i.e., MU territory size, shape, and location) may affect the surface electromyograhic findings.

CLINICAL ASSESSMENT OF MAXILLARY SINUS FLOOR AUGMENTATION USING CARBONATE APATITE: A 30-MONTH FOLLOW-UP STUDY

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Keywords: Carbonate apatite, sinus floor augmentation

Purpose/Aim: Carbonate apatite (CO3Ap), an inorganic component of human bone, can be fabricated in chemically pure form from calcium carbonate block via a dissolution-precipitation reaction. A first-in-human clinical trial was conducted to evaluate the safety and efficacy of CO3Ap granules in sinus floor augmentation. The aim of the present study was to report the results of this clinical trials and to discuss the effectiveness of CO3Ap granules as bone substitute in maxillary sinus floor augmentation.

Materials and Methods: Ethical permission was given by Kyushu University Hospital ethics committee and informed consent was obtained from all participants. Treatment procedure was staged approach in all cases. Prior to maxillary sinus floor augmentation and implant placement, maxillary bone height was measured using computed tomography (CT) images. Implants were placed at augmented sites 6 to 10 months after the augmentation procedure. During implant placement, insertion torque value was recorded. To evaluate bone created by CO3Ap granules around implants, the patients were followed 30 months after augmentation clinically (implant survival, stability and screw loosening) and radiologically (peri-implant bone resorption: panoramic radiographic assessment).

Results: Six subjects (3 males and 3 females, mean age: 64.8±8.5) were selected according to our inclusion and exclusion criteria. The mean values of preoperative and postoperative maxillary bone height were 3.0±1.5mm and 10.0±1.4mm, respectively. Although residual CO3Ap granules were found in some cases during the implant placement, all implants were placed uneventfully. The mean insertion torque value was 24.8±14.0Ncm. At 30-month follow-up visit, all implants were in function without any problems and screw loosening were not observed. Panoramic radiographic assessment demonstrated that no abnormal bone resorption of the augmented areas was

observed and bone height supporting the implants was maintained.

Conclusions: Within the limitations of the present small investigation, CT and panoramic radiographic images, and clinical findings showed that CO3Ap granules were effective and safe materials for sinus floor augmentation. In addition, they possess the capacity to provide implant stability. More cases with long term observation is imperative to investigate the influence of CO3Ap granules as bone substitute.

ANTIBACTERIAL DENTAL ADHESIVE CONTAINING CETYLPYRIDINIUM CHLORIDE MONTMORILLONITE

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Keywords: Antibacteria, Dental adhesive, Cetylpyridinium chloride montmorillonite

Purpose/Aim: Bioactive adhesives that besides good bonding ability as primary property have an additional therapeutic effect may become the next generation of dental adhesives. In light of this objective, we prepared a new antibacterial adhesive by adding the antibacterial agent cetylpyridinium chloride (CPC) as loaded in an inorganic montmorillonite (Mont) carrier, being referred to as 'CPC-Mont'. CPC is a sacationic quaternary ammonium compound with antiseptic properties, typically used in mouth rinses or tooth pastes. The purpose of this study was to determine the optimal concentration of CPC-Mont when added to a self-etch adhesive.

Materials and Methods: Experimental bonds were prepared by adding CPC-Mont in concentrations of 1, 3, and 5wt% to the dental adhesive (Clearfil SE Bond 2; C-SE2; Kuraray Noritake) as part of a 2-step self-etch adhesive, with C-SE2 without CPC-Mont serving as control. Regarding primers, all experiment used intact ones. 'Immediate' (7d water storage) and 'aged' (100k thermocycles) bonding effectiveness to bur-cut dentin were tested in terms of micro-tensile bond strength (μTBS) using the composite Clearfil AP-X (Kuraray Noritake). Antibacterial activity was evaluated by bacterial growth of Streptococcus mutans. Micro-Raman spectroscopy was used to measure the degree of conversion upon proper light-curing (Bluephase 20i, Ivoclar Vivadent: 'high mode' with an output of 1200 mW/cm2). All data were analyzed using two-way ANOVA and Tukey's post-hoc test for multiple comparisons ($p<0.05$).

Results: No difference in immediate/aged bond strength was recorded between the experimental adhesive formulations and the control, except for the significantly lower μTBS of C-SE2_5%CPC-Mont. Bacterial growth for 24h/7d was significantly lower for C-SE2_1/3%CPC-Mont than for C-SE2_5%CPC-Mont and the C-SE2 control. The 24h/7d degree of conversion of C-SE2_5%CPC-Mont was significantly lower than that of the other experimental formulations and the control.

Conclusions: In conclusion, the experimental 2-step self-etch adhesive formulations containing 1 and 3wt% CPC-Mont were the most promising antibacterial adhesives.

COMBINED PROSTHODONTIC AND SURGICAL MANAGEMENT OF PATIENTS WITH AMELOGENESIS IMPERFECTA: CASE SERIES OF THREE PATIENTS

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Keywords: : Prosthodontic, Surgical, Amelogenesis Imperfecta

Case Presentation: Background: Amelogenesis Imperfecta (AI) is an inherited condition that affects the structure of enamel of both sets of dentition. Hypoplastic, hypocalcified, hypomaturation and hypomaturation-hypoplastic phenotypes have been described. Five genes namely: - AMELX, ENAM, MMP-20, KLK4 and FAM83H have been implicated. The concerns for adults with AI are:- poor aesthetics, sensitivity, open bite, insufficient functional occluding units.

Purpose: To demonstrate the benefit of muldisciplinary collaboration in the management of adult patients presenting with amelogenesis imperfect (AI) but lacking restorative space.

Methods: Impressions were taken using irreversible hydrocolloid (BluePrintR) and poured in Type III gypsum to generate study casts. Using a face-bow record, these were mounted in a semi-adjustable articulator (Dentatus ARH). Reference points were made on the casts after careful evaluation by the prosthodontic and surgical teams. Mock "cast surgery" was rehearsed on one half of the casts but sparing the palatal/lingual. Base plate wax was adapted on the reduced casts to assess for adequate room for denture teeth but maintaining the occlusal vertical dimensions.

New set of impressions were taken using irreversible hydrocolloid in custom trays and poured in type III gypsum to generate working casts. The aforementioned procedure was repeated and selected complete denture teeth arranged. The patients approved of the set up before processing and finishing. Surgical phase was undertaken under general anaesthesia and the dentures fitted intra operatively. Tissue conditioner (Coe Comfort) was applied to the dentures on the third day post operatively and changed every one week for a month. Thereafter, monthly follow ups for 6 months.

Results: The patients reported satisfaction with the outcome as far as their appearance, ability to masticate and enhanced self-esteem. The ladies have since been married and now have babies. The male patient appeared in TV commercial for the Bank for whom he works.

Conclusion: Despite providing a removable option, satisfactory outcome can be possible with a combined prosthodontic and surgical approach for adult patient with AI but with no prosthetic space.

Clinical Implication: Despite providing a removable option, improvement of the concerns of the affected persons was achieved. Hence, improved oral health – related quality of life (OHRQoL).

MAXILLARY MOLAR INTRUSION BY USING MINI IMPLANTS FOR PROSTHETIC REHABILITATION: CASE REPORT

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Keywords: mini implant, intrusion, overeruption

Case Presentation: Overeruption of molars in patients who have lost the opposing molars is frequently observed. This situation causes occlusal interferences and periodontal problems. Maybe the most important thing about this oral situation is prosthetic rehabilitation may be impossible. When maxillary molars are extruded, orthodontic intrusion is a noninvasive treatment option.

This case report presents the use of orthodontic mini implants to intrude an overerupted maxillary second molar as a strategy to obtain adequate interocclusal space for replacing a missing second lower opposing molar. Standard implant was placed in the tooth region (47) prior to mini-implants. While waiting for the osseointegration, the mini implants were placed for tooth intrusion (17). At the end of 5 months, the molar intrusion was performed in sufficient quantity and the prosthetic treatment process started. Extraoral cementation of implant crown which is an alternative prosthetic treatment option that designed to prevent periimplant complications of cemented crowns was applied for this case.

Molar intrusion using orthodontic mini implants is a conservative, predictable, cheap, and simple procedure that is well?tolerated by patients.

The patient did not show a relapse or adverse effects on the pulp or tissues. This noninvasive treatment option can offered to the patients who don't have adequate vertical dimension in the molar regions instead of invasive treatment options.

A FULLY DIGITAL WORKFLOW CHANGES THE APPROACH TO

DENTISTRY: A CASE STUDY

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Keywords: digital, workflow, implant

Case Presentation: The development of digital technologies in dentistry has changed the therapeutic approach in every kind of patients both in the preliminary stages of clinical case studies and when supporting the actual surgical and manufacture phases. The goals of the digital workflow are to reduce time and costs, to increase efficiency and precision and to improve the predictability of treatment outcome. A thorough description of a complex clinical case analyzes how these new digital technologies are used in every step of the surgical and prosthetic therapy to perform the reconstruction of a bar retained overdenture and full fixed prosthesis.

A PRELIMINARY STUDY ON THE ACCURACY AND COST OF A DIGITAL WORKFLOW FOR METAL-BASED FRAMEWORKS

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Purpose/Aim: The most cost-effective treatment for the replacement of missing teeth is by removable partial dentures, which can either be based entirely in acrylic resin, or be reinforced by a metal framework. Metal frameworks are traditionally made by the lost wax casting method. This is a lengthy and labour-intensive process that comprises many steps. A digitally constructed prosthesis can allow for the elimination of waxing on a comparatively rough refractory cast, which may reduce the potential for errors and result in better quality control in the dental laboratory and lead to improved framework fit. The purpose of this study was to compare the accuracy and comparative costs of a digital workflow that produced a milled hard resin framework pattern to be cast conventionally with an identical framework manufactured conventionally from a wax pattern.

Materials and Methods: A maxillary master cast was prepared with appropriate tooth preparations for an agreed design. From the master case, 6 casts were made and their accuracy determined using a Reflex Microscope (Consultantnet Ltd, Cambridge, UK). Three casts were scanned using an inEos extra-oral scanner (Dentsply Sirona, Germany). The other three casts were used for the conventional casting technique, by sending normal instructions for the design to a commercial laboratory. The three scanned models were imported into the design software (Sirona inLab, Dentsply Sirona, Germany) and a pattern designed on each in accordance with the design. The digital pattern was milled in a resin block (Vipiblock, Brazil). Each framework was measured using the reflex microscope at pre-determined points on the framework. Thereafter, the milled framework was sent to the same laboratory, together with its corresponding cast, with instructions to cast and finish the framework.

Results: The outcomes of the study will be presented in a graphic and diagrammatic format, comparing the accuracy of the digital versus the conventional casting methods.

Conclusions: A milled poly methyl methacrylate framework has the potential to reduce the cost compared with rapid prototyping and /or milling directly or sintering a framework. This study will establish the validity and viability of digital workflow and form a platform for future prospective studies.

MANAGING ANGULATED IMPLANTS IN ATROPHIC FULLY EDENTULOUS MAXILLA WITH IMPLANT SUPPORTED OVERDENTURE

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Keywords: angulated implants, atrophic ridge

Case Presentation: Introduction:
Top-down treatment planning is a critical key factor for success of implant prostheses. Proper communication between the restorative dentist and the surgeon to determine final treatment plan, using imaging guides then thorough analysis of CBCT images, and precisely using surgical guides during implant placement can prevent complications from malpositioned implants. However, sometimes we have challenges to deal with malpositioned or angulated implants when we take referrals. In this case presentation, details of full mouth rehabilitation with angulated implants and atrophic maxillary fully edentulous ridge will be reported. Some guidelines for predictable outcomes will also be reviewed.

Case Description: A 61-year-old female was referred to us for full mouth reconstruction. She presented with 3 implants in maxillary fully edentulous ridge and only tooth 35,34,33,43 remained in mandible. Clinical examination revealed small maxilla, shallow vestibule, and 3 angulated implants. Severe attachment loss was found in tooth 43 and tooth 33 was severe lingual titled. The patient did not want to receive any further implant surgery. The final treatment plan was maxillary single overdenture and mandibular Kennedy class I removable partial overdenture.
Pick up impression with polyvinyl siloxane was used to get implant analog model Double tray technique was used to get mandibular analog model. Determining of vertical dimension, bite registration, casts mounted on an articulator, and diagnostic wax up was done, Because the angles between 3 implant axes were too large to use separate locators, we designed a maxillary milled titanium bar i with CADCAM technique based on the wax up. Three implants was connected by the milled bar and 2 locators were attached on the bar to provide support, stability, and retention of overdenture.

Discussion: Proper impression technique to get accurate three-dimensional positions of angulated implants is very important for a passive fit milled bar. Using pick up technique, individual tray, polyvinyl siloxane, and verification jig to confirm the implant position should be performed before designing of bar. For malpositioned or angulated implants, connection with a bar provides support, stability, and retention of overdenture. And in fully edentulous maxilla, splinted anchorage for implants showed higher implant survival rate than the non-splinted anchorage. However, the patient will pay much higher laboratory fee for a milled bar. To prevention of unexpected expenses and complicated clinical procedures, prosthetic driven implant therapy should be carefully executed.

Conclusion: For unexpected angulated implants in a fully edentulous maxilla, splinted milled bar and overdenture is a good solution. To get the accurate implant analog model is critical to success.

CROSS CONTAMINATION DURING DENTURE FABRICATION

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Purpose/Aim: Contamination during denture fabrication can occur at any point between the laboratory and clinic. Contaminated denture surfaces are reservoirs and vehicles for both opportunistic and pathogenic microorganisms between patients and dental personnel. This study assessed the level of cross contamination between the clinic and the laboratory, as well as the efficacy of a currently used disinfectant.

Materials and Methods: Samples of denture debris, impressions, trial bases, primary and master casts and articulators were collected with sterile cotton tipped swabs after completion of each procedure prior to disinfection (if carried out) and then after disinfection. At least 10 samples were collected for each stage of denture manufacture. Common aerobic bacteria were isolated on several agar media. A disc diffusion test was used to determine the antimicrobial activity of Germicide 3 and Chlorhexidine disinfectants. Microbiological results were descriptively analysed, using both quantitative and qualitative analyses. The presence and absence of contamination was determined by a Chi-squared test.

Results: Mixed flora were present in 87% of the samples from the clinic. Streptococci had the highest prevalence (71.5%), with a cell count of >100 cfu/ml (32.6%). The least prevalent microorganism was Lactobacilli (11.7%). Disinfection in the clinic resulted in a reduction in numbers but not elimination of the microorganisms present. Primary impressions were disinfected in 70% of tested samples whereas try-in dentures were only disinfected in 30% of samples. The mean zone of inhibition of Germicide was greater with S. aureus and S. mutans. The zone of inhibition was comparable for both disinfectants with Candida. However, the zone of inhibition with Lactobacilli was greater with the 0.2% Chlorhexidine gluconate than the Germicide.

Conclusions: Streptococci, Lactobacilli, Candida, aerobic gram-negative bacteria and S. aureus were present at every stage of denture fabrication. The disinfectant used reduced the level of microorganisms but did not eliminate them. Thus clinicians must be cognizant of disinfection protocols and ensure complete item disinfection before and after laboratory transportation.

PERI-IMPLANT SOFT TISSUE HEALING WITH USING PROVISIONAL RESTORATIONS AFTER FLAPLESS POSTEXTRACTION SOCKET IMPLANT PLACEMENT

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Keywords: Dental papilla, immediate implants, implant prosthesis

Case Presentation: Background
The use of provisional restoration after immediate implant placement may promote peri-implant soft tissue healing. Provisional restorations encourage soft tissue and also support it from collapsing. This situation brings aesthetic advantage to the patients, but also brings immediate psychological relief.

Case Report: A 19-year-old female patient was admitted to our clinic with class 3 mobility in both central incisor teeth. In the anamnesis, it was learned that the patient experienced dental trauma history at the age of 10 years. In the radiological and clinical examination, maxillary central insisors endodontic treatments and horizontal root fractures were found. Mobile maxillary central incisors was extracted. Apical broken piece of roots was not extracted to protect the bone tissue. After the extraction, implants were placed to the sockets immediately then the impression was taken. Provisional restorations were prepared and attached to the implants the same day. Gingival recontouring was followed for 3 months. After the gingival reshapeing custom impression copings were prepared. Zirconia abutments planning on titanium base were used. After including the preparation of maxillary lateral insisors, totally 4 full ceramic restorations (3 crowns and 1 lamina restorations) were applied to the patient to ensure adequate aesthetics.

Discussion: The extraction of apical broken piece of roots and maxillary central incisors could be done with flap. But the tissue healing process would surely be badly affected. Bone augmentation could be prefered before the implant placement. But it would have to wait extra 4-6 months for bone healing and the result would be questionable. Custom impression copings could be prepared with different techniques. In a study of Chu and colleagues, they had stated that a prefabricated polymethyl methacrylate (PMMA) shell device was developed to replicate the shape and dimensions of the extracted root at the cervical area and properly support the subgingival mucosal tissues.

Conclusion: In order to obtain aesthetic results in the anterior region, the methods that will cause minimal damage to the tissues should be selected in the procedures. Immediate implant and provisional restoration placement can provide an acceptable tissue healing and can avoid tissue collapsing.

Clinical Implications: Some anatomical formations, such as buccal frenulum, may prevent adequate formation of the dental papilla.

MULTIDICIPLINER MANAGEMENT OF MISSING MAXILLARY LATERAL INCISORS IN PATIENT WITH OBLIQUE OCCLUSAL PLANE: CASE STUDY

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Keywords: hypodontia, oblique occlusal plane, aesthetic dentistry

Case Presentation: Background:
The purpose of this case study is to inform the readers about the rehabilitation of the aesthetic region with different aesthetic problems such as hypodontia and oblique occlusal plane.

Case Report: A 24-year-old female patient presented to our clinic with aesthetic complaints. The patient did not have maxillary lateral incisors congenitally and was oblique in the occlusal plane. The patient also had an unsuitable implant-supported fixed restoration in anterior region that make the rehabilitation harder. It was decided to replace the restoration with esthetic material and received periodic help from Periodontology to revise the soft tissue arch. Smile arc also remanaged with esthetic material Emax Press in golden ratio. Maxillary canines and premolars returned maxillary lateral incisors and canines with lamina restorations and full crown in full ceramic restoration.

Discussion: Actually an ortognatic and an orthodontic rehabilitation is need in this case. However the patient had neither the time nor the economic and psychologic condition to meet this.

Conclusion: It is tried to provide suitable and esthetic smile design with use multidisipliner managements to the patient with different dental problems.

Clinical Implications: Prosthondontics always provides patients rapid and acceptable solutions with use esthetic materials and aesthetic indications.

COMPARATIVE STUDY ON DIMENSIONS OF 3D PRINTED DENTAL MODELS OBTAINED AFTER INTRAORAL AND EXTRAORAL SCANNING

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Keywords: 3D printed models, intraoral scanners, extraoral scanners

Purpose/Aim: The aim of this study was to evaluate the accuracy of 3D printed dental models manufactured after intraoral (IO) and extraoral (EO) scanning.

Materials and Methods: A reference dental study maxillary model (Frasaco GmbH/Germany) was used for this research; standard preparations were made on different teeth by one trained, experimented doctor for certain types of fixed prosthetic restorations (1.2. - ceramic crown; 2.4., 2.5. – partial crowns; 2.7. – mesial-occlusal-distal inlay). In order to obtain a 3D digital reference model, the study model was scanned with an industrial scanner (XT H 225 ST/Industrial CT scan/Nikon Metrology Inc./U.K.); a reference STL file was generated (STL-R). Successively, the study model was scanned with an intraoral scanner (TRIOS 3 Battery Cart/3 Shape/Denmark) and with an extraoral (laboratory) scanner (Swing Dental Scanner/Dof Inc./South Korea). Based on the latest generated STL files, 3D printed models were produced according to the manufacturer's recommendations (Form2/FormLabs Inc./U.S.A.). Both obtained printed models were scanned with the industrial scanner, resulting in other STL files (STL-IO, respectively STL-EO). Scans were superimposed in pairs using 3D analysis software to evaluate the accuracy of the complete dental arch; the scanned image obtained with the industrial scanner (STL-R) was used as a reference. Scanned images were super-imposed by means of the software's best-fit algorithm method.

Results: Small differences appeared within studied groups, but all were within acceptable clinical tolerances.

Conclusions: Within the limitations of this study, we can conclude that good results were achieved in manufacturing the 3D printed dental models via IO or EO scanning, yet slight differences - within the limits of agreement - were noted. Further studies are currently performed to confirm the outcomes.

EXPLORING DIFFERENT MODULES FOR THE RESTORATION OF THE EDENTULOUS MAXILLA

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Keywords: Implants, edentulous, restoration

Case Presentation: Background
When it comes to the prosthetic rehabilitation of the edentulous maxilla there is a great number of options for the clinicians to select as far as the design and materials are concerned. Conventional dentures are of great acceptance to the elderly patients. However, edentulous patients of younger age expressing the desire for fixed restorations as well as special anatomic defects, such as the extreme resorption of the alveolar crest, lead to treatment plans including dental implants.

Aim
The aim of this report is to present all the available options to date, for the construction of implant supported restorations for the edentulous maxilla through the presentation of clinical cases.

Material and Methods
The parameters analyzed for the meticulous design of such prostheses are the number and type of implants, the type of restoration (fixed, removable or combination of both), the type of abutments selected and superstructure design, material and manufacturing methods, and the choices of the overlaying materials.
Two implants placed at the canine positions can serve for the fabrication of a fixed anterior partial denture supporting a removable partial denture through ERA attachments. Placing four implants is the minimum number for overdentures, while six implants is the least for constructing fixed restorations.
Frameworks can be constructed of metal, PEEK or Zirconia. The fabrication of metal frameworks can be achieved either by casting or by CAD/CAM Milling or Sintering. Whereas PEEK and Zirconia Frameworks can only be CAD/CAM Milled.
The evolution of teeth fabrication materials, with high optical and textural properties, allow these prostheses to achieve optimal aesthetics.

Results
The number of implants that can be placed in the edentulous maxilla due to anatomic defects, the ability of grafting or not, and financial potentials are most determining for the type of restoration to be chosen. Digital imaging of the final prosthesis and the fabrication of stereolithographic surgical templates lead to favorable implant placement and help deliver immediate prostheses to the implants. Material development can lead to reconstructions of great physical and aesthetic properties. The detailed planning from the very beginning makes the selection among all the analyzed factors easier, predetermining the cost, the time needed and a view of the final result.

Conclusion
This guide sets the clinical, biological and technical parameters that should be taken into consideration to the selection of implant type, the superstructure parts, the materials and the designs particularity when rehabilitating patients with implant supported prosthesis.

RETROSPECTIVE CLINICAL EVALUATION OF IMPLANT-ASSISTED REMOVABLE PARTIAL DENTURES COMBINED WITH IMPLANT SURVEYED PROSTHESES

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Keywords: Implant-assisted removable partial dentures

Purpose/Aim: To evaluate the clinical status and complications of IARPDs combined with implant surveyed prostheses in terms of clinical tissue condition, marginal bone resorption, and prosthetic complications.

Materials and Methods: Patients treated by IARPDs combined with implant surveyed prostheses and had worn an IARPD at least 12 months were included. 24 patients (25 cases, 12 maxilla and 13 mandible) were selected, and 80 implants used as abutments for IARPDs were surveyed. Average follow-up was 27.6 months and maximum follow-up was 78 months. Implant cumulative survival rate, marginal bone resorption, probing depth, peri-implant inflammation, bleeding, plaque, calculus, and complications were evaluated.

Results: No implant failure occurred and all implants functioned without clinical mobility. Mean marginal bone resorption of implants at 1 year after loading was 0.772 ± 0.63 mm, and mean probing depth was 3.36 ± 0.06 mm. No patient developed peri-implantitis and no implant failed. Two clasp fractures, one rest fracture, de-cementation, and a porcelain fracture of implant surveyed prostheses were detected at 12 months after loading.

Conclusions: Within the limits of the present study, it was found that well-planned IARPD using implant surveyed prostheses was clinically appropriate. Longitudinal and systematic clinical studies are necessary to confirm these results.

DIGITAL SMILE DESIGN IN THE INTERDISCIPLINARY MANAGEMENT OF AN ATTRITION PATIENT, 4Y FOLLOW-UP

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Keywords: Attrition, Toothwear, LithiumDisilicate

Case Presentation: Communication within the different parts of the interdisciplinary team is of utmost importance in order to deliver good results in the functionally /esthetically challenging case. Digital Smile Design as a communication instrument allows better understanding and more accurate information transmission within the team.
The following clinical case uses Digital Smile Design as a means of evaluation and communication in the treatment planning and execution of a extensive fixed prosthodontics case by the means of extensive reconstruction with fixed lithium disilicate toothborne reconstruction.
43 years old male patient presents to the prosthodontic clinic in Santiago, Chile with a chief complaint of unaesthetic anterior tooth wear, describes difficulty to cut thin articles with anterior teeth.
Upon clinical examination, severe tooth wear in anterior zone, loss of tooth guidance, anterior open bite. Altered plane of occlusion weres observed. Full photo/ video evaluation and DSD protocol was applied. This protocol improves communication within the interdisciplinary team and allows the prosthodontist to provide the information required by the lab technician in order to provide esthetic wax-up. This esthetic wax-up, tried in as a mockup, is followed by the functional wax-up, which will then be used as a template for aesthetic crown lengthening, as well as crown prep, provisional and final restorations.
Full crown monolithic Lithium Disilicate restorations, were used for reconstruction of a severely worn dentition, altered occlusal plane, and functional alterations, loss of anterior guidance reconstruction as well as establishment of an adequate occlusal plane and anterior aesthetics.
DSD protocol provides an excellent way to communicate within the interdisciplinary team and allows interaction between all member of this team in order to provide the best standard of care in restoring a esthetically challenging restorative case.

Up to 4 years of case follow up is presented.

DOES PROBIOTIC LACTOBACILLUS HAVE THERAPEUTIC EFFECT ON PERI-IMPLANT DISEASES: A SYSTEMATIC REVIEW AND META-ANALYSIS?

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Keywords: Probiotic, Peri-implant disease, Meta-analysis

Purpose/Aim: The success of implantation can be affected by biological complications of peri-implant diseases (peri-implant mucosistis and peri-implantitis). Recently, there has been an increasing interest in using probiotic as an adjunctive means to the treatment of peri-implant diseases. However, evidence from available clinical studies (RCTs) showed controversial results on this topic. The present systematic review with meta-analysis aimed to evaluate the additional efficacy of Lactobacillus in the management of peri-implant diseases.

Materials and Methods: Six databases (PubMed/Medline, Embase, Cochrane Library, Web of Science, Wiley and Elsevier) were searched up to May 2019 without time and language restrictions. Study selection and data extraction were conducted by two reviewers independently. The inclusion criteria applied to this review were founded on the PICOS format. Randomized controlled trials (RCTs) comparing nonsurgical treatment combined with probiotic Lactobacillus or placebo agent in patients with peri-implant diseases were

included. The methodological quality of retrieved studies was assessed according to the Cochrane Collaboration's Risk of Bias tool. Odds ratio (OR) and 95% confidence interval (CI) were applied for dichotomous data, while mean difference (MD) and standardized mean difference (SMD) with 95% CI were applied for continuous variables.

Results: Seven RCTs with 296 implants were involved in this meta-analysis. Lactobacillus showed additional effect than placebo in peri-implant mucositis. The MD of probing pocket depth (PPD) immediately after treatment termination was -0.05 (95% CI: -0.28 to 0.18; P = 0.67) and -0.50 (95% CI: -0.61 to -0.40; P < 0.00001) at least two months after treatment termination. It showed no significant differences for the secondary outcomes of bleeding on probing (BOP) or plaque index (PI) (P > 0.05). In a narrative synthesis of peri-implantitis, the effect of Lactobacillus on PPD and BOP remained controversial.

Conclusions: The systematic review showed that probiotic Lactobacillus didn't provide additional benefits to the nonsurgical treatment of peri-implant mucositis or peri-implantitis when compared with placebo agents except for the PPD index. Well-designed RCTs are warranted to identify better choice of probiotic strains, local and/or systemic use, and the frequency of intake in the future.

EFFECT OF NANO-HYDROXYAPATITE CONTAINING DESENSITIZING TOOTHPASTES ON THE BONDING PERFORMANCE OF TWO SELF-ETCH ADHESIVE SYSTEMS

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Keywords: dentine hypersensitivity, self-etch adhesive, bond strength

Purpose/Aim: As a popular desensitizing strategy, nano-hydroxyapatite (nHAp) containing toothpastes may modify the surface properties of dentin, which is pivotal as a bonding substrate in the resin-dentin bonding. However, whether the modification affects the bonding performance of adhesives remains unknown. The present study aimed to evaluate the dentinal tubular occlusion of nHAp containing desensitizing toothpastes and their influence on the resin-dentin bonding performance of two mild self-etch adhesives.

Materials and Methods: Mid-coronal dentin specimens were prepared from obtained intact human third molars. They were immersed in 1 % citric acid for 20 s to expose the dentinal tubules to simulate sensitive teeth and then randomly divided into four groups. The control group received no desensitizing treatment. Experimental groups were treated with two commercial nHAp containing desensitizing toothpastes (Biorepair and Dontodent) and an experimental pure nHAp paste respectively. Each group was further divided into two subgroups and bonded with either G-Bond or Clearfil S3 Bond. The micro-tensile bond strength was tested and failure mode distribution was analyzed. Moreover, the effect of desensitizers on dentinal tubular occlusion was observed by the field-emission scanning electron microscope (FESEM). Resin infiltration of the adhesives labeled by fluorescent Rhodamin B was evaluated under confocal laser scanning microscopy (CLSM).

Results: FESEM revealed that all the desensitizers noticeably occluded the dentinal tubules, and the extents were completer after application for 7 days. The majority of the occlusion still preserved even after acid challenge with cola or adhesive. CLSM demonstrated shorter resin tags were produced in the desensitized groups. When boning with G-Bond, the pure nHAp group showed comparable bond strength to the control group, while Biorepair and Dontodent treatment decreased the bond strength. For groups bonded with Clearfil S3 Bond, all the desensitizers reduced the bond strengths compared to the control and no significant difference was found among the three groups.

Conclusions: Nano-hydroxyapatite containing desensitizing toothpastes could occlude dentinal tubules effectively with a certain degree of acid resistance, which contributes to the relief of dentin hypersensitivity. While, the application of these nHAp desensitizers comprised the resin infiltration of G-Bond and Clearfil S3 Bond, resulting in decreased bond strengths of the resin-dentin bonding.

FIXED PROSTHODONTICS IN COTE D'IVOIRE, WEST AFRICA: KNOWLEDGE AND PRACTICES OF CAD/CAM

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Keywords: Fixed dental prosthesis, CAD / CAM, Knowledge

Purpose/Aim: BACKGROUND
Technological innovations have taken over the daily practice of dentists. They have increased the level of their technical platforms, expanded therapeutic offers and improved the quality of prosthetic care offered and dispensed to patients.
At the impression stage, the transmission of clinical data to the laboratory has evolved considerably. From the conventional impression with elastic materials, the digital impression is now used thanks to the contribution of digital technology. But, moreover, the image obtained on computer can be treated by a software which allows a virtual design and realization of the fixed dental prosthesis. It is now possible, thanks to Computer Aided Manufacturing Design (CAD / CAM) to make virtual simulations of the therapeutic project and to fabricate the prosthesis. In Cote d' Ivoire, does this new fixed prosthodontic technique have a real impact on daily practice?
OBJECTIVES
- Appreciate the level of knowledge of Cote d' Ivoire practitioners on CAD / CAM.
- Determine the rate of use of CAD / CAM in fixed prosthesis.

Materials and Methods:
-This study targeted 158 dentists from the private and public sectors of the Abidjan district and the academic staff from the Patient care services of the University Hospital of Cocody-Abidjan, through a self-administered questionnaire from July 2017 to October 2017.
-The data entered was processed using the software Epi-info7, Word2013, Excel2013 under Windows 8.1. Correlation was done using the Fisher test. The level of significance was set at p ? 5%.

Results: Only 33% of the sample know computer-aided design and manufacturing
Only 8% of practitioners with CAD / CAM knowledge make it.
80% of respondents believe that one of the difficulties of acquisition and implementation of CAD / CAM is the lack of training.

Conclusions: It is clear that in Côte d'Ivoire, knowledge of CAD / CAM is low. And this is reflected in the practice of this technique where the rate is also low. It would be essential to integrate practical training modules in both initial and continuing education and to facilitate the importation of CAD / CAM devices in order to reduce the costs of treatment deemed to be expensive.

HYBRID DIGITAL–ANALOG WORKFLOW IN FABRICATING ORBITAL PROSTHESIS: A CASE REPORT

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Keywords: orbital prosthesis, digital workflow, maxillofacial prosthetics

Case Presentation:
Introduction: To restore extra-oral facial defects, a traditional moulage technique is often employed. This is often uncomfortable for patients, and there is potential for distortion due to patient position and weight of the material and may result in more clinical time spent and more patient visits to compensate for said distortions.
This case presentation describes the use of cone beam computed tomography (CBCT) to acquire data on the defect morphology in the fabrication of an orbital prosthesis.

Case Presentation: Mr TCH is a 55-year-old Chinese male diagnosed with melanoma of his right eyelid. He underwent right orbital exenteration and subsequently presented at the National Dental Center Singapore (NDCS) for fabrication of an orbital prosthesis.

In lieu of a traditional facial moulage, a limited field of view CBCT was taken. Computer aided design was used to design the orbital prosthesis. This was then 3D printed with biocompatible resin and tried in on the patient to ensure fit and determine optimal extensions for the final orbital prosthesis. A custom made ocular prosthesis was also fabricated at the same time. The 3D printed prosthesis was then converted to wax and the position of the iris was determined clinically. A negative model of the defect site was created using dental plaster. The silicone orbital prosthesis was then fabricated using conventional laboratory procedures.

Discussion: The use of digital technologies in the fabrication of maxillofacial prosthetics has become increasingly widespread. In this case report, only visualization and design of the prosthesis were achieved using digital technologies as rapid prototyping of silicone materials and wax were not readily available.

Conclusion: Numerous challenges remain in the fabrication of maxillofacial prosthetics using digital technologies and a fully digital workflow may not be feasible at this point in time. Nevertheless, digitization may offer advantages over conventional workflows. Further studies are required to continue developing and refining digital workflows in maxillofacial prosthetics.

IN-VITRO INVESTIGATION OF THE SURFACE TOPOGRAPHY OF ZIRCONIA IMPLANT ABUTMENTS AFTER DIFFERENT POLISHING PROTOCOLS

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Keywords: implants, zirconia abutments, surface topography

Purpose/Aim: The success of an implant-supported restoration depends on the long-term stability of the soft tissue that surrounds it. There are many factors that can affect this stability, among which the surface topography of the implant abutment is of particular interest. The aim of the present study is to evaluate and compare the surface topography of zirconia specimens following different polishing protocols.

Materials and Methods: 50 square zirconia specimens (Zirkonzahn GmbH) were fabricated and divided into 5 experimental groups. In the control group (ZP1) no further processing was performed. For the polishing of the remaining specimens two different commercially available diamond-impregnated polishers were used ("Polisher 1": Meisinger GmbH, "Polisher 2": Ivoclar Vivadent AG), as well as a polishing paste for ceramics (OptraFine HP, Ivoclar Vivadent AG) in the following order: ZP2:Polisher 1, ZP3: Polisher 1+Paste, ZP4: Polisher 2, ZP5: Polisher 2+Paste. Polishing was performed in a specially designed, experimental unit, under controlled pressure and for a specific time. Specimens were then studied under an optical profiler and for each specimen parameters Sa, Sz, Sdr, Sds, Sci, Std were recorded. No filters were used.

Results: The control group presented with the highest values for all recorded parameters. Groups ZP2 and ZP4 showed statistically significant differences from the control group for some of the recorded parameters (Sa, Sz, Sds). Groups ZP3 and ZP5 showed statistically significant lower values compared to both the control group and groups ZP2 and ZP4 for the majority of the recorded parameters (Sa, Sz, Sdr, Sds).

Conclusions: No statistically significant difference was observed on the effect of the different polishers on the zirconia surfaces. The use of paste following the use of polishers affected significantly the zirconia surfaces, compared to the use of polishers only. The resulting surface consisted of some prominent peaks, however it was more flat and homogenous. During the manufacturing process, a trace was left which none of the studied polishing protocols was able to eliminate.

Clinical Implications: Based on the results of the present study, it would be recommended to polish custom-made zirconia abutments after the manufacturing procedure. Polishing should involve diamond-impregnated polishing systems, followed by the use of polishing paste.

THE BIOLOGICAL PRINCIPLES OF THE TEETH PREPARATION FOR FIXED RESTORATION (EXPERIMENTAL – CLINICAL STUDY)

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Keywords: tooth preparation, pathological change, pulpier region.

Purpose/Aim: To survive clinically and experimentally the histo-pathological changes that brings the traumatic preparation of the tooth for the prosthetic restoration.

Materials and Methods: The teeth were divided in 2 groups: In the first group were included the teeth where their preparation was carried out by water; and in second group were included the teeth where the preparation was carried out not used water (without-in dry). Every tooth was fixed in a 10% formaldehyde solution for 5 days. To de-calcification of the teeth, those were developed with EDTA solution, until to be soften and later were cute in transversal section.

Results: At the teeth preparation by the water was shown that remain glaze and dentine store their architecture. The pulpier tissue stores the partial connection with hard tissues of the tooth. The pulp's vitality is clearly observed, because is shown jointing of the pulpier tissue with dentine. While, at the teeth preparation without water (drying), were shown that architecture of the dentinal channels was pulled by the surface of the pulpier chamber. The pulpier region was accompanied by chronic necro-biotic changes.

Conclusions: The heating effect which was created during the teeth preparation without use of water (drying) cause the necro-biotic changes into the pulpier tissue.

STUDY ON THE CLINICAL EFFECT OF DIFFERENCE BETWEEN DIGITAL AND TRADITIONAL IMPRESSION FOR FIXED RESTORATION

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Keywords: Tooth defect; Fixed restoration; Oral digitization; Impression

Purpose/Aim: To compare the clinical effect and outcome of defected teeth restored with crown by digital system and traditional impression.

Materials and Methods: The cases of defected teeth which meet the inclusion criteria were randomly divided into two groups, which were undergone for restoration of PFM (A) or ceramic crown (B). In regard to A group, two approaches (A-1 digital impression, A-2 traditional impression) were conducted by the CEREC Omnicam scanning and traditional silicone rubber impression, respectively, and the same procedure was performed in B group (B-1 digital impression, B-2 traditional impression). Intraoperative emotion tensity was evaluated and clinical efficacy such as marginal adaptation, periodontal index was also investigated statistically.

Results: Statistical significance could not be found between two ways for the ceramic crown group on the clinical effect (P?0.05), while there was a statistical significance existed in the PFM crown group ($P < 0.05$). Moreover, it demonstrated emotion tensity could be reduced remarkably by digital impression.

Conclusions: Full crown restoration by digital system could achieve good clinical results compared with traditional impression, and rehabilitation based on the digital technique showed to have an advantage over traditional ones from the aspects of clinical experience with more comfort, which could take the place of traditional impression and provide new guidelines for future clinical practice.

THE CELLULAR RESPONSE OF DENTURE –BEARING TISSUES ON MECHANICAL STRESS IN DIABETIC CONDITIONS

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Keywords: VEGF, denture pressure, diabetes mellitus

Purpose/Aim: To determine VEGF levels in terms of chronically and acute pressure in underlying tissues in diabetic patients and animals with/without DM.

Materials and Methods: Healthy (42) and DM type 2 (36) patients wearing partial dentures for more than 5 years, candidates for teeth extractions were included in the study. For VEGF measuring (pg/ml) in terms of chronically pressure (5 years of denture wearing), 2 mucosal samples were taken during teeth extractions for each subject. Tissue samples were taken in the region that was covered by denture (compressive sample) as well as in the region that was not covered by denture. For VEGF measurement in palatal mucosa after 3 days wearing experimental plate (acute pressure), also 2 mucosal samples were taken (covered/not covered by experimental plate) in controls (20) and experimentally induced DM rats (20). The concentrations of VEGF in human and animal tissues (pg/mL) were measured by commercially available Enzyme-Linked Immunosorbent Assay (Human VEGFA ELISA Cell Culture Supernatant, Urine; RayBiotech and Rat VEGFA ELISA Kit for Cell Culture Supernatant, Urine; RayBiotech)
Results were presented as frequencies or as mean ± SD. Two-way ANOVA with repeated measures and Chi-squared test were used for comparisons between groups. One-way ANOVA with repeated measures and post-hoc Bonferroni test was applied within groups. Comparisons between appropriate group-time points were done by using Student's t-test for the independent samples. Significant differences were considered for $P<.05$. Data were analyzed with Stat for Windows 8, StatSoft, Inc, USA, 1984-2007.
Tissue VEGF levels were measured using ELISA.

Results: VEGF concentrations in mucosa not covered by denture were similar in control and diabetic partial denture wearers. In compressive samples VEGF significantly decreased in both groups, being significantly lower in diabetics, comparing to healthy patients. VEGF concentrations in palatal mucosa without palatal base were similar in control and diabetic animals. In the presence of palatal base VEGF concentrations were increased being significantly lower in diabetic animals comparing to controls.

Conclusions: Chronically mechanical stress decreases VEGF contrary to acute mechanical stress that increases VEGF in palatal mucosa. In DM, both acute and chronically compression are linked with impaired, lower VEGF levels, suggesting the altered homeostasis.

THREE-DIMENSIONAL ACCURACY OF IMPLANT ANALOGS IN THREE-DIMENSIONAL PRINTED RESIN MODELS

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Purpose/Aim: To study the effect of system, model orientation on printing platform, analog holder radial offset setting and time after print on 3D linear and absolute angular distortions of implant analogs in 3D printed resin models.

Materials and Methods: A sectional master model simulating a two-implant, 3-unit fixed prosthesis in a partially edentulous jaw was fabricated. Three digital analog systems - Straumann (ST), Core3DCentres (CD) and Medentika (MD), were tested. The corresponding scanbodies were secured onto the implant fixtures and scanned using an intraoral scanning device (3Shape Trios). Each system had two print orientations (transverse (X) and perpendicular (Y) to the printer door) and two radial offset settings (0.04mm and 0.06mm), with a total of 60 models (n=5). The physical positions of the implants in the master model and the analogs in the printed resin models were directly measured with a Coordinate Measuring Machine (CMM). The measurements were done at two timings: within 5 days (T1) and 1 month (T2). 3D linear and absolute angular distortions (?R and Absd? respectively) defined the 3D accuracy of the analogs in the printed models.

Results: Mean ?R at T1 for ST (-0.156 ± 0.0606mm), CD (+0.125 ± 0.0650mm) and MD(-0.093 ± 0.4796mm) were significantly different. Mean Absd? at T1 were not significant between ST (0.571 ± 0.4804?) and CD (0.414 ± 0.2690?), but both were significantly different from MD (2.114 ± 1.1392?). Model orientation and analog holder radial offset settings had no significant effect on ?R and Absd?. Time had no significant effect on ?R and Absd?.

Conclusions: 3D linear distortion in printed resin models were found to exceed values reported for conventional Type IV dental stone implant models (+18µm to +84 µm). System choice appears to result in either positive or negative linear distortion of final implant

positions. System scanbody, analog and printed model receptacle design may be factors that contribute to final overall distortion. Printed models were found to be dimensionally stable for up to 1 month.

BIOMECHANICS OF IMMEDIATELY LOADED IMPLANTS BASED ON ALL-ON-FOUR CONCEPT- IN VITRO STUDY

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Keywords: All-on-four, implant, finite element

Case Presentation: The presented study aims in identifying the stress generated after load application on tilted distal implants in all-on-four system in edentulous mandible, comparing three different degrees of angulations and three different implant thread designs with same implant material and same cantilever length.Three implants with different thread designs, namely V?thread, buttress, and reverse buttress thread designs with similar dimensions will be considered. The site of distal implants will be the mandibular premolar- molar region and site of anterior implants will be the mandibular canine region with cortical and trabecular bone assuming to be isotropic and homogeneous. All Finite Element Model will have implants placed on "All- on- four concepts". Only the distal two implants will be angulated 15 degrees in 1st model, 30 degrees in 2nd model and 45 degrees in 3D model. The angulations will be repeated to all three designs. ANSYS program, version 13 will be used to analyze the biomechanical behavior of implants.

LASER SURFICE TEXTURING TO GUIDE IMPLANT ROUGHNESS: A PRELIMINARY SURVEY ON OSTEOBLAST ADHESION

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Keywords: implant1,surface2,laser3

Purpose/Aim: Laser Surface Texturing (LST) may be conveniently used to generate definite patterns on the implant fixture. Aim of the present work was to explore whether a correlation could be established between roughness as measured according to a series of different parameters and immediate osteoblast adhesion.

Materials and Methods: Commercially pure titanium samples (Oxy Implant S.r.l.) were laser textured to generate 8 different surfaces (LASIT TowerMark con laser YAG 10W). A qualitative characterization of the surfaces was obtained through Scanning Electron Microscope (Zeiss SUPRA 40, Carl Zeiss AG, Oberkochen, Germany), as well as surface. Commercially pure titanium samples (Oxy Implant S.r.l.) were laser textured to generate 8 different surfaces (LASIT TowerMark con laser YAG 10W). A qualitative characterization of the surfaces was obtained through Scanning Electron Microscope (Zeiss SUPRA 40, Carl Zeiss AG, Oberkochen, Germany), as well as surface.

Results: Each surface was observed at the SEM (a paradigmatic sample to test the LST manufacturing conditions is reproduced in Fig. 1) and then measured at the profilometer (Fig.3) (Table 1). As reported in the graphs (Fig.2) a clear correlation could not be established between the number of adherent cells and the roughness, although an interesting trend may be noted for Sal and Ssk (skewness).

Conclusions: Here, a series of roughness descriptors are systematically compared to early osteoblast adhesion in order to assess if a correlation could be established. Noteworthy was Sal, representing the horizontal distance in the direction in which the auto-correlation function decays to the value assigned (0.2 by default) the fastest. The possible role of Sal is well known in tribology, but it is unprecedented, to the authors' knowledge, as for the biological interfaces and it may deserve further investigation.

COMPARATIVE ANALYSIS OF INTERNAL AND MARGINAL FIT OF LITHIUM-DISILICATE CAD-CAM CROWNS WITH DIFFERENT FINISH LINES

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Purpose/Aim: To evaluate in vitro the internal and marginal fit of lithium disilicate CAD/CAM crowns with different finish lines using X-Ray micro-computed tomography.

Materials and Methods: Frasaco maxillary central incisors (Frasaco GmbH, Germany) were prepared for complete crowns with 3 different finish lines (3 test groups: chamfer, feather-edge and rounded shoulder). Digital impressions were made with the 3Shape TRIOS intra-oral scanner. Each incisor was duplicated to fabricate CAD/CAM lithium disilicate crowns-IPS e.max CAD (Ivoclar Vivadent AG) (N=3x10). The crowns were cemented with Nexus III (Kerr USA) dual-cure resin cement. For every sagittal and coronal section, a total of 9 measurement points was determined and digitally standardized: 7 points for defining the internal fit (IG) and 2 points both for defining the marginal fit (MG) and the absolute marginal discrepancy (AMD). Mean values of the measurements from the three groups were compared by ANOVA at the 5% significance level, and between-group differences were assessed with the Tukey's Post-hoc test.

Results: Statistically significant differences were observed between the three test groups. With respect to IG, feather-edge finish line showed the smallest mean values, followed by chamfer and rounded shoulder. As for MG, shoulder finish line showed the smallest mean values, followed by chamfer and feather-edge, yielding statistically significant difference. With respect to AMD, shoulder finish line showed the smallest mean values, followed by chamfer and feather-edge.

Conclusions: Within the limitations of this study, it can be concluded that: a) internal/marginal fit and absolute marginal discrepancy of milled e.max crowns differ significantly according to the finish line configuration, b) lithium disilicate CAD/CAM crowns with feather-edge finish line have the best internal fit, while lithium disilicate CAD/CAM crowns with rounded shoulder finish line have the best marginal fit.

STRENGTH OF A ZIRCONIUM OXIDE CERAMIC PRODUCED WITH AN ALTERNATIVE PRODUCTION PROCESS

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Keywords: Zirconium oxide ceramic, manufacturing process, fracture strength

Purpose/Aim: The classical production process of Yttria stabilized Zirconium oxide ceramic (Y-TZP) involves compressing the powder at high pressure uniaxially and or isostatically, which requires expensive equipment. Using a slurry technique would simplify this process considerably. The objective of this study was to compare the strength of a YTZP ceramic (U) to a Zirconium oxide/Aluminumoxide hybrid ceramic (A) either produced using the classical way (Control, HIP) or the slurry technique (EXP). The null hypothesis was that there is no difference between a) the manufacturing process and b) the materials.

Materials and Methods: EXP ceramics: 32 discs were produced by sintering to a diameter of 14 ±0.2 mm and subsequently polished with a lapping process using 15 µm diamond particles to a thickness of 1.2 ± 0.2 mm. Control ceramics (HIP): 32 discs were produced by sintering to a diameter of 15.5 ± 0.02 µm and subsequently machined to a thickness of 1.99 ± 0.04 mm. The disks were then submitted to a biaxial fracture strength test using an Instron Universal testing machine at a cross head speed of 0.5mm/min. Data were analyzed with two-way ANOVA and Weibull analysis.

Results: The characteristic strength of both EXP ceramics was in the same statistical group and significantly higher than the one of the HIP materials, which were not significantly different (Table). The Weibull parameter m varied from 3.55 to 8.73. EXP A and U and HIP U were in the same statistical group and significantly higher than HIP A.

Conclusions: For the characteristic strength the null hypothesis a) was rejected, while for the materials it was accepted. For the Weibull modulus the null hypothesis a) was accepted only for the U materials; null hypothesis b) was only accepted for the EXP ceramics. Since the EXP materials were equal or better than the control materials, the new production process is very promising and should be further tested with dental applications.

MULTIDISCIPLINARY APPROACH FOR FUNCTIONAL AND ESTHETIC IMPLANT SUPPORTED RECONSTRUCTION IN THE AESTHETIC AREA

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Keywords: multidisciplinary approach; digital technique; aesthetic effect

Case Presentation: Background: Dentition defects and malocclusion in the aesthetic area are very common in the clinic. In some cases, multidisciplinary approach including orthodontic treatment, implant restoration treatment and periodontal surgery to improve the aesthetics of the patient.
Technique/Case Report: A 19-year-old man with the tooth loss of 21 and dentition malocclusion came to our department three years ago. After the extra- and intra-oral examination, a multidisciplinary treatment plan was achieved. Firstly, a year and a half of the orthodontic treatment aligned the dentition basically and 21 implant space was reserved. Then Straumann® Roxolid® bone level implant (SLActive ?3.3 × 12 mm) was placed in the place of 21 and guided bone regeneration was used to correct the local defect of labial alveolar bone. After 4 months immerged healing, a rolled palatal connective tissue technique was used to further improve the esthetic effect of alveolar contour. The digital impression was used to create the individual implant-supported provision with the method of computer aided-mirror copying technique afterwards. After 3 months soft tissue conditioning, the alveolar contour was favorable and the final digital impression was obtained. Then, individual CAD-CAM all-ceramic abutment and the all-ceramic crown were fabricated for the final restoration. Finally, the implant restoration showed the favorable aesthetics which was coordinated with the surrounding tissue and dentition. After one-year follow-up, the contour of the alveolar bone and labial tissue remained stable and the patient was satisfied with the final outcome.
Discussion: This case represented a challenging situation with single tooth loss in the aesthetic area. A multidisciplinary approach was very essential to the treatment approach and digital technique favored for the final esthetic effects.
Conclusions: A multidisciplinary approach with the aid of digital impression and CAD-CAM technique could create a satisfactory effect to treat the dentition defects and malocclusion in the aesthetic area.
Clinical implications: Digital technique favored the satisfactory effect in challenging cases of esthetic areas, especially in a multidisciplinary approach.

THREE PATIENTS TREATED WITH DIFFERENT HYBRID PROSTHESIS: CASE SERIES

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Keywords: All on four, fixed complete denture, hybrid prosthesis

Case Presentation: BACKGROUND: Hybrid prosthesis provides aesthetics, phonation and lip support in atrophic jaws, and it is very important that the prosthesis is removable because it is screw-retained in any case requiring fracture or repair. Hybrid prostheses can be made on a different number of implants, with at least four implants, with as many implants as possible. Factors such as number and distribution of implants, oral hygiene, aesthetics, passive compatibility of infrastructure material, biological and technical complications may affect the prognosis of hybrid prostheses.
CASE REPORT: Case 1: A 55-year-old female patient applied to the clinic with all teeth extracted except the second molars in the maxilla for periodontal reasons. There was no tooth deficiency in the mandible except the first premolar. Maxilla was rehabilitated with hybrid prosthesis due to insufficient lip support and advanced bone resorption. The mandible was restored with full-arc zirconia. Case 2: A 64-year-old male patient applied to the clinic with full mouth edentulous. All-on-four concept was applied considering the bone insufficiency in the posterior region, the patient's unwillingness to intervene with advanced surgical techniques, age, morbidity and complications.
Case 3: A 52-year-old female patient applied to the clinic due to complaints of bone loss in the anterior region of the maxilla and mandible, mobility of canine-canine teeth, diastema and aesthetic. After the canine-canine tooth extraction of the the patient, prosthetic rehabilitation was performed on the implant with zirconia substructure.
DISCUSSION: The limitation of this case is that the hybrid prosthesis is more difficult to clean than the removable prosthesis because of its fixed and high cost of titanium substructures. Thanks to an accurate maintenance protocol to be applied, complications that may appear in patients using hybrid prosthesis can be diagnosed early and necessary treatments can be performed without delay.
CONCLUSION: In this case series, aesthetic and functional rehabilitation of three patients with implant supported hybrid prostheses was achieved. Hybrid prostheses provided satisfactory results in patients. Long-term follow-up is required.
CLINICAL IMPLICATIONS: Hybrid prosthesis should be considered as a treatment option in patients with complete edentulous and partial edentulous.

THE FLEXURAL STRENGTH, SURFACE HARDNESS AND SURFACE ROUGHNESS OF 3D PRINTED DENTURE BASE MATERIAL

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Keywords: 3d printing, Denture base, Surface Roughness

Purpose/Aim: The aim of this study was to evaluate the flexural strength, surface hardness and surface roughness of denture base materials, which has produced with different production methods.

Materials and Methods: Production methods to be used in this study are a conventional flasking method (Group C) N=8 and additive manufacturing method (Group A) N=8. As an additive manufacturing method, Envisiontec Vida 3D printer and E-Denture 3D+ denture base material (ENVISIONTEC GMBH Gladbeck, Germany) and as a conventional flasking method Meliodent® Heat Cure (Kulzer GMBH Hanau, Germany) were used. Flexural strength was assessed with a three-point bending test using a universal testing machine (Shimadzu AGS-X, Columbia, Maryland). Disk specimens were subjected to surface roughness test with a profilometer (MarSurf M300C, Mahr GMBH Göttingen, Germany) and Vickers Hardness test (Shimadzu HMV, Columbia, Maryland) after finishing and polishing procedures.

Results: Mean flexural strength of Group C is 69,8N ±8,2N and Group A is 57,2N ±1,17N. Mean Ra Values of Group C is 0,065 ±0,027, and Group A is 0,051 ±0,02. Mean Vickers Hardness Values of Group C is 16,19 ± 0,078 and Group A is 9,9 ±0,82. For the group comparisons, Mann Whitney U test was used ($p<0,05$). There are statistical differences between groups in Vickers Hardness Values p=0,001, and in flexural strength values p=0,001. But there is no statistically differences in surface roughness levels between the groups p=0,248.

Conclusions: Additive manufacturing methods can be used to produce denture bases, but further studies are needed to use this method safely.

ER,CR:YSGG LASER THROUGH Y-TZP CERAMIC FOR DEBONDING PURPOSES: PULSE RATE EFFECT AT LOW POWER SETTINGS

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Purpose/Aim: The use of an erbium, chromium: yttrium-scandium-gallium-garnet (Er,Cr: YSGG) laser could serve as an alternative method for debonding yttrium stabilized zirconia (YSZ) structures in a more effective manner by producing thermal softening of the resin cement as long as the energy transferred through the ceramic does not cause damage to the dental pulp (>42°C). A recent study [1] has shown that at low laser power settings, irrigation rather than frequency results in relevant thermal effects through the YSZ structures. Based on these findings, the aims were 1) to determine the effect of dry low power laser on the debonding strength between a YSZ ceramic and a resin cement, and 2) to characterize the effect of the laser irradiation at two locations: the directly irradiated YSZ ceramic surface and the fracture surface after the bond strength test.

Materials and Methods: Slices (~1 mm thick) were obtained from a partially sintered YSZ block (IPS e.max ZirCAD, Ivoclar Vivadent) using a cutting device (Accutom 50, Struers). The slices (n=10) were sintered, silica-coated and silanized before being cemented to resin composite cylinders (Ø=~4.0 mm) using a dual-cure resin cement (Multilink Automix, Ivoclar Vivadent). The sets were divided into three groups according to the following laser application: a) control group (no laser application), b) 20 PPS with irrigation, and c) 20 PPS without irrigation. The Er,Cr:YSGG laser (Waterlase MD™, Biolase) was operated at 1 W, using a MG6 tip (spot: 1 mm). Each sample was irradiated for 120 seconds using a line scanning method across an area of 4 mm x 4 mm. After laser irradiation, samples immediately underwent shear bond strength testing (ElectroForce 3200, Bose) using a 0.5 mm orthodontic stainless steel wire at a loading rate of 1 mm/min until failure. Failure analysis was performed using an optical microscope to assess failure types at the bonding interface and to characterize the irradiated YSZ surface.

Results: The data passed the normality test (S-W, p=0.303) and had a statistical power of 0.943. Tukey's test (?=0.05) showed that when the laser was used either without or with irrigation (p=0.529), the bond strength values were similar. However, significant differences were found between the control and both with (p=0.001) and without irrigation (p=0.008) groups. The failure analysis showed that there was an increased thermal effect in the resin cement only when the laser was applied without irrigation. No damage was observed so far at the directly irradiated YSZ ceramic surface.

Conclusions: Laser irradiation at 1 W in either with or without irrigation significantly reduces the bond strength between the YSZ ceramic and the resin cement.

*Winner of the Ivoclar Vivadent / ICP Research Fellowship in Dental Restorative Materials

EFFECTS OF TWO SYSTEM POST ON FAILURE PATTERNS ON ENDODONTICALLY TREATED MANDIBULAR PREMOLARS

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Keywords: failure patterns, post system, fiber reinforced

Purpose/Aim: This study aims to compare the fracture patterns according to site and direction, on endodontically treated mandibular premolars restored with fiber reinforced resin (FRC) and prefabricated metal(PM) posts.

Materials and Methods: Sixty extracted human mandibular premolars were endodontically treated and divided into 2 groups of 30. The following in vitro treatments were evaluated: group A: 2-mm continuous ferrule/fiber reinforced composite post and resin core/metal crown (Fiber Post Tenax, Coltene/Whaledent) and group B: 2-mm continuous ferrule/prefabricated metal post and resin core/metal crown (Mooser Post, Denstply/Maillefer). Specimens were loaded (N) at 45 degrees to the longitudinal axis until ultimate failure occurred. All samples were assessed for failure modes by eye inspection and were defined according to fracture site (apical, middle or cervical third) and fracture direction (horizontal, oblique or vertical). Failure patterns between groups was analyzed by Fisher's exact test.

Results: The majority of the failures were at cervical third and oblique direction. (group A 69.2% and group B 74.1% - fracture at cervical third; group A 88.46% and group B 96.3% - oblique fracture direction). There was no significant difference among the fracture site between both groups ($p > 0.05$) and according to fracture direction there was no significant difference between both groups ($p > 0.05$)

Conclusions: Within the limitations of this in-vitro study, the variable post system has no influence on the failure patterns in terms of site and direction of endodontically treated mandibular premolars.

OCCLUSAL REHABILITATION OF CLASS II ADULT PATIENTS USING A PROSTHODONTICS-CENTERED MULTIDISCIPLINARY APPROACH: A CLINICAL REPORT

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Keywords: Rehabilitation, Class II, occlusal

Case Presentation: Background : The occlusal rehabilitation of adult patients with severe skeletal Angle Class II malocclusion is a complex procedure, involving orthodontic, orthognathic and restorative options. When treatment without orthodontics is selected, a restorative/ prosthodontic approach based on locating the most suitable maxillomandibular relationship for function and range of motion at an established vertical dimension of occlusion (VDO) may be used.
Case Report: A multidisciplinary approach was employed for the full-mouth restoration of a 52-years old Class II male patient. Endodontic, periodontal and implant placement procedures were combined with fixed prosthodontic rehabilitation. Extraoral evaluation showed a reduction of the lower facial height, while intraoral and radiographic examination revealed the presence of severe occlusal discrepancies, failing fixed restorations and advanced periodontitis. After initial periodontal treatment, extractions of hopeless teeth and endodontic treatment of selected teeth, an occlusal appliance was fabricated in order to locate the most suitable maxillomandibular relationship for function and range of motion at an established VDO. The same appliance was used to accurately transfer this relationship to an articulator for the fabrication of provisional and definitive restorations. Diagnostic wax-up was performed and

provisional crowns were fabricated accordingly. The provisionals served as a guide for the definitive restorations. The patient was monitored for 3 months. In the meanwhile, implant placement at the posterior mandible and extraction of the mesiobuccal roots of maxillary first molars was performed. The absence of symptoms ensured the patient's adaptation to the increased VDO. After the evaluation period, definitive restorations (full-mouth PFM restorations at the maxilla and mandible and an implant crown at the posterior mandible) were completed. Long and wide contact areas were developed in the anatomy of the restored teeth to avoid interferences in the range of motion. Routine clinical assessments were made after 1 week, 1 month, 3 months, and 6 months.
Discussion: Function and esthetics were established in this patient through a prosthodontics-based multidisciplinary approach, involving endodontic and periodontal procedures. Patient compliance and state-of-the-art therapeutic processes were essential in achieving a predictable result.
Conclusion: Accurate clinical and radiographic examination, determination of the range of function and correct VDO, precise diagnostic wax-up and patient monitoring with the use of temporary restorations are crucial for favorable treatment prognosis of adult Class II patients.
Clinical Implications: During full-mouth prosthetic restoration of adult patients with Class II malocclusion, care should be exerted in order to avoid occlusal interferences in the range of motion of the mandible. Occlusal relationships established and checked on temporary restorations should be accurately transferred to the definitive ones.

FIBULAR RECONSTRUCTION OF MANDIBULE WITH VIRTUAL SURGICAL PLANNING

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Keywords: mandibular reconstruction, virtual surgical simulation

Purpose/Aim: The reconstruction with vascularized fibular free flaps following segmental mandibulectomy has become the gold standard because of high success rate and good long term outcomes. However, it requires long and complex procedure and the results were sometimes influenced by surgeon's experiences and manual skills. Nowadays CAD/CAM technologies are becoming popular in use for maxillofacial reconstruction. However, there are issues of cost, delivery time, and regional restriction because most of these accessed the outsourcing laboratory or company. This study will report the mandibular reconstruction using with in-house surgical devices fabricated by 3D printer and evaluate the accuracy of the mandibular reconstruction.

Materials and Methods: Nine consecutive patients presented with SCC of the mandible posterior regions and planned segmental mandibulectomy, reconstruction using free fibular flap in Tohoku University Hospital. The resection of mandible and apposition of fibula were simulated, and the osteotomy guides of mandible and fibula were designed using CAD software. The simulated mandibular models and the guides were fabricated by 3D printer. The surgeries were performed as preoperative surgical planning using the surgical devices. The pre- and postoperative CT data were used for evaluation of the accuracy of the mandibular reconstruction. The intercondylar differences were measured for 3 times and compared before and after surgery. The mandibular angles on surgical side (S) and no surgical side (N) were examined for 3 times using the frontal view of images. The absolute value of the difference between mandibular angles (S and N) was defined as the angle difference. The angle differences were compared the simulated mandible (baseline) and the reconstructed mandible

Results: The initial mean intercondylar distance of 125.5 ± 2.0 mm decreased 122.7 ± 1.7 mm at 1 year after surgery. These differences were not statistically significant. The mean intercondylar difference before and after surgery is 2.82±0.91mm. The mean angle difference at baseline (simulated mandible) significantly increased at 1 year after surgery.

Conclusions: Despite limited number of patients and short follow-up period, these results suggested that this technique using with in-house surgical devices provided optimal results and the importance of multi-disciplinary management for the patients who undergo maxillofacial reconstruction.

FOLLOW-UP AFTER 6 MONTHS OF DEFINITIVE SINGLE IMPLANT-SUPPORTED CROWNS IMPRESSIONED BY USING HIND'S TECHNIQUE

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Keywords: Interim implant-supported fixed prosthesis, Hind's technique

Case Presentation: Background: Guided soft tissue healing with a fixed interim restoration is one of the key factors for obtaining the aesthetic view. Accurate transfer of the peri-implant soft tissue borders to the definitive cast could be challenging with standard impression copings. A clinician could use the interim restoration for achieving an impression that reflects the peri-implant soft tissue by using Hind's technique.

Case Reports: Two patients applied to the Prosthetic Department of Erciyes University for definitive restoration. They had previously received a interim fixed restoration in the same day of the immediate implant surgery. Both the interim restorations were in the maxillary premolar site without any occlusal contact. The impressions were obtained by using additional silicone (Zhermack Elite HD+ Maxi Putty Soft Fast, Elite P&P Light Body, Italy), and a coping that was modified with flowable composite which is representing the peri-implant soft tissue contour. Zirconia core veneered with feldspathic porcelain (Zenostar Weiland, Germany; Ceramco® PFZ, USA) was manufactured and cemented onto the definitive abutment. In the follow-up session, which was after six months, both patients were glad and had no complaint about the crowns. All papillas were intact and unaffected.

Discussion: In a few reports, after the removal of the interim restoration, the collapse of peri-implant soft tissue during the impression process has been showed. Its reason was defined as the disappearance of the pressure which was derived from the interim restoration. By this way, the low osmotic pressure in the mucosa creates an inflow of interstitial fluid. Therefore, the emergence profile collapses. In addition to that, this pressure may contribute to the sealing of the gingival sulcus and the defense mechanism of supracrestal tissue attachment.

Conclusion: By the help of Hind's technique, the collapse of the peri-implant tissues during the impression stages would not be a limitation to transfer the accurate peri-implant tissue.

Clinical Implications: Either of the successful aesthetic results and the patient satisfaction in a single implant-supported fixed prosthesis therapy could be achieved by transferring peri-implant tissues accurately.

COMPARISON OF PEKK (POLY-ETHER-ETHER-KETHONE) AND ZIRCONIA BASED DIFFERENT CERAMIC VENEER SYSTEMS ON THE FRACTURE RESISTANCE

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Keywords: bilayered, fracture strength, monolithic

Purpose/Aim: The aim of this study is to compare the fracture strengths of restorations which were produced with different materials and designed as either monolithic or bilayered using CAD / CAM systems.

Materials and Methods: The maxillary first premolar was prepared with a chamfer design of 1mm and scanned using a dental scanner, then selective lazer sintering was used to produce Cr-Co based abutments (n=60). Specimens were divided into 5 groups (n=12) according to the type of CAD/CAM material used: Group S; monolithic zirconia reinforced lithium silicate, group ZI; bilayered zirconia substructure with lithium disilicate, group ZE; bilayered zirconia substructure with resin infiltre hibrit ceramic, group PI; bilayered poly-ether-kethone-kethone (PEKK) substructure with lithium disilicate, group PE; bilayered poly-ether-kethone-kethone substructure with resin infiltre hibrit ceramic. All specimens were cemented on Cr-Co abutments with a self etch resin cement (Multilink N). The specimens were subjected to dynamic loading and thermocycling. Fracture resistance of the restorations were tested with a universal testing machine (0,5 mm/min).The statistical analysis of the data were made with Kruskall-Wallis H ($p < 0,05$) and Mann Whitney U test ($p < 0,05$).

Results: In between all the groups the highest compression strength values were observed in the group S (1930 ±452,187) ($p<0.05$), followed by ZI (1165,416±264,046). No difference was found between group PE (852±195,269) and group PI (789,5±158,688), group

PE (852±195,269) and group ZE (957±169,305) (p>0,05) in terms of fracture resistance values.

Conclusions: Monolithic zirconia reinforced glass-ceramics (zirconia reinforced lithium silicate) have better fracture resistance than bilayered restorations. All tested dental CAD/CAM materials exhibited a fracture resistance considerably exceeding the average occlusal force in the posterior dentition.

AESTHETIC CONSIDERATIONS OF ANTERIOR FIXED RESTORATIONS

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Purpose/Aim: The objective of this study was to evaluate the aesthetic satisfaction level in patients whom had received anterior fixed porcelain fused to metal restorations in the aesthetic zone, to determine which factor played the decisive role in patient dissatisfaction. The current study did not take into considerations which type of porcelain or alloy was used to fabricate the restorations.

Materials and Methods: 25 patients were selected from the electronic database of the dental clinic, which had received a bridge in the aesthetic zone within the last five years. A minimum of one year needed to have passed after cementation. The mean age of the patients was 56. The patients were given satisfaction questionnaire's concerning overall satisfaction with the restoration. Visual examination and Digital photographs were taken for each patient to evaluate the aesthetics of the restoration, in relation to the patients neighboring teeth, smile line and gingival tissue.

Results: Data demonstrated that 83.3% were still satisfied with the appearance of the restoration, however factors that left patients unhappy in our study, was compromised central – lateral incisor ratio (16%) as well as unhappiness with shade was reported in 40% of the patients. In general, older patient above the age of 60 are more satisfied with the color of their restoration than younger patients. Presence of gingivitis were seen in 40% of the patients and gingival recession seen in 75% of the patients.

Conclusions: Aesthetic Satisfaction remained high among patients following one year of placement. There was a correlation between patient satisfaction and bridge symmetry as well as shade selection. Patient oral home care instructions must be reinforced by reviewing the patient at regular intervals to ensure it is being followed and to address any signs of periodontal disease as soon as possible. In order for patient to be satisfied there has to be a good communication between patient concern and the dentist. The dentist and the lab technician have to insure a satisfactory outcome of the restoration that remains throughout the years.

EVALUATION OF CLINICAL OUTCOME IN EARLY LOADED IMPLANTS WITH DIFFERENT IMPLANT SYSTEM

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Keywords: dental implant, comparative study

Purpose/Aim: The purpose of tooth replacement with implants is to restore adequate function and esthetic without affecting hard and soft tissue structure. These implants can be loaded using any these types loading protocol which are immediate loading early loading and conventional or delayed loading. The concept of immediate and early loading were proposed by many authors during the 1990 who noted that it would be beneficial for patient satisfaction if the edentulous healing period could be shortened via immediate or early loading of implants.

Materials and Methods: This is a prospective, randomized controlled trial of 40 subjects. Written consent was obtained from all subjects enrolled in this study. All subjects who were partially edentulous in the mandibular arch and who fulfilled the inclusion/exclusion criteria of the study were chosen and were randomly divided in two groups, each consisting of 20 subjects into group X and group
A dental implant system. The primary outcome measures of the study were marginal bone loss at mesial and distal area, stability and esthetic outcome of the implant. The secondary outcome measures were peri-implant probing depth (PD), modified plaque index (PI) and modified Sulcular bleeding index (mSBI). The outcome measures were observed at pretreatment (baseline) and post treatments (6 weeks,3 month and 6 month recall).

Results: There was a significant difference between the two implant systems with Respect to hard tissue Parameters at baseline, 6 weeks, 3 months and 6 months. There was no significant difference between the two implant systems with respect to soft Tissue parameters at 6 weeks, 3 months and 6 months.

Conclusions: The performance of Group X implants system was better than Group A implants system with Respect to hard tissue parameters at baseline, 6 weeks, 3 months and 6 months when subjected to Early loading. The performance of Group X implants system was similar to Group A implants system with Respect to soft tissue Parameters at 6 weeks, 3 months and 6 months when subjected to early Loading.

NEW CONCEPT OF ROTATION AXIS FOR ANALYZING MANDIBULAR MOVEMENTS

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Keywords: rotation axis, mandibular movement, least motion axis

Purpose/Aim: In order to analyze mandibular movements, several rotation axes have been used, for instance, the instantaneous center of rotation (ICR), hinge axis (HA), and kinematic axis (KA). KA separates the translational and rotational components of sagittal jaw movement and enables the simple expression of jaw movement. The translation of the mandible is said to minimize in the area of mandibular foramen due to a biologic necessity. Therefore, we have proposed a new-concept rotation axis of the mandible named the least motion axis (LMA). LMA has the minimum range of motion of the mandible within the sagittal movement. The purpose of this study is to investigate the spatial and kinematic characteristics of KA and LMA in healthy adult volunteers.

Materials and Methods: Forty-five volunteers (24females, 21male, 26.7+/-6.6yrs) with asymptomatic TMJs participated in this study after giving informed consent. A custom-made electro-magnetic jaw tracking device was employed to record the sagittal border jaw movements. The KA points (KAPs) and LMA points (LMAPs) were individually computed in 13 particular sagittal planes using estimation algorithm of our own. KA and LMA were, then, determined as the straight lines so that the sum of the square distance for each set of 13 points would be minimum using 3D linear regression. To investigate the spatial characteristics of KA and LMA, the square mean perpendicular distances between the axis points and the line, the radial thickness of KA and the range of motion of LMA, and the distances and angle between KA and LMA were calculated. A statistical analysis was performed with the Wilcoxon Signed Ranks test with a significant level set at $p<0.05$.

Results: KAP and LMAP were located mostly on KA and LMA, respectively. There were very little kinematic differences between right and left KAPs and LMAP. LMA was approximately parallel, and was located significantly antero-inferior to KA.

Conclusions: Although LMA was found apart from KA, LMA has almost same spatial and kinematic characteristics as KA except the location. In conclusion, the present study has demonstrated that LMA can be applied to analyzing mandibular movements.

EFFECT OF CAVITY DEPTH ON BOND STRENGTH OF DIFFERENT TYPES OF BULK FILL COMPOSITES

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Keywords: Bulk Fill, push-out bond strength, fiber reinforced composite

Purpose/Aim: Bulk fill composites are very useful materials for minimal inventive reconstruction of deep cavity after large caries removal. Material properties of bulk fill composites should have good polymerization, low shrinkage and high fracture toughness under limited light application. Short fiber reinforced (FRC) bulk fill composite has been developed as a dentine replacement material. This new material shows high polymerization depth, higher fracture toughness and good bonding properties to dentin. The aim of this study is to evaluate the effects of different bulk fill composite materials on the push-out bond strength to root canal dentine at 0 to 8mm light irradiation distance assumed as deep cavity.

Materials and Methods: Total of 30 bovine mandibular incisors were used for deep cavity specimens. The pulp was removed and 8 mm deep cavity space was prepared using a tapered diamond point to obtain consistent thickness of the bulk fill composite from the coronal to the apical. Three different bulk fill composites were used, i.e.) everX Posterior (EXP) as a FRC bulk fill composite, everX Flow bulk shade (EXF) as a FRC Flow bulk fill composites and SDR (SDR) as a control. For bonding procedure, the bonding agent (G-Premio BOND) was applied into the cavity, and polymerized for 10 s. The cavity space was filled with the bulk fill composite and polymerized for 10 s on EXP and EXF, 20 s on SDR, using a LED light curing unit (G-LightPrimaII). After filling procedure, the specimens were stored in distilled water for 24 h at 37 °C. The specimens were then horizontally sectioned to obtain 1 ± 0.1 mm thickness, and five slices of different vertical positions were obtained for a total of 150 slices. Push-out tests were performed at a cross-head speed of 1.0 mm/min using a universal testing machine. The maximum failure load was recorded in Newton (N), and the push-out bond strength (MPa) was calculated. The results among the groups with different vertical positions from coronal (1) to apical (5) and total push-out bond strength, which were calculated using the average values of all depths in the same groups, were compared using one-way analysis.

Results: Among all groups, the highest bond strength was observed in SDR1 (22.8 ± 6.9 MPa), whereas the lowest was observed in EXF3 (10.3 ± 4.5 MPa). The bond strength in each position, EXF showed similar value in all position, and was not affected by the depth of the cavity. EXP showed slightly increased and SDR showed decrement of bond strength in deeper cavity.

Conclusions: Within the limits of the study, it may be concluded that the effect of cavity deps affected to the bond strength of EXP (increase) and SDR (decrease). EXF was not affected by the depth of the cavity.

PHYSICAL PROPERTIES OF NEW HYBRID RESIN BLOCK FOR CAD/CAM

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Keywords: Resin block, CAD/CAM, Dental material

Purpose/Aim: Hybrid resin blocks for CAD/CAM are known as useful material for clinical use. In recent years, hybrid resin crown for

CAD/CAM restoration in molar teeth was approved by Japanese national insurance. Recently we launched the next generation "CERASMART300" only in Japan. CERASMART300 has superior mechanical properties by utilizing a new silane coupling agent and improving the interface between inorganic filler and resin matrix. The purpose of this study was to evaluate physical properties of the new material and other products in the marketplace.

Materials and Methods: Five products were selected for analysis, 1) CERASMART300 (GC Corp.), 2) Tetric CAD (Ivoclar/Vivadent), 3) Grandio Blocs (VOCO), 4) Enamic Multicolor (VITA), 5) LAVA Ultimate (3M ESPE). These blocks were evaluated by i) 3-point bending test and ii) 3-body wearing test. i) The specimens of 3-point bending test were prepared in accordance with ISO6842 and test was conducted using Autograph (AG-IS, SHIMADZ) with a crosshead speed of 1 mm/min. ii) The specimens of 3-body wearing test was prepared by milling and conducted with original wear test machine for 200,000 cycles (load 0.84MPa). Antagonist was PMMA disc, and slurry mixture of PMMA and glycerin was applied to contact area during test. Wear value of specimens were calculated from difference of its height before and after wear test. All results were analyzed by one-way ANOVA ($p<0.05$).

Results: The results of 3-point bending test, CERASMART300 showed the highest flexural strength in this study. The results of 3-body wearing test, CERASMART300 showed the lowest value, but there were no significant difference among the products except for Enamic Multicolor.

Conclusions: From all results, CERASMART300 exhibited the highest flexural strength and lowest wear value. Therefore it is expected that CERASMART300 is a durable material and may have clinical advantages.

THE IMPACT OF GENERAL BONE MINERAL DENSITY ON THE EDENTULOUS MANDIBLE

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Keywords: bone mineral density, edentulous, jaw bone

Purpose/Aim: Was to detect impact of general bone mineral density (BMD) on jaw bone structure in elderly edentulous females.

Materials and Methods: In the present study were included 62 edentulous females aged 65-91 years (average age 74.00 ± 6.6 y) and who underwent cone beam computed tomography (CBCT) (Next generation i-CAT, Kavo eXam vision) examinations due to implant planning.
Bone mineral density measurements (BMD) of lumbar spine and both femoral necks by dual energy X-ray absorptiometry (DXA) (Lunar DEXA DPX-NT, GE Medical Systems) were made. The worst T-score reading from both were taken into account. Based on DXA results patients were divided into 2 groups: normal BMD (T-score ? -1.0) and reduced BMD (T-score ? -1.1).
CBCT images were analysed with OnDemand3D Dental software. Cross section area of the whole mandible, area of the trabecular and cortical bone was measured in region of the mandibular right lateral incisor. We calculated total bone area, cortical, trabecular bone area and proportion of cortical/ trabecular bone area. Measurements were made by one experienced observer with two attempts. Difference between groups was evaluated by T-test. Measurement error was determined by using Dahlberg method.

Results: According to the DXA results all females were divided into 2 groups: normal BMD – 19 (mean age 73.47± 7.0 y) and females with reduced BMD - 46 (mean age 74.15 ± 6.8 y) The age differences between groups were not statistically significant (p= 0.71).
There was larger area of total mandible area and cortical bone area in group female with normal BMD than female with reduced BMD respectively- total bone area:169.05± 29.9 and 149.79±38.4 mm2; (p=0.05); cortical bone area: 94.0±21.9 and 78.1±21.2 mm2; (p=0.008)
There was no statically significant difference between the groups according area of trabecular bone (p=0.69).

Conclusions: Reduced BMD have negative effect on elderly female amount on the edentulous mandible and amount of cortical bone.

Acknowledgments: This project was supported by "Post-doctoral Research Aid" 1.1.1.2/VIAA/1/16/139.

AN EVALUATION OF THE EFFICACY OF TWO PROSTHESIS IN PALATOPHARYNGEAL INCOMPETENCY PATIENTS

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Keywords: Nasal speaking valve, palatal lift prosthesis, palatopharyngeal incompetency

Purpose/Aim: To evaluate palatal lift prosthesis and nasal speaking valve in terms of changes in
1. Speech intelligibility of monosyllabic and conversational speech
2. Hypernasality

Materials and Methods: The study was conducted in Department of Prosthodontics, Crown and Bridge, Faculty of Dental Sciences, K.G.M.U. UP, Lucknow. Patient was considered eligible according to pre-defined inclusion and exclusion criteria. Written informed consent was taken from each of the patient.
2. 90 Patients will randomized into either Palatal lift prosthesis (Group 1) or Nasal speaking valve (Group 2) or speech therapy (Group 3) by a nurse with 30 patients in each group..

Results: Patient who receive nasal speaking valve have less than 25% of Nasalance score while patients receiving palatal lift prosthesis have grater than 30% of Nasalance score .Pateint with nasal speaking valve have better speech intelligibility compared to palatal lift prosthesis.

Conclusions: Nasal speaking valve provide better speech intelligibility and hypernasality than palatal lift prosthesis

AESTHETIC EVALUATION OF PERI-IMPLANT SOFT TISSUE - THE INFLUENCE EXERTED BY THE OBSERVER'S CLINICAL EXPERIENCE

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Keywords: pink esthetic score?peri-implant soft tissue

Purpose/Aim: The pink esthetic score (PES) is tool utilized to objectively evaluate single-tooth implant restorations in the esthetic zone (canine to canine). The aim of this study is to assess the influence exerted by the observer's clinical experience and compare Japanese prosthodontists' opinion with Japanese resident' opinion of the esthetics of single-tooth implants by PES.

Materials and Methods: The 9 color-calibrated photographs of a single-tooth implant restoration (only maxillary lateral incisor) in the esthetic zone surrounded by virgin teeth were presented to three prosthodontists and nine residents of the first year to conduct a PES evaluation. The photographs consisted of three different case and three different evaluation period (temporary restoration, definitive prosthesis and definitive prosthesis at 1 years after treatment). We used a visual analog scale (VAS) to assess the patient's satisfaction with the treatment outcome from an esthetic point of view.

Results: The mean total PES of prosthodontists was 10.37±1.20 and the mean total PES of residents was 11.05±1.18. Prosthodontists tended to give lower ratings than residents. However, the difference between the groups was not significant. The correlation between the PES and the VAS score was statistically significant (Pearson coefficient of correlation).

Conclusions: The PES is an objective tool in rating the esthetics of implant supported single crowns and adjacent soft tissues. This study also concluded that a PES evaluation is hardly influenced by the clinical experience in japan.

STUDY ON PHYSICAL PROPERTIES AND EFFECT ON

OSSEOINTEGRATION BY SURFACE TREATMENT OF ZIRCONIA

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Keywords: Zirconia, Biomaterials, Surface treatment

Purpose/Aim: The aim of this study was to investigate effect of zirconia on osseointegration and physical properties by surface treatments using various acid solution, and to suggest the optimum conditions for application in clinical treatment on the basis of the results.

Materials and Methods: The prepared zirconia disc specimens were treated with hydrofluoric acid solution and photo-assisted etching under various condition. The surface was analyzed by SEM and the surface roughness was analyzed by using surface profiler. The osteogenic effect of hFOB cells was assessed via cell counting and reverse transcriptase-polymerase chain reaction (RT-PCR). For analysing physical property of treated zirconia, specimens were used to examine the biaxial flexural strength(ISO 6872 standard).

Results: Various roughnesses were obtained according to the surface treatment method. The surface roughness increased in the group treated with hydrofluoric acid solution, but the aspect of roughness increased in nano units. In the method using photo-assisted etching, the surface roughness increased in micro units. Cell reaction showed better results in the photo-assisted etching group than in the hydrofluoric acid-treated group($P<0.05$). There was no statistical difference between groups in the physical experiment.

Conclusions: As a result, the photo-assisted etching method is more effective than the simple hydrofluoric acid solution treatment for zirconia treatment for osseointegration.

TOOTH - SUPPORTED OVERDENTURES RETAINED WITH ROOT CANAL ANCHORS: CASE SERIES

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Keywords: Overdenture, block pivot, edentulism

Case Presentation: BACKGROUND: The prevalence of edentulism is strongly associated with ageing. However, it has been proven that tooth loss depends on a number of factors such as socioeconomics, habits, oral hygiene. The need for dental treatment of the elderly population is rapidly increasing. For partial or complete edentulous patients, a variety of treatment options are available, including conventional prostheses, tooth - supported overdentures and implant-supported overdentures. Tooth - supported overdentures can be retained by attachments, retention and stability can be increased, as well as bone resorption can be reduced. Another advantage of these prostheses; they can be more cost effective and provide more proprioception than implant-supported overdentures. The fact that it does not require surgical intervention renders it preferable for elderly patients compared to implant – supported overdentures.

CASE REPORT: A 65-year-old male, 67- and 83-year-old female patients applied to the clinic. The maxilla was completely edentulous and there were canine teeth in the mandible. It was decided that implant surgery was not indicated considering the patients' current systemic conditions and age factor. Root-supported overdenture prosthesis indication was introduced to provide chewing functions in a shorter period of time than implant surgery. After endodontic treatment of canine teeth, block pivots (Rhein 83, Titanium Spherical Pivot Line) were placed. Mandibula was rehabilitated with tooth supported overdenture prosthesis and maxilla with conventional total prosthesis.

DISCUSSION: The literature shows that more than 50% of patients using complete dentures experience problems with retention and stability. Studies have shown that the problem with the prosthesis in the mandible is much higher than in the maxilla. One of the most important problems adversely affecting the retention of the prosthesis is the physiological alveolar arch resorption resulting in a decrease in the volume of oral tissues supporting the prosthesis. By using dental implants, both physiological arc resorption can be prevented and retention stability problems can be solved. Treatment costs will increase with implant placement. Therefore, when choosing treatment options, if any, existing teeth should be taken into consideration. The limitation of this case series is the mobility and root fractures of the abutment teeth. Patients should be informed that long-term success of implant supported overdentures is higher.

CONCLUSION: When implant indication could not be given in elderly patients, the construction of root-supported overdenture prostheses gave successful results and achieved patient satisfaction. However, long-term follow-up of these cases is required.

CLINICAL IMPLICATIONS: Tooth supported overdenture prosthesis should be considered as an option in patients who cannot get implant due to age, systemic disease and cost.

PROPERTIES OF NOVEL DENTAL ZIRCONIA MATERIALS: A PILOT STUDY

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Keywords: High-translucent zirconia; Translucency; Flexural Strength; Bond strength

Purpose/Aim: to evaluate and compare the translucency, flexural strength and shear bond strength of 3 types of zirconia materials, each of which contains several brands.

Materials and Methods: 1. Translucency tests were designed into high-translucent zirconia group containing LavaTM Plus (LP), X-CERA SHT (XTH) and SHTC (SHTC); ultra-translucent zirconia group containing LavaTM Esthetic (LE), X-CERA TT (XTE) and Xuancai® AT (AT); control group as glass ceramic(UP.CAD). The translucency of each group was obtained by using spectrophotometer.
2. Three-point flexural strength tests conducted by employing universal material testing machine and designed into High-translucent zirconia group containing LavaTM Plus (LP), X-CERA SHT (XTH), SHTC (SHTC), Ideal Translucent (IT) and ST-Color (ST); ultra-translucent zirconia group containing LavaTM Esthetic (LE), X-CERA TT (XTE), brilliant ®AT (AT), Ideal Esthetic (IE) and TT-LT (TT).
3. Micro-shear bond strength tests were conducted by biomechanical analyzer and designed into ultra-translucent zirconia group containing X-CERA TT (XTE), Xuancai® AT (AT), Ideal Esthetic (IE) and TT-LT (TT); traditional zirconia group(control group) containing X-CERA ST (XT), STC (STC), Ideal Opaque (IO) and HT-Color (HT).

Results: 1. The translucency of glass ceramics (UP.CAD) with three kinds of thickness was significantly higher than that of other groups ($P<0.01$).Results showed that AT of 1.5mm was better than SHTC($P<0.01$). LE of three thickness was better than LP. XTE of 1.0mm showed better results than XTH ($P<0.01$). SHTC, XTE, AT, LE were the best in each group with the thickness of 0.5mm; XTH, XTE were the best in each group with the thickness of 1.0mm; XTH, XTE, LP were the best in each group with the thickness of 1.5mm($P<0.01$).
2. The three-point bending strength of high-translucent zirconia was significantly higher than that of ultra-translucent zirconia as to each brand($P<0.01$). XTH and XTE were the best in each group ($P<0.01$).
3. The micro-shear bonding strength of the same brand of ultra- translucent zirconia was significantly higher than that of traditional zirconia ($P<0.01$). AT and XTE showed the best micro-shear bonding strength in ultra-translucent zirconia and STC showed the best results in traditional zirconia group($P<0.01$).

Conclusions: 1. The translucency of glass ceramics with three kinds of thickness was better than that of new zirconia; the translucency of ultra-translucent zirconia was higher than that of high-translucent type.
2. The three-point bending strength of high-translucent zirconia was higher than that of ultra-translucent zirconia, and the three-point bending strength of ultra-translucent zirconia used in the experiment is more than 300 MPA.
3. The micro-shear bonding strength of ultra-transparent zirconia was higher than that of traditional zirconia as to each brand.

TRANSLUCENCY AND MICRO-SHEAR BOND STRENGTH OF NOVEL DENTAL ZIRCONIA MATERIALS : A PILOT STUDY

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Keywords: Novel zirconia, Translucency, Bond strength

Purpose/Aim: The purpose of this in vitro study was to evaluate the translucency and micro-shear bond strength of novel dental zirconia materials.

Materials and Methods: We chose two domestic brands of high-translucent and ultra-translucent zirconia as experimental groups comparing with lithium disilicate and traditional zirconia respectively.
1. Translucency test. Experimental group 1 was high-translucent zirconia: X-CERA SHT, SHTC. Experimental group 2 was ultra-translucent zirconia group: X-CERA TT, Xuancai® AT. The control group was lithium disilicate: UP.CAD. The shade of lithium disilicate and zirconia was A1. Square-shaped specimens (n=6) were prepared with dimensions of 7×7×0.5mm, 7×7×1.0 mm and 7×7×1.0 mm. A spectrophotometer was used to measure the CIE L*a*b* coordinates of samples on white and black backgrounds. Translucency parameter (TP) were calculated. Data were statistically analyzed using one-way ANOVA and T test.
2. Micro-shear bond strength (?SBS) test. The experimental group was ultra-translucent zirconia: X-CERA TT, Xuancai® AT. The control group was traditional zirconia: X-CERA ST, STC. Square-shaped specimens (n=10) were prepared with dimensions of 10×10×3mm. The zirconia disc was with the treatment of airborne-particle abrasion with 50 mm aluminum-oxide(Al2O3) particles. Mixed resin cement was applied onto the composite cylinder (Ø 1 mm×5 mm), which was then placed on the zirconia disc under a fixed load of 0.4 N. For measuring bond strengths, a stainless-steel orthodontic wire (diameter 0.2 mm) was used to apply a shear force to the bonded interface. The micro-shear bond strength of each group was obtained by biomechanical analyzer. Data were statistically analyzed using by T test.

Results: 1.The control group was significantly more translucent than the zirconia systems ($P<0.01$). When the brand was the same, there was no significant difference between Xuancai® AT and SHTC of 0.5mm and 1.0mm but Xuancai® AT of 1.5mm was better than SHTC ($P < 0.01$). There was no significant difference between X-CERA TT and X-CERA SHT of 0.5 mm and 1.0mm, but X-CERA TT of 1.5mm was better than X-CERA SHT ($P <0.01$). For experimental group 1, X-CERA SHT no significant difference was found between SHTC and X-CERA SHT of 0.5mm; X-CERA SHT of 1.0mm and 1.5mm showed higher translucency ($P<0.01$). For experimental group 2, X-CERA TT and Xuancai® AT showed no difference; X-CERA TT of 1.0mm and 1.5mm showed higher translucency ($P<0.01$).
2. The micro-shear bond strength of experimental group was significantly higher than that of the same brand in the control group ($P<0.01$). For the experimental group, no significant difference was found between Xuancai® AT and X-CERA TT ($P<0.01$).

Conclusions: 1. The translucency was affected by thickness. The highest mean translucency parameter was obtained in lithium disilicate group. For the thickness of 1.5mm, ultra-translucent zirconia was more translucent than that of high-translucent type.
2. Ultra-translucent zirconia showed higher micro-shear bonding strength than that of traditional type.

INVESTIGATION OF MICRO-STRUCTURAL AND NANO-MECHANICAL PROPERTIES OF MONOLITHIC ZIRCONIA CERAMICS BEFORE AND AFTER IN-VITRO AGING

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Keywords: Monolithic zirconia, aging, surface roughness

Purpose/Aim: Monolithic zirconia ceramics constitute a class of biomaterials with great interest in dental prosthodontics, due to their high strength, hardness and good optical properties. However, limited scientific information still exists on many aspects of monolithic zirconia performance and especially considering its susceptibility to LTD and its effect on hardness and Young's modulus. The aim of the present study was to investigate the nano-hardness (H) and the Young's modulus (E*) of two monolithic zirconia ceramics before and after in-vitro aging.

Materials and Methods: Twelve specimens (2x10x10mm) from two zirconia blocks, Group A: Bruxzir (BruxZir® Solid Zirconia, USA) and Group B: Zircon BioStar (SILADENT Dr. Böhme & Schöps GmbH, Germany) were milled, fully sintered and mirror-polished through a series of SiC papers and diamond pastes. For the in-vitro aging, specimens were placed in an autoclave at 121°C at 2bars pressure for 10h. Surface characterization was performed with Fourier Transform Infrared Spectroscopy (FTIR), X-ray diffraction (XRD) analysis, Micro-Raman Spectroscopy, Scanning electron microscopy-Energy dispersive spectroscopy (SEM-EDS) and Atomic Force Microscopy (AFM). The mechanical properties (nano-hardness (H) and elastic modulus (E*)) were investigated by nano-indentation tests before and after in vitro aging. Two-way Anova was used to test the statistically significant differences at $p<0.05$.

Results: A statistically significant effect of "aging" and "material" on the mechanical properties was recorded, with Group A presenting the lowest values. While before aging both groups presented similar values of H and E* without statistically significant differences, after aging, mean E* of group B was higher by an average of 39 % relative to the corresponding value of group A ($p = 0.001$), and mean H of group B was higher by an average of 76% relative to the corresponding value of group A ($p < 0.001$). The transformation zone exceeded 50?m and the monoclinic phase volume fraction was significantly higher for the Group A. On the surface of the specimens, multiple scratches were apparent due to the grinding and polishing procedures, while after aging an irregular surface with uplifts and uneven rough patterns was observed for both groups (Figure 1). Significantly higher values of surface roughness were recorded after aging for both zirconia ceramics. In this study, although after polishing both groups presented similar monoclinic content, they presented quite different behavior regarding their resistance to LTD. According to data provided by the manufacturers, the slightly higher amount of

Fe2O3 of group B ceramics may have contributed to the difference in aging sensitivity, as the presence of the trivalent ions Fe3+ may have acted as dopants, stabilizing further the tetragonal phase.

Conclusions: In-vitro aging resulted in a higher percentage of t?m transformation and significantly lower nano-hardness and Young's modulus for the Group A, suggesting higher susceptibility to LTD.

PROSTHODONTIC RECOVERY OF A PATIENT WITH SEVERE CENTRAL INCISORS ROOT RESORPTION ASSOCIATED WITH IMPACTED CANINES

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Keywords: transposition, impacted canine, gingival aesthetics

Case Presentation: Background: Severe incisor root resorption associated with an impacted maxillary canine has significant implications. The technique of transposition of a canine to the extraction site of a maxillary central incisor has been reported. However, the technique could cause gingival aesthetic implications such as inappropriate gingival zenith position and low levels of interdental papillae. Technique/Case Report: The patient was a16 year-old female. Two-thirds of the roots of bilateral upper central incisors were resorbed due to impacted canines. She had crowded teeth and has failed as yet to lose a right maxillary deciduous canine. Both maxillary central incisors were extracted. The extrusion of the impacted canines was performed with the modified lingual arch appliance. Subsequently, the canines were orthodontically inclined so that the distance between roots became 1.5 mm which is an appropriate distance for the reconstruction of the papillae. After the full-mouth orthodontic rehabilitation, it was found that the gingival zeniths of canines were located approximately in the middle of the cervical line and the level of the interdental papillae between canines was not high enough to ensure an optimal gingival aesthetics. The tooth preparation was carried out in a manner that the labial, mesial and distal finish lines were set 0.7 mm subgingivally. A silicone rubber impression was taken. Then, provisional restorations (PVR) fabricated on the working cast were delivered on the canines. The labio-distal and mesial subgingival contours of PVR were modified to a convex form. Mesial contact point was set at 5.5 mm away from the alveolar ridge. The form of the adjusted contour of PVR was transferred to the definitive prosthesis by using a pick-up impression of customized zirconia copings with casting wax. Finally, porcelain fused zirconia crowns were delivered on the bilateral canines as the bilateral central incisors. Discussion: Since the zenith of a canine was generally located in the middle of the cervical line, it is necessary to change the position of zenith to distal to imitate the cervical line of the central incisors. In the present case, the convex form was provided for the labio-distal subgingival contour and the zenith was

successfully moved to distal. In addition, growth of the papillae was promoted by the interdental convex form of the restorations. After the delivery of definitive prostheses, the zenith and papillae have been keeping the stable condition for 7 months and the patient is satisfied with the aesthetics. Conclusion: This clinical report describes orthodontic and prosthetic workflows that recover the aesthetic disturbance due to severe root resorption of maxillary central incisors associated with the impacted canines.

3-D POSITIONAL AND MATING ACCURACY OF INTRAORAL AND LABORATORY IMPLANT SCAN BODIES

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Keywords: implant, scanbody, accuracy

Purpose/Aim: The study aimed to evaluate the effect of torque application on the three-dimensional positional accuracy of scan body systems to implant fixtures and/or replicas.

Materials and Methods: Ten test groups derived from seven scan body systems were tested on Straumann bone level Regular CrossFit implants or replicas. Scan body systems were divided into those for intraoral use only (Medentika[I-MS]); laboratory use only (Amann Girrbach[L-AG], Nobel[L-NP], Sirona[L-SR]); and dual use (Straumann CARES Mono[I-SM / L-SM], Straumann scan body[I-SS / L-SS], Core3D[I-CO / L-CO]). Eight of ten test groups allowed for variation of torque application (5Ncm, 10Ncm, 15Ncm), while two groups (L-NP and L-SR) were hand-positioned only. Straumann Meso abutments [ME], torqued to 35Ncm and 15Ncm for implants and replicas respectively, served as controls. A Coordinate Measuring Machine was used to measure vertical linear distortion (dz), global linear distortion (dR), two-dimensional tolerance displacement (dr), change in scan body height (?H) and coaxiality of the scan bodies (n=10).

Results: Mean dz ranged from -9 ± 7?m for L-SS to 23 ± 14?m for L-AG. Mean dR ranged from 11 ± 6?m for I-SM to 74± 41?m for L-SS. Mean dr ranged from 5 ± 4?m for I-SM to 73 ± 41?m for L-SS. Mean ?H ranged from -5 ± 10?m for I-SM to 23 ± 14?m for L-AG. Mean coaxiality ranged from 17 ± 6?m for I-SM to 163 ± 93?m for L-SS. Two-way ANOVA found that torque had a significant effect on dz and ?H.

Conclusions: No significant difference was found between test groups and the controls for dr, dR and coaxiality except for I-SS and L-SS. L-CO, L-AG and L-SS were significantly different from the control for dz and ?H. The height of all the scan bodies was found to decrease with increasing torque application from 5 to 15Ncm except CO. L-SS and I-SS performed significantly poorer than their respective controls for all distortion parameters. I-ME was found to be significantly different from all the intraoral scanbody systems for dz and ?H.

TELECONSULTATION IN DETERMINATION OF TOOTH RESTORABILITY

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Purpose/Aim: To evaluate the feasibility of using intra oral images in place of a physical clinical examination in the assessment of restorability for single teeth

Materials and Methods: Patients seen at the National Dental Centre Singapore (NDCS) are referred to prosthodontically trained clinicians (PTC) for the assessment of broken down teeth to determine if they can be restored. Single teeth requiring such assessments from September 2017 to January 2019 were identified for this pilot study. 4 standardised images were taken by the referring clinician using the Claris 14D intra-oral camera (Sota imaging) and were evaluated by the PTC remotely. The same PTC then examined the tooth clinically. Results were collated and the degree of concurrence between decisions made through remote examination via images and those via clinical examination were recorded. Reasons for any differences were also noted, if any.

Results: A total of 51 patients with 51 teeth requiring assessment were identified. 10 of these teeth were found to be unsuitable for tele consultation due to the poor image quality recorded and were not included in the analysis. In 39 out of the remaining 41 observations (95.1%), the decision on tooth restorability made through viewing the images were similar to that made when the teeth were actually examined. One tooth which was assessed to be unrestorable in the images was assessed as restorable and one tooth that was deemed as restorable was assessed to be unrestorable when clinically examined. In total there were 37 teeth assessed to be restorable and 4 deemed unrestorable when viewed from the images alone. Thus, 36/37 (97.3%) teeth assessed to be restorable through viewing the images accurately depicted the clinical condition while 3/4 (75%) teeth assessed to be unrestorable through imaging concurred with the decision made when clinically examined

Conclusions: Initial results from this pilot study showed good agreement between tele consultation and clinical assessment in the assessment of restorability for single teeth. Where imaging was adequate, restorability of single teeth could be accurately determined by the viewing of images alone. Due to the small sample size of teeth deemed unrestorable through viewing images, caution should be exercised in the interpretation of results for that group

CORRELATIONS BETWEEN GENERAL HEALTH STATUS AND MATERIALS USED FOR THE SUBTOTAL EDENTULOUS PATIENT TREATMENT

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Keywords: epilepsy, dental material selection, injected acrylic resin

Case Presentation: Background. This case report highlights the aspects related to the general health status and the modern materials used for the removable dentures in the context of a growing number of patients presenting complex pathologies that requires a certain, personalised treatment approach.

Techniques: Patient G.A., a 59 years old male, bimaxillary subtotal edentulous, with the presence of 1.7 on upper jaw and 3.2, 3.3, 4.3 on lower jaw, with incorrect partial removable dentures, presented to our clinic asking for dental - maxillary rehabilitation. His general status, severally altered: physical handicap with left hemi paresis, speech alteration, attention deficiency, epilepsy after a car accident and surgery on cervical vertebral column and inferior members, arterial hypertension and treated C hepatitis, lead us to the treatment plan. The patient was under neurological and cardiological treatment and also does physiotherapy. Due to these general conditions we choose to perform the 2 removable partial dentures, with no pro prosthetic treatment that could eventually interfere with his health status, preparing the patient for the complete denture that he will wear after the loss of his last teeth.

Discussions: In order to enhance the mechanical resistance of the dentures bases, a modern injected thermo polymerizable poly – methyl – methacrylate (PMMA) resin (Vitaplex/ Roko) was used, being well known the necessity of resistant materials for the patients with epilepsy, to avoid the fracture and the possibility of swallowing parts. This material is twice resistant than the normal acrylic resin and has also other advantages (less polymerisation contraction, less residual monomer, etc). At the same time, the dentures made of this of material are light and delicate, providing a better comfort for the patient.

Conclusions: Patients with epilepsy need to be carefully evaluated by the dentist and supervised by the neurologist and special measures need to be taken for the prosthetic treatment (the use of modern and improved materials).

Clinical implications: This case confirms the necessity of the individualised selection of dental materials in particular subtotal edentulous cases, offering stable and durable therapeutic results.

TWO DIFFERENT RETENTION SYSTEMS FOR A

BAR RETAINED OVERDENTURE

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Case Presentation: Osseointegrated dental implants have been proven successful in the treatment of edentulism. Several techniques have been described for the successful restoration of the edentulous mandible.52-year-old man reported to Ege University Faculty of Dentistry Department of Prosthodontics for prosthetic evaluation. The patient had received fixed maxillary and complete mandibular dentures. He had difficulty in function and aesthetics.

After clinical and radiographic examination, it was planned to restore maxilla with tooth sopported fixed and mandible with 4 implants supported bar retained overdenture.4 I-system implants (Novodent SA, Yverdon-les-Bains,Switzerland) has been placed according to submerged implant installation protocol. After healing period,clinical and laboratory procedures have been carried out and the upper and lower dentures has been delivered to patient.

In this implant system a clamping force between abutment-implant results in high frictional forces that resists pull out forces during function. On the other hand the retention of the bar over the abutments are maintained with restorative screws. This case report describes the clinical and laboratory steps of screw retained bar restoration over screwless retained abutments.

SHEAR BOND STRENGTH OF RESIN CEMENT TO ZIRCONIA CERAMIC AFTER ALUMINUM OXIDE SANDBLASTING

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Keywords: shear bond strength, zirconia ceramic, sandblasting

Purpose/Aim: Various surface treatment methods have been suggested for zirconia to obtain high bond strength to resin cements. The aim of this study was to evaluate the effect of aluminum oxide sandblasting with various propulsion pressures on the shear bond strength (SBS) of a yttria stabilized tetragonal zirconia polycrystalline ceramic (Y-TPZ) to resin cement.

Materials and Methods: A total of 84 bar-shaped specimens (6x10x1.5mm3) were equally divided into four groups (n=21) according to the test protocols. The specimens in control group received no surface treatment. Other groups were airborne-particle abraded with 110?m Al2O3 particles at 200kPa, 400kPa and 600kPa (2bar, 4bar and 6bar) pressure, respectively. Then, zirconia specimens embedded in plastic rings with auto-polymerizing acrylic resin as the abraded surfaces were on top and stored in distilled water at 37°C. 84 disc-shaped composite specimens were fabricated (ø=6 mm, h=2 mm). Control and sandblasted zirconia groups were then divided into three sub-groups. Composite discs were cemented onto the zirconia specimens with a dual-cured resin cement (Panavia V5) with different film thicknesses (100µ, 150 µ and 300 µ). After they were stored in distilled water at 37°C for 24?h, the SBS test was performed at a crosshead speed of 1?mm/min. Data were analyzed using two-way ANOVA and Tukey HSD test for multiple comparisons ($p < 0.05$).

Results: Results showed statistically significant differences between sandblasting pressures ($p<0.05$; $F=11.625$) and cement film thicknesses ($p<0.05$; $F=34.59$). All sandblasted groups (2MPa, 4MPa and 6 MPa) exhibited significantly higher bond strengths than control group ($p<0.05$). However, no difference was observed amongst sandblasting with different pressures ($p=0.852$). On the other hand, the ranking amongst the film thicknesses were as follows: 300µ >150µ >100 µ. Besides, significant two-factor interaction between sandblasting pressures and cement film thicknesses ($p<0.05$; $F=3.965$). The lowest SBS was recorded in either control specimens cemented with 150µ and 300µ film thicknesses or sandblasted with 2MPa and cemented with 300µ film thickness specimens. In addition, the highest SBS was recorded in 2MPa-100µ group, followed by 4MPa-100µ group.

Conclusions: Cement film thickness should be as thin as possible. Sandblasting increased the bond strength of zirconia compared to control. 2 and 4 MPa seem to be suitable for bonding zirconia to resin cement when the cement film thickness is 100µ.

ONE STAGE TECHNIQUE VS TWO STAGE TECHNIQUE FOR PLACEMENT OF EXTRA-SHORT IMPLANTS: A MULTICENTER STUDY

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Keywords: Short implants

Purpose/Aim: The aim of the research is to compare the clinical outcome of extrashort implants inserted with one-stage and two-stage technique in the upper or lower jaw in adjacent sites.

Materials and Methods: 12 patients who needed to receive two extra-short implants either in the lower or in the upper jaw were recruited in the Prosthodontics Department of University of Turin and University of Genova. Patients had to be in good health with no contraindications to the oral surgery.
Bone quality was evaluated by Hounsfield scale with the BTI Scan® program. In every patient we inserted two adjacent distal implants (n24, extrashort BTI 5,5mm or 6,5mm lenght); one of the implant was submerged (two-stage technique), the second was immediately connected by the multim abutment (one stage technique). After three months, second stage surgery was performed and the implants were loaded with screw-retained splinted rehabilitation.
Periapical x-ray follow-up were made to evaluate the bone resorption around the implants (comparison of periapical X-ray by Adobe Photoshop), ISQ value (Osstell) was performed to analize the implant stability, periodontal indexes (plaque index, BOP, probing depth) were measured to assess gum healing.
Follow-up and measurements were made at surgery time, 3, 6 and 12 months of follow up.

Results: The linear mixed model of the ISQ results shows a non-significant difference between one stage group and two stage group (p=0.367) at t0. The linear mixed model shows a non-significant difference between one stage group and two stage group (p=0.559) at t3.
The MB mesial of the two groups didn't differ consistently on the two techniques. For one stage was registered a mean of 0.36 (SD: 0.55) at T0 and a mean of 0.62 (0.63) at T3. For control group (two stage) was registered a mean of 0.10 (SD: 0.27) for T0 and 0.55 (SD: 0.58) for T3.
The MB distal of the two groups didn't differ consistently on the two techniques. For one stage was registered a mean of 0.08 (SD: 0.63) at T0 and a mean of 0.52 (0.61) at T3. For control group (two stage) was registered a mean of -0.07 (SD: 0.40) for T0 and 0.12 (SD: 0.57) for T3.
The use of mixed generalized models, including the interaction of technique and type of bone, shows a non-significant relationship for the improvement of the MB, between the two techniques both for distal MB and mesial MB.
The chi square test shows a non-significant difference for the plaque between the two stage and one stage groups.
The t test shows a significant difference for the probe depth (mean) between the two stage and one stage groups.

Conclusions: According to preliminary results, no statistically differences resulted between one-stage or two-stage technique.

MECHANICAL PERFORMANCE OF CAD/CAM RESTORATIVE MATERIALS AFTER EROSIVE CHALLENGE

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Keywords: erosive challange, CAD/CAM, Flexural strength

Purpose/Aim: CAD/CAM restorative materials are increasingly used in the restoration of the worn dentition patients. The aim of this study was to evaluate the strength and fatigue resistance of CAD/CAM restorative materials submitted to erosive challenge.

Materials and Methods: Four hundred rectangular beams (2x2x12 mm) were sectioned from the CAD-CAM blocks; Lava Ultimate (3M, ESPE, Seefeld, USA) (LU), Grandio (Voco GmbH, Cuxhaven, Germany)(GR) and Cerasmart (GC, Japan) (CS). Sectioned and sintered IPS e.max (EM) (Ivoclar-Vivadent, Schaan, Liechtenstein) beams as well as direct composite resin (FS) (Filtek Supreme XTE, 3M, ESPE,) were used as controls. The polished beams were tested either after water storage (24 hrs, 37 °C) or 15 days erosive challenge in a simulated gastric juice (pH = 1.2, 15 days, 37 °C).The beams were subjected to either quasi-static (n=10/ group) or cyclic

(n=40/group) four-point flexure testing using a stress ratio of 0.1 and frequency of 4Hz to failure in hydrated conditions. The specimens were loaded until 1.2 million cycles. Data were analyzed using one-way ANOVA for quasi-static and Wilcoxon Rank Sum test for fatigue data (?=0.05). Morphological analysis were obtained using scanning electron microscopy (SEM).

Results: The baseline flexural strength of the composite CAD/CAM beams ranged between 239.4 (±28.8) MPa for EM and 114.7 (±28.3) MPa for FS. Significant differences were observed among the baseline flexural strength of the beams ($p<0.05$). The four-point flexure strength, fatigue resistance and endurance limits were significantly affected by the acidic challenge ($p <0.05$). The reduction in the flexural strength ranged between 10% (EM) to 20% for CS and FS.

Conclusions: The erosive conditions tested in the present study significantly decreased the mechanical performance of the CAD/CAM restorative materials under quasi static and cyclic loading conditions.

LONG-TERM OUTCOMES FOR A PATIENT WITH FIXED IMPLANT-SUPPORTED PROSTHESES OVER A 27-YEAR PERIOD: CASE REPORT

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Keywords: implants, complications, long-term

Case Presentation: Introduction:
This case report illustrates time-dependent changes and complications over a 27-year period for an oligodontia male patient treated in 1991 with fixed restorations in the anterior maxilla and mandible. The patient's original treatment consisted of single-unit (12, 22) and multi-unit (x-44-43-x-x-x-x-33) implant-supported screw-retained fixed dental prostheses (FDPs). Following treatment, the patient was non-compliant with the maintenance schedule due to a long period of depression. In 2018, the now 47 year-old patient re-presented with a series of complaints including prosthesis looseness and compromised aesthetics.

Case Summary:
The patient's assessment in 2018 revealed prosthesis looseness, fracture of the veneering material, wear, gingival inflammation, and malocclusion. Implant-supported crown 22 was mobile due to loosening of the prosthetic and abutment screws. The implant-supported crowns (12, 22) were fabricated on non-engaging intervening abutments, which had resulted in several episodes of screw loosening since their original fabrication. The veneering acrylic of the mandibular implant-supported metal-acrylic FDP had fractured completely leaving only the metal framework. The exposed metal framework combined with parafunction had caused significant attrition on the opposing maxillary incisor (11). The patient's homecare was suboptimal, resulting in generalized gingival inflammation. Comparison to pre-treatment records indicated orthodontic changes and may be the result of life-long craniofacial changes. The patient's management focused on addressing the immediate issue of prosthesis looseness as well as definitive rehabilitation with prosthesis designs that are less likely to loosen, delaminate or fracture over time. Single-unit maxillary implant-supported crowns are planned to be replaced with engaging components and the multi-unit mandibular bridge is planned to be replaced with a full-contour zirconia prosthesis.

Discussion/Conclusions:
This case report highlights the important concepts of maintenance, optimal prosthesis design, and life-long craniofacial changes. The evolution of contemporary implant, connection, abutment, screw and prosthesis design aim at prevention of historical technical complications such as screw loosening and veneering material fracture. Long-term maintenance and management of complications are a critical part of prosthodontic treatment. Regular professional maintenance of implant-supported prostheses is important to the prevention and timely diagnosis of biologic and prosthetic complications as well as limiting the impact of such complications.

CLINICAL DILEMMAS IN RESTORING TEETH IN THE ANTERIOR ESTHETIC REGION: CASE REPORT AND LITERATURE REVIEW

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Keywords: esthetic, anterior zone, restorative dentistry

Case Presentation: Restoration of a single or of a limited number of teeth in the anterior esthetic region is always a big challenge, as the restorative dentist has not only to match the shape, color and texture of the restorations to those of the adjacent natural teeth, but also to handle very carefully the surrounding soft tissues. The problem becomes even bigger when the patient presents a high smile line. In these cases even minor soft tissue defects (i.e. recession) may compromise the final esthetic result. Soft tissue grafting has been advocated as a possible solution for this problem. Use of pink ceramics can offer an alternative solution, if the patient refuses to undergo additional treatment procedures, due to time or financial restrictions.
This presentation outlines, through a case report and review of the literature, the critical points for the fabrication of restorations in the anterior esthetic zone, including proper material selection, margin design and placement, impression procedures and mode of fabrication (analog vs. digital). Furthermore, it rationalizes the restorative dentist's decision on which approach to follow (soft tissue grafting vs. pink ceramics) when a patient presents with previous restorations not satisfying their esthetic expectations. The Pink Esthetic Score (PES) and the White Esthetic Score (WES), that have been introduced for the evaluation of implant retained anterior restorations and the adjacent peri-implant tissues, and their application on restorations retained by natural teeth is also examined

COMPARISON OF ACCURACY OF COMPLETE DENTURES FABRICATED WITH CAD/CAM TECHNOLOGY

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Keywords: CAD/CAD, CNC milling, 3D printing

Purpose/Aim: This in vitro study was to compare the reproducibility of the occlusal surface and dimensional accuracy of complete dentures fabricated with digital technologies (CNC milling and Rapid prototyping).

Materials and Methods: Two maxillary and mandibular edentulous models (EDE1001-UL-UP-FEM, Nissin, Japan) were mounted on semi-adjustable articulator (Stratos 200, Ivoclar) using a technique based upon average values. Then, the models and wax rim were scanned by 3Shape E3 scanner (3Shape, Denmark) and designed with software (Exocad , Germany). The complete dentures were fabricated by two different manufacturing techniques: CAD/CAM milled (CORITEC 250i, imes-icore, Germany) and 3D printing (NextDent). Then the 3D printing group was furtherly divided into 4 groups according to printing angle (45 and 90 degrees) and post-curing modification (post curing on cast or not). 5 sets of maxillay and mandibular dentures were evaluated in each group. The dimensional accuracy was evaluated by: 1) intercanine width 2) intermolar width 3) anteroposterior plane 4) Vertical plane. All the specimens were scanned by scanner (3Shape E3, Denmark) and outputting an STL files for each denture's intaglio and cameo surface by the superimpose with the corresponding pre- processing cast using surface matching software (Geomagic Control 2014; 3D Systems) at selected 10 points for each denture using an overlay guide to verify the location of the measurements.

Results: CNC milling group presented better accuracy (maxilla: 0.037~ 0.074mm, mandible: 0.031~0.097mm) compared with 3Dprinting group. In the 3Dprinting group, the printing angle of 45?showed both large discrepancies (0.0142~ 0.299mm) both at anterior and posterior teeth. Besides, post curing on mandibular master cast had better accuracy than without placement of master cast.

Conclusions: Within the limitation of the study, the conclusions are
1.The CAD/CAM milled denture process presented with higher dimensional accuracy.
2.For 3D printing technique, the building orientation affected the dimensional accuracy. Meanwhile, Post-curing on master cast improved the adaptation of tissue surface of the denture, and had less distortion on the occlusal surface.

USING DSD AND PROSTHETICALLY GUIDED ALL-ON-4 SURGERY FOR THE ESTHETIC AND FUNCTIONAL REHABILITATION OF EDENTULOUS MAXILLA

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Keywords: DSD, prosthetically guided all-on-4 surgery

Case Presentation: Background: A digital smile analysis using digital clinical photography and specific computer programs make it possible to achieve desired esthetic smile. A prosthetically driven surgery based on DSD for the esthetic and functional rehabilitation of edendulous maxilla help to produce ideal maxillary complete-arch prostheses supported by 4 implants.
Case report: This case report describes a multidisciplinary approach to a 59-year-old female patient who had edentulous maxilla and removable mandibular prosthesis. Complete-arch, implant-supported restoration with 4 implants in the maxilla was planned. A DSD was performed using computer software (Romexis Software; Planmeca USA, Inc). An interim maxillary prosthesis based on DSD was fabricated for esthetic and functional evaluation of the patient and guided surgery for All-on-4 treatment.
Conclusion: Using DSD and prosthetically guided All-on-4 surgery could provide pleasant esthetic and functional results for a patient with edentulous maxilla.

EFFECT OF IMPLANT ABUTMENT AND CEMENT COLOR ON THE FINAL COLOR OF MONOLITHIC ZIRCONIA CROWNS

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Keywords: implant abutment, zinc phosphate cement, color

Purpose/Aim: Obtaining adequate ceramic thickness to mask the abutment tooth color is not always possible and appropriate use of cements may help to provide better esthetic results. The purpose of this in-vitro study was to evaluate the effect of cement and substructure color on the final color of monolithic zirconia based restorations.

Materials and Methods: A total of 80 CAD/CAM monolithic zirconia crowns were fabricated. The crowns were cemented on titanium or zirconia abutments with Hoffmann?s cements. The effect of cement color and substructure on the final color of ceramic crowns was analyzed by calculating the color change (?E) value using a spectrophotometer (VITA Easyshade spectrophotometer; Vita Zahnfabrik). Obtained data were analyzed using two-way analysis of variance (ANOVA) and Tukey's tests.

Results: The ?E values of the ceramic crowns were significantly affected by the substructure ($P<.05$) and cement color ($P<.001$). Significant interactions were determined among these 2 variables ($P<.05$). The white, pink/white and pink/brown/white Hoffmann?s cements caused the highest color change (?E=10.13, 5.17, and 4.03, respectively). Titanium abutments demonstrated the greatest ?E values relative to other variables tested. The white Hoffmann?s cement over titanium substructure showed the greatest effect on the final color (?E=10.13) of monolithic zirconia crowns.

Conclusions: The final color of the restoration is influenced by the cement and substructure color.

MAINTENANCE OF ONE-PIECE FULL-ARCH HYBRID PROSTHESES: SHORT TERM CLINICAL FOLLOW-UP

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Keywords: hybrid prostheses, implant dentistry, edentulous patients

Case Presentation: Background:
Hybrid prosthesis often refers to fixed rehabilitation composed of a metal-based substructure covered with acrylic resin using four to six implants. One-piece full-arch hybrid prostheses provide long-term masticatory function for edentulous patients. But this kind of screw-retained prosthesis can only be removed by the dental professional. Therefore the maintenance of one-piece full-arch hybrid prostheses is an important part of clinical practice. The complications that occurred in these prostheses with a high prevalence were the fracture of acrylic teeth, difficulty in oral hygiene, occlusal abrasion and wear. The aim of this case report was to observe the short-term biological and mechanical complications of screw retained acrylic hybrid restorations fabricated on 4 implants.

Technique/Case Report: 4 patients (2 maxilla and 2 mandible) with a mean age 50 were treated with one-piece full-arch hybrid prostheses. The opposite arches were treated with removable or fixed prostheses. For all patients same protocol was applied. Open-tray splinted impression technique was used. After arrangement of denture teeth to evaluate esthetics and maxillomandibular relationship, metal frameworks were designed to hold acrylic teeth. The prostheses were examined at 1,3, 6, 12 months. At each appointment the prostheses were removed and the plaque accumulation, oral hygiene, peri-implant tissue and soft tissue health were evaluated.

Results: In two-years follow-up only one mechanical complication (acrylic tooth was broken and renewed in mouth) was observed. The patients had oral and dental hygiene care and low plaque scores.

Discussion: The patients who have an edentuolus arch, have various treatment options. One-piece full-arch hybrid prosthesis is one of those treatment choices. This type of prosthesis has supposed a progress in the quality of life of edentulous patients compared with conventional complete dentures, since they offer functional, aesthetic and psychological advantages. Howevere, in a survey of literature, %42 mechanical and biological complication was reported for 7 year results. Patients should be informed about both oral hygiene and mechanical complications.

Conclusion: Within the limitation of this case report, implants and one-piece full-arch hybrid prostheses showed rather high short-term success. We must also provide a passive adjustment to the metal frame of the prosthesis and make a prosthetic tail that offers, adequate access to facilitate oral hygiene.

Clinical Implication: Clinicians should continuously monitor patient's compliance with oral hygiene instruction, assess conditions of inserted implants and provide regular peri-implant maintenance care in order to prevent or minimize peri-implant inflammation and bone loss.

A NOVEL SURGICAL GUIDE FOR LARGE MANDIBULAR DENTOALVEOLAR DEFECTS: AN APPROPRIATECH METHOD

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Keywords: Ameloblastoma, implants, guide

Case Presentation: Background:
Ameloblastomas are benign but locally aggressive tumours of odontogenic epithelium origin. Reported prevalence rates are 1% of all oral tumours and cysts of the jaw, increasing to 10-12% if all odontogenic tumours are considered. The mandible is more commonly affected than the maxilla. 3 variants are recognised: conventional solid and multicystic, unicystic, and a peripheral or extraosseous variant. Various treatment modalities exist, ranging from conservative enucleation or marsupialization with peripheral ostectomy to en bloc segmental resection.

Technique/Case Report: In our setting (Chris Hani Baragwanath Academic hospital and Charlotte Maxeke Johannesburg Academic hospital) the treatment modality of choice is en bloc segmental mandibular resection with reconstruction plate and spacer placement, followed by particulate graft from the iliac crest and graft consolidation. Dental rehabilitation involves implant placement with acrylic dentoalveolar prostheses.

Discussion: The large extent of hard and soft tissue volume loss seen in these dentoalveolar defects following reconstruction complicate the use of current intraoral scan and design technology to fabricate milled surgical guides for implant placement. In a resource constrained setting, an Appropriatech surgical guide has been developed to ensure that implant placement meets both surgical and prosthetic demands, with implants ultimately placed within the planned prosthetic envelope for successful dental rehabilitation. The outcome of implant placement with the use of this novel surgical guide in 3 cases is discussed.

Conclusion: The use of a novel surgical guide facilitated the placement of implants within prosthetic parameters in cases of large mandibular dentoalveolar defects.

Clinical Implications: This novel, Appropriatech surgical guide can readily be fabricated in a resource constrained setting to aid with

implant placement for large dentoalveolar defects.

BIOMECHANICAL COMPARISON OF INCLINATION AND LENGTH OF IMPLANTS IN ALL-ON-FOUR CONCEPT BY FINITE ELEMENT METHOD

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Keywords: all-on –four concept, Finite Element Methods, tilted implants

Purpose/Aim: The benefits and advantages of tilted implants in all on –four treatment concept have been discussed. But biomechanical response of the periimplant bone should be considered. Stresses and deformation levels in periimplant bone are affected besides other factors, by implant length, and position of the implants.
The purpose of this study was to evaluate, compare and analyze, via 3-dimensional (3-D) finite element analysis (FEA), stresses and deformations transmitted long (13 mm) and short implants (8mm) inclined 30, and 45 degrees.

Materials and Methods: A 3-D segment of the jaw model was created using customized computer Finite Element Method (FEM) ANSYS software. The FEM was used to evaluate periimplant bone stresses and deformations distribution from long (13mm) implants with tilted 30 and 45 degree respectively and from short (8mm) implants with tilted 30 and 45 degree respectively.

Results: Biomechanical comparison between short (8mm) and long implants (13mm), indicates that, there are no big differences of the deformation levels in the cases of tilted implants 30 degree (0,036 mm and 0,038 mm respectively), but the deformation levels increases more than 3 times in the same implants length with tilted 45 degree (0,135mm and 0,140 mm respectively).
Also simulation shows, that there are no big differences for the stresses level between short and long implants exhibits (1.116?109 Pa and 1.067?109 Pa in that order) , but the stresses levels are increased in the same implants with tilted 45 degree. The periimplant crestal bone around 45 degree tilted implants are experienced more than 2 times stress (2.854?109 Pa and 2.615?109 Pa respectively) than around 35 degree.

Conclusions: According to FEM, periimplant crestal bone around short (8 mm) and long (13 mm) implants are subjected about the same levels of stresses and deformations, but periimplant crestal bone around 45 degree tilted implants are subjected more than 2 times stress and more than 3 times deformation than around 30 degree tilted implants.

PREPARING THE EMERGENCE PROFILE AND GINGIVAL CONTOUR IN IMPLANT SUPPORTED CROWNS: A CASE REPORT

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Case Presentation: Introduction
Tooth loss is an important problem impairing the functional, esthetic and phonetic integrity of stomatognatologic system as well as the general health of population. Recently, the most conservative treatment method for the replacement of missing teeth is dental implant therapy. The main goal of dental implant treatment is to fulfill the esthetic and functional demands of the patient via the replacement of the lost tissues. One of the most important criteria for long-term success of a treatment is the fabrication of a proper implant prothesis which is in harmony with surrounding gingival tissues

Case Report: 32 years old female patient was applied to our clinic with the complaint of gingival discomfort and hygiene problems around the existing implant supported crown (# 25) . After clinical and radiographic examination, overlapped restoration contours onto the gingival tissues was noticed. It was decided to replace the ceramic crown with a temporary crown for the preparation of a proper gingival emergence profile. Alginate impressions were taken and a thermoplastic plaque were prepared on stone model. The old crown was removed and the temporary composite resin crown with “concave s profile” was fabricated using over impression technique. After gingival recontouring, a “titanium base zirconia” custom abutment and a zirconia veneer ceramic crown were fabricated and delivered to the patient through cementation.

Result: After routine controls, the gingival health and esthetics were considered as acceptable. Gingival emergence profile is very important for the long term health of implant supported prosthesis.

A MURINE PERI-IMPLANTITIS MODEL: CHARACTERIZATION AND COMPARISON TO PERIODONTITIS

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Keywords: Peri-implantitis, Murine, Periodontitis

Purpose/Aim: The aim of this study was to develop a murine model for bacteria-induced alveolar bone loss around titanium implants, and to study the differences in gene expression and alveolar bone loss around implant in various conditions compared to teeth.

Materials and Methods: Screw-shaped titanium implants, smooth surface or SLA coated, were inserted immediately after extraction of the first upper left molar, in 5-6-weeks-old BALB/c mice. The mice were infected with Porphyromonas gingivalis and Fusobacterium nucleatum 21 (early infection) or 42 days (delayed infection) after implantation. Six weeks post infection, bone volume around implants and teeth was compared by using micro CT. Histological analysis was performed and differences in gene expression was compared by performing RNA deep sequencing analysis on extracted mRNA from the tissue surrounding the implants and the teeth.

Results: The bacterial infection induced alveolar bone loss around the teeth and the implants. A difference was noticeable in the survival rate of immediately infected implant (60%) compared to delay infected (100%). The level of bone loss was significantly higher around SLA and smooth surface implants compared to teeth. The level of bone loss around the smooth surface implants was higher than the SLA surface in control and infected groups with no statistical significance. There is no significant difference between the early and the delayed infection in alveolar bone loss level around the survived implants. A difference was found in the gene expression between the control and infected groups. In the infected group, the implants presented lower inflammatory response pathways compared to teeth.

Conclusions: The results show that the alveolar bone resorption around implants is higher compared to teeth and that there is a difference in the gene expression response between implants and teeth. In addition the results might indicate that a delayed infection method is superior for a model of osseointegration and induced peri-implantitis. This research opens new possibilities for studying peri-implantitis, and understanding its pathogenesis and genetics.

PROSTHETIC OPTIONS AND CONSIDERATIONS FOR THE MISSING TOOTH IN THE ANTERIOR ESTHETIC REGION

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Keywords: esthetic, anterior zone, restorative dentistry

Purpose/Aim: The anterior tooth replacement has always posed an esthetic challenge for restorative dentists. Many treatment modalities have been described in the literature as available options for replacing a single missing tooth in the anterior zone. These include: (a) restoration retained by a dental implant, (b) fixed dental prosthesis (FDP), (c) resin bonded FDP, (d) orthodontic space closure.
The present study provides a systematic review in order to identify the preference and the efficacy of different treatment options for the single missing anterior tooth.

Materials and Methods: An electronic MEDLINE search was conducted by three independent reviewers to identify English language articles, published in dental journals between January 1990 and December 2018, reporting on the treatment of a single anterior maxillary tooth. The search terms were categorized into the four groups comprising the PICO question. Supplementary manual searches of published full text articles and reviews were also performed.

Results: The initial database search did not identify any randomized control clinical trials. Furthermore no study directly comparing the different treatment approaches was found. The follow-up period of the treatments performed was not stated in most of the articles.
Conventional fixed partial dentures have been used to allow the replacement of missing teeth for many years, providing both strength and esthetics. Resin-bonded FDPs can be seen as long-term provisional restorations with the survival rate being higher in anterior locations and when a cantilever design is applied. Dental implants in the esthetic zone are well-documented in the literature, showing high survival and success rates. Tooth structure, periodontal tissues, available bone, financial restrictions and patient age are some of the factors that must be considered when choosing between the previous options .

Conclusions: Definitive conclusions cannot be drawn, since no clinical trials have directly compared the different treatment approaches. All included studies reported separately on the examined treatment options, and used different protocols. According to the literature reviewed, it seems that all treatment modalities are effective and the clinicians' preferences and experience is important in choosing the treatment approach.

DIGITAL VERSUS CONVENTIONAL IMPRESSION IN FIXED PROSTHODONTICS: THE PATIENTS´VIEW

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Keywords: digital, conventional, impression

Purpose/Aim: The digital impression techniques (DIT) are for some years concluded as clinically acceptable alternative to conventional impression methods (CIM) in fabrication of crowns, short FPDs and implant supported crowns and short FPDs. From clinicians´ view they seem faster with clinically acceptable accuracy. The goal of the study was to show the patients´view. Do they feel the same as clinicians?

Materials and Methods: In total 45 patients were treated with DIT (3Shape, TRIOS®) and CIM (A-silicon, resin tray, impression copings) for fabrication of crowns and short FPDs or of implant supported ones in Dentistry Department at Faculty of Medicine in Hradec Kralove, Charles University, Czech Republic. They received and fulfilled a short questionnaire including 11 questions. They were asked about time, feelings, comfort, sensitivity of the teeth, preferential method for future.

Results: DIT were considered as faster methods as well as more comfortable methods. The sensitivity of the teeth and physical aspects of treatment (temperature etc.) were evaluated equally in both methods. The oral comfort as nausea or maximal opening of the mouth were much more worse in CIM. DIT were considered as the preferential methods for future treatment.

Conclusions: Under limitation of this study DIT were concluded as more comfortable methods for abutment and implant supported crowns and short FPDs fabrication. DIT were also selected from the patients´view as methods of choise for next appointments.

A FULL-DIGITAL WORKFLOW FOR NANOCERAMIC ENDOCROWNS: A 1-YEAR PROSPECTIVE STUDY

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Keywords: endocrown, monolithic, full-digital-workflow

Purpose/Aim: Devitalized teeth are often challenging to restore due to the lack of coronal support and retention. New CAD/CAM materials and intra-oral scanning devices offer new possibilities to restore non-vital teeth in a simple and minimally invasive manner. The aim of this study was to evaluate the success of monolithic endocrowns using a digital workflow.

Materials and Methods: Patients requiring restoration of a devitalised molar or premolar were included in the study. The preparation was scanned using an intra-oral scanner (Cerec Bluecam) and a monolithic restoration was made from a nanoparticle resin-based hybrid composite (Lava Ultimate and GC Cerasmart) or a polymer infiltrated ceramic (Vita Enamic). At time of placement, after 6 and 12 months, radiographs, clinical pictures and a digital impression were taken. Also, the quality of the restoration and patient satisfaction were assessed.

Results: No complications occurred in the Vita Enamic group (#10). In the GC Cerasmart group (#9), 2 chippings and 1 debonding occurred. In the Lava Ultimate group (#10), 1 chipping and 2 fractures occurred. USPSC scores were high, except for the colour match. Patient satisfaction increased after 6 months and did not change thereafter.

Conclusions: The endocrown is a minimally invasive and predictable treatment for the endodontically treated tooth, which can be easily

performed using a chairside scan- and milling system. Although no significant differences were found, ceramic based hybrid material (VE) seems to have a higher survival rate than composite based hybrid materials (LU and CE) as endocrown restoration.

SEVERE PERIODONTITIS-INDUCED DENTITION LOSS ALL-ON-4 IMMEDIATE IMPLANT RESTORATION SHORT-TERM EFFICACY OBSERVATION

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Keywords: dentition loss; immediate implanting; All-on-4

Purpose/Aim: To evaluate the clinical effect of All-on-4 immediate weight-bearing implant denture in patients with severe periodontitis.

Materials and Methods: Twenty patients with severe dentition loss caused by severe periodontitis underwent “All-on-4” immediate weight-bearing denture restoration. After 3 months, 6 months, and 12 months of permanent repair, the plaque index, gingival bleeding index, and depth of probing were examined. The vertical bone level was measured indirectly by radiological examination of the implant. The changes of the distance between the neck of the implant near the middle, the far middle, the cheek/lip side, the tongue/skull side, and the cervical cortex were recorded. The permanent restoration was performed after 3 months, 6 months and 12 months. Edge bone resorption; evaluation of implant success rate, chewing efficiency and patient satisfaction at 12 months.

Results: After 1 year of permanent repair, the implant success rate was 98.45%, and the chewing efficiency was 0.673±0.102. There was no significant difference in plaque index between 3 months, 6 months and 12 months ($P>0.05$). The bleeding index was the highest at 12 months, the difference was statistically significant ($P<0.05$). There was no significant difference between the 6 month and the 3 months ($P>0.05$). After 3 months, 6 months, and 12 months of permanent repair, 20 patients had marginal bone resorption of less than 0.2 mm, and the proximal, distal, buccal/lipral, and lingual/temporal bones at 3 time points .There was no significant difference in the absorption ($P>0.05$). The patient's stability and pronunciation satisfaction were 99.35%, aesthetic satisfaction was 96.52%, chewing function satisfaction was 93.27%, and comfort satisfaction was 90.00%.

Conclusions: "All-on-4" immediate weight-bearing dentures have excellent performance in terms of periodontality, implant success rate and chewing efficiency. Patient satisfaction is also high, short-term efficacy is reliable, long-term efficacy needs further observation.

THE EFFECT ON BOND STRENGTH OF NEW TYPE TISSUE CONDITIONER WITH ADDITION OF PMMA RESIN

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Keywords: Tissue conditioner, Tensile bond strength, Hyperbranched polyester

Purpose/Aim: The in vitro study was to evaluate the effect of addition of PMMA resin on tensile bond strength between the new type tissue conditioner (NTU-TC) and poly (methyl methacrylate) (PMMA) denture base resin.

Materials and Methods: Eight hundred and forty cylinder PMMA resin blocks (Ø30 mm) (Lucitone 199, Dentsply) was prepared and divided into 7 groups (n=10) of NTU-TC according to the weight percentages (wt%) of PMMA resin and poly (ethyl methacrylate) (PEMA) resin. The study groups (n =10) added 2.5, 5, 7.5, 10, 12.5, and 15 wt% PMMA into PEMA powder and mixed with the liquid of 78.3 wt% acetyl tribute citrate (ATBC), 8.7 wt% hyperbranched polyester (TAH) and 13 wt% alcohol. The control group added 100 wt% PEMA with the same liquid for comparison. The tested tissue conditioner (cross-sectional area: 707 mm2; thickness: 3 mm) was positioned between two PMMA resin blocks. After immersion in the distilled water at 37±1°C for 0, 1, 3, 7, 14, and 28 days, these test specimens were undergone the tensile test by a universal testing machine at a crosshead speed of 10 mm/min. The data were analyzed using two-way ANOVA, one-way ANOVA and Tukey HSD post hoc test ($p<0.05$). The failure mode was observed with visual examination and stereomicroscope among all the test specimens.

Results: From Day 0 to Day 28, the increase of bond strength was found at each test group. Especially, the significantly highest values of bond strength were found from 0.42 to 1.45 MPa in the group of 7.5 wt% PMMA resin addition. Besides, most failure mode was mixed failure (53.3%).

Conclusions: Within the limitation of the study, addition of 7.5 wt% PMMA resin to the powder of NTU-TC had the maximal increase on tensile bond strength to PMMA denture base resin within 28 days. Addition of proper amount and proportion of PMMA resin is an effective method to increase bond strength of NTU-TC, and it provides a reliable bonding property.

COLOR STABILITY OF DUAL-CURED RESIN CEMENTS CONTAINING WITH OR WITHOUT ALTERNATIVE PHOTOINITIATORS

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Keywords: resin cement, color stability, porcelain veneers

Purpose/Aim: The aim of this study was to evaluate the color stability of dual-cured resin cements containing with or without

alternative photoinitiators after artificial accelerated aging.

Materials and Methods: Four resin cements were used in the study, including PANAVIA V5?Clear??PANAVIA F2.0?Light??3M Rely X Ultimate?Translucent??RelyX Unicem 2?Translucent?. All photoinitiators were characterized by UV-Vis spectro- photometry. Disk-shaped lithium disilicate ceramic specimens that were 1 mm in thickness were prepared using IPS e.max Press (Ivoclar Vivadent, shade HT/A1). For baseline control groups, resin cement specimens that were 10 mm in diameter and 0.5 mm of thickness were prepared and stored in 37? distilled water in dark. Spectrophotometric baseline color measurements (PR-655 SpectraScan, Photo Research) were performed at 24 h (D65 illuminator) with natural die material as background. For experimental groups, the resin cements were bonded to lithium disilicate ceramic disks(n = 40?10 in each group). Then color measurements were determined again after thermal cycles10000 and 20000 times of aging (Thermo Scientific,USA), each aging using the PR-655 SpectraScan (Photo Research) to measure the color value CIEL*a*b*, ?E ? 3 as a clinical acceptable range. All data were submitted to two-way ANOVA and Tukey's test (a = 0.05; b = 0.2).

Results: ? E of Each specimen were 1.37 ~ 4.00, ? E of the ceramic+ resin cement group were 1.37 ~ 3.15, ? E of the resin cement group were 1.61 ~ 4.00, after two aging, ? E of the PANAVIA V5 were less than other subgroups (? E ?2.0).

Conclusions: The four resin cements after artificial aging in varying degrees of color change. ? E of resin cement containing alternative photoinitiators was minimal at the same cycling in the same group, showing higher color stability.

DIGITAL FOUR - DIMENSIONAL VIRTUAL PREDICTION AND REALIZATION TECHNOLOGY IN AESTHETIC RESTORATION OF ANTERIOR TEETH

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Keywords: DSD design; 3-dimensional digital technology; cosmetic dentistry

Case Presentation: A patient with aesthetic defect of anterior teeth was selected. Before the operation, virtual prediction of the treatment planning of three and four dimensions was carried out through digital technology, so as to realize the visualization of the effect of four dimensions, and provide a variety of visual plans for patients to choose, and assist patients to choose the plan. After the plan is determined, accurate transfer of preoperative design effect can be achieved through digital method, and the shape of the prosthesis approved by patients can be transferred to the formal prosthesis precisely, so as to achieve good aesthetic result.DSD and four dimension virtual prediction can help medical technicians to have a more comprehensive understanding of the dynamic aesthetic information of patients' teeth in the aesthetic restoration of anterior teeth, facilitate doctor-patient communication, guide the whole treatment process, effectively shorten the clinical operation time, and improve the aesthetic effect of restoration and the satisfaction of patients.

ENHANCED OSSEOINTEGRATION AND BIOCOMPATIBILITY OF MG-AL-LDH NANOSHEET PATTERNED PORE-SEALED PEO BILAYER COATING ON MAGNESIUM

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Purpose/Aim: Magnesium and its alloys could self-degrade to avoid second operation for its remove, and enable to promote bone repair with proper mechanical property. However, Mg's high rate of degradation leads to an excessive inflammatory response, hindering a good binding between Mg and bone tissue. Endowing Mg with favorable degradation rate and osteoimmunomodulatory property is of great importance in clinical practice.

Materials and Methods: A multifunctional bilayer composite coating of PEO/LDH with plasma electrolytic oxidization and hydrothermal synthesis was developed on a pure Mg metal to seal the pores of PEO substrate. SD rats are used for the systematic evaluation of in vivo osseointegration and degradation rate. Micro-CT and Scanning Electron Microscope was utilized to observe the degradation of Mg and the bonding interface with bone.

Results: PEO produce a highly adherent ceramic oxide coating on the pure magnesium and LDH sealed the pores of PEO coating with no obvious cell cytotoxicity. LDH coating reduces the cytotoxicity of PEO, especially LDH-12h. LDH-2h and LDH-12h showed obvious lower degradation rate than the others. The surface of LDHs appeared in close contact with tissues, indicating better biocompatibility compared to Mg and PEO group. And the Scanning Electron Microscope showed the novel Mg material and bone tissue are more closely combined.

Conclusions: The osteoimmunomodulatory property of bone biomaterials is a vital property determining the in vivo fate of the implants. The constructed PEO/LDH multilayer coating on magnesium is expected to provide a new idea and theoretical basis for the clinic application of Mg.

AESTHETIC RESTORATION OF MAXILLARY INCISOR WITH IMPLANT: A CASE REPORT

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Keywords: Dental implant; Maxillary Incisor; Aesthetic; provisional resin restorations

Case Presentation: Here, we report a case of dental implant treatment for maxillary incisor. The patient was a 56-year-old man with the chief complaint of missing and defection of maxillary anterior incisors. Tooth 21 has been extracted 3 months ago and tooth 22 has undergone root canal re-treatment 4 weeks ago. After clinical and radiography examination, the implant placement with full ceramic crown restoration for tooth 21 and metal post core with full ceramic crown restoration for tooth 22 was planned. Prior to surgery, a

CBCT was taken to evaluate the bone condition of the edentulous area (bone hight 16 mm; bone width 3.9mm). Under the guidance of the implant guide, the implant (3.7mm*13mm TSV, Zimmer, USA) was installed in tooth 21 area, following by the buccal bone augmentation for teeth 21 and 22. After 4 weeks of the healing period, CAD/CAM titanium post core was cemented to tooth 22, and then the resin cantilever provisional bridge of teeth 21 and 22 was performed. 6 months after the implant placement, the gingival of tooth 21 area was incised for the replacement of healing cap. Following a 4-week period, the implant-supported provisional resin crown was performed and the gingival contour of it was adjusted for every 4 weeks. After 3 adjustments, the ideal shape of gingival margin and papilla was achieved and then the impression was taken. Thus, the custom zirconia abutment of tooth 21 and definitive zirconia crowns were placed in teeth 21 and 22. The indicators for evaluating the aesthetic restoration of anterior teeth are white esthetic score (WES) and pink esthetic score (PES). In this case, the WES and PES was 9 and 13, respectively, achieving a perfect white and red aesthetic effect. It suggests that the chairside adjustment of provisional resin restorations to induce idea gingival shape of implant-supported crowns is recommended and the additional time of customizing the impression or making a new temporary restoration is avoided.

EVALUATION OF TREATMENT EFFECTS OF ORAL APPLIANCE AT DIFFERENT MANDIBULAR POSITIONS FOR PATIENTS WITH OSA

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Keywords: Obstructive sleep apnea, Oral appliance, Treatment effect

Purpose/Aim: Oral appliances (OAs) have become widely used for the management of obstructive sleep apnea (OSA). The aim of OAs is to advance the mandible slightly to enlarge the upper airway and prevent collapse during sleep. Larger mandibular protrusive distance will produce a larger decrease in OSA events, while some studies described that the increase of mandibular protrusive distance caused the increase of side effects such as occlusal changes including tooth pain.
The purpose of this study was to evaluate the difference of treatment effects of OAs at 50% and at 75% anterior mandibular positions.

Materials and Methods: 31 OSA patients (17 male 14 female; 61.6±11.82 years) were included in this study. All patients were randomly divided into two groups: OAs at 50% anterior mandibular position group (the 50% group) and at 75% anterior mandibular position group (the 75% group). Overnight polysomnography (PSG) tests lasting at least 5 hours. were performed twice; before and after the OA treatment.

Results: There was no difference of AHI between two groups before and after treatment (p=0.538, p=0.570 respectively). There was a significant improvement of AHI in both the 50% group and the 75% group (p=0008, p=0.035 respectively).

Conclusions: These results suggested that the 50% anterior mandibular position in easy to accept while still offering some effects in OSA patients. There might be some OSA patients who can acquire treatment efficacy, even though their mandibular protrusion is not large.

IGSF10: AN OLD/NEW FACTOR BENCHMARKED TO BMP2 AND IMPLICATIONS IN BONE REGENERATION

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Keywords: IGSF10, bone regeneration, BMP2

Purpose/Aim: There is an acute need for new bone regeneration factors, given adverse effects associated with existing biologics such as BMP2. IGSF10 was first discovered in 2004 in a single report, showing its expression apparently in fracture callus. However, little is known whether IGSF10 ligand may or may not promote osteogenesis. Our preliminary RNA Seq data revealed ~16-fold IGSF10 expression in the remodeling periodontal bone over dental pulp, a relatively remodeling-dormant soft tissue. Here, we explored putative osteogenesis roles of IGSF10 by molecular signaling and in an in vivo orthotopic bone defect model.

Materials and Methods: Donor matched periodontal bone and dental pulp samples were obtained from six human subjects after IRB approval. Periodontal cells (PCs) and dental pulp cells (DPCs) were isolated and passaged to <passage 4. Cell proliferation and migration were assayed using CCK8 and Transwell. Osteogenic differentiation was assayed with alizarin red and western blot, and benchmarked to BMP2. Qiagen Cignal Reporter assay was used to explore IGSF10's molecular pathways, followed by Western Blotting. Critical-size, calvarial bone defects were created in C57/BL mice, followed by IGSF10 delivery in vivo. All quantitative data were treated with statistical analysis ($p<0.05$).

Results: IGSF10 showed ~16-fold higher expression in remodeling-active periodontal tissue than donor-matched dental pulp, which is remodeling dormant, per RNA-seq data. IGSF10 further promoted proliferation (Fig. 1C) and mineralization in a dose-dependent manner, but only in osteogenesis induction medium and with 100 ng/mL being the most effective dose per alizarin red staining and calcium assay. IGSF10 at 100 ng/mL significantly promoted the migration of PCs, similarly to 10% FBS. Remarkably, IGSF10 at 100 ng/ml promoted robust mineralization similarly to BMP2, also at 100 ng/mL, and further showed synergistic effects to BMP2, both at lower doses than either factor alone. JNK and other signaling pathways were activated upon 100 ng/mL IGSF10 treatment using Qiagen Cignal Reporter assay, followed by Western blot confirmation.

Conclusions: These findings represent an original demonstration of IGSF10's robust osteogenesis capacity, similar to BMP2, and yet in a context-dependent manner and via MAPK/JNK pathway, instead of canonical BMP signaling. IGSF10's osteogenesis potential, independent of and yet synergistic to BMP2, suggests that it may reduce BMP2 doses and/or act as a new osteogenic factor.

EVALUATION OF THE EFFECTS OF POLISHING SYSTEMS ON SURFACE ROUGHNESS AND MORPHOLOGY OF COMPOSITE RESIN

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Keywords: Dental composite, Polishing, Surface roughness

Purpose/Aim: A rough surface negatively impacts on a restoration's aesthetics, increasing it's susceptibility to exterior staining, diminishing the amount of gloss, it's ability to reflect light and therefore the perceived colour of the composite resin. Furthermore, it affects the accumulation of plaque on the restoration's surface and the perceived roughness to the patient's tongue. There are many variables that can influence the immediate surface roughness of a dental material such as the type of material, polishing system, force and timing of polishing and polishing in wet or dry conditions. In this in-vitro study, polishers of a similar composition were hypothesised to provide similar surface polish and be measured as residual surface roughness. Five different 2-step diamond impregnated polishing systems (Sof-Lex Spirals, Venus Supra, Komet Spirals, CompoMaster and Diatect Shapeguard) were evaluated with regards to their effect on the surface roughness and morphology of a single submicron hybrid composite resin material. (Brilliant Everglow).

Materials and Methods: 200 composite resin discs were prepared and pre-polished using 180 SiC paper to produce a uniform baseline

surface. The samples were randomly assigned to one of five groups and polishing was completed by one operator. Surface roughness (Ra) was measured using contact profilometry and the surfaces were examined under scanning electron microscope(SEM). Statistical analysis of the profilometry results was completed using SSPS software.

Results: Statistical differences ($p<0.05$) were identified between the surface roughness of the polishers and therefore the null hypothesis was rejected. Diatech Shapeguard (0.22µm, SD 0.08) and Komet Spiral (0.26µm, SD 0.09) polishers produced the lowest surface roughness (Ra) values. The CompoMaster polishing system produced the highest surface roughness values (0.55µm, SD 0.19). The SEM images were generally consistent with the results of the profilometry.

Conclusions: Within the limits of this in-vitro study of the efficacy of diamond impregnated 2-step polishing systems, Diatech Shapeguard and Komet Spiral polishing systems produced the lowest surface roughness values. These polishers produced acceptable surface roughness values with regards to oral health and patient comfort. However, the surface roughness results were much higher than levels required to reduce the risk of surface staining. The CompoMaster group produced the highest surface roughness when tested and generated values of more than twice that of the Diatech and the Komet polishers.

Clinical relevance: Similarly composed polishing systems may not produce comparable surface roughness levels and clinicians should be aware of this when considered polishing protocols for a particular composite resin.

INFLUENCE OF ORAL HYGIENE ON FUNGAL GROWTH IN PATIENTS – USERS OF AN REMOVABLE DENTURES

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Keywords: removable dentures, stomatitis, hygiene

Purpose/Aim: Patients with candidiasis may report varied symptoms, but such infections are most often asymptomatic. In addition to its high incidence in denture users (60%–100%), there is a concern that Candida species from the oral cavity may colonize the upper gastrointestinal tract and lead to septicemia, which has a 40%–79% mortality rate and can require a prolonged hospital stay. It is thus important for all physicians to be aware of the risk factors, diagnosis, and treatment of oral candidiasis in older patients.The objectives of the study was to answer to the following questions: Is there any relationship between oral hygiene and the growth of yeast in patients without mucosal inflammation? Is there a need for mycological examination patients without mucosal inflammation?

Materials and Methods: A prospective study was carried out on a group of patients which have undergone: 1) the mycological examination, 2). the intensity of yeast growth and 3).an assessment of oral hygiene.

Results: 91 denture wearers lacked signs of clinical inflammation were included to the study. The growth of Candida albicans was as follow: 14 patients had up to 20 colonies, 19 patients had over 20 colonies. 10% of patients with good oral hygiene proved to have more than 20 yeast colonies. 5% of patients with bad oral hygiene had more than 20 colonies.

Conclusions: There was no influence found hygiene on the growth rate of fungal microorganisms.

LYMPHATIC RESPONCE TO TRAUMA-INDUCED INFLAMMATION AFTER VITAL TEETH PREPARATION FOR FIXED PROSTHESIS

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Keywords: lymphatic system, fixed prosthesis, dental pulp

Purpose/Aim: The aim of the study was to analyze, based on the literature, pulp response to trauma-induced inflammation after vital teeth preparation for fixed prosthesis.

Materials and Methods: The study analyzed literature on the lymphatic system in the pulp, lymphangiogenesis and angiogenesis as well as vital teeth preparation for fixed prosthesis and the incidence of dental pulp inflammation.

Results: The preparation of teeth for receiving crowns or conventional bridge retainers could involve a large degree of tooth reduction and cause significant trauma to the dental pulp. These teeth may have previously had a range of restorative procedures, leaving the dental pulp with an impaired ability to recover from trauma from further dental procedures.

Endodontic origin diseases affecting the abutment teeth were considered to be a biological failure of the fixed protheses. These particular situations require higher vascular density. Excessive development of the blood vessels, however, can be detrimental and lead to reversible pulpitis. This is because of the pulp chamber's limited space. Without an adequate outflow of lymph-dependent fluids and substances, they cannot be removed. The pressure of the fluid tissue in the dental pulp will increase until it reaches the vascular pressure, resulting in ischemia and the risk of dental pulp necrosis.

Conclusions: Dental procedures, oral infections and poor oral hygiene can lead to the introduction of oral microorganisms into the lymphatic system or the blood stream. Understanding angiogenesis and lymphangiogenesis mechanisms during inflammation processes may be beneficial for more effective disease treatment. Although the existence of pulpal lymphatics is controversial, because of the difficulties in distinguishing lymphatic capillaries from blood capillaries and venules.

THE EFFECT OF THE ER:YAG LASER DECONTAMINATION PROCESS ON THE SURFACE OF TWO TITANIUM ALLOYS

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Keywords: titanium alloys, periimplantitis, Er:YAG laser

Purpose/Aim: In this work, blocks of two titanium alloys that are commonly used in implantology were subjected to Er:YAG laser using various exposure parameters, and then subjected to observations under the SEM microscope, to determine the safety of lasers in decontamination of the implant surface in terms of integrity of implant surface structure.

Materials and Methods: The cubes used in the test were made of titanium-vanadium and titanium-niobium alloys. The material was exposed to a laser: Er:YAG (Light Walker Fotona) with a wavelength of 2940 nm. Individual samples were treated with various laser light parameters to investigate their effect on the surface of the material. ThermaCAM P640 thermal imager (FLIR) was used, with a visible range of 7.5-13 ?m and a 640 x 480 pixel matrix. In the second stage of the study, the material was subjected to observations under the SEM microscope.

Results: The observations carried out under the SEM microscope showed no changes in the surface of the material after the use of the Er:YAG laser with moderate power. However, it has been shown that the use of high power can damage the surface of the alloy, which creates microscopic inequalities susceptible to bacterial colonization.

Conclusions: Nowadays, laser devices with the use of moderate power could be applied in the treatment of periimplantitis thanks to their bactericidal effect. The Er: YAG laser can be a clinically acceptable method of decontamination of titanium alloys, provided that the device is carefully cared for during operation, especially time and exposure parameters as well as sufficiently intensive cooling. Otherwise, it may result in micro-cracks, which in addition to the weakening of the implant itself are a niche for colonization with oral bacteria, which can lead to an increased risk of periimplantitis.

SECTIONAL MAXILLARY COMPLETE DENTURE IN A PATIENT WITH

MICROSTOMIA: A CLINICAL REPORT

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Keywords: removable, sectional denture, microstomia

Case Presentation: Background:
Microstomia is defined as abnormally small oral orifice. Patients with maxillofacial trauma, surgical treatment of oral and facial neoplasms, scleroderma, and burns often present with this condition. Fabrication of complete dentures for these patients can be very challenging due to limited access to the oral cavity. Removable prostheses with various designs such as locks, magnets, hinges or attachments have been reported to be useful in fully edentulous patients with microstomia.

Case Report: This clinical report describes a simple and cost effective technique used to fabricate a sectional maxillary complete denture. The patient is a 55 years old Chinese male with limited mouth opening from previous burns. He sought treatment for a new set of complete dentures. For his new maxillary denture, sectional special trays were fabricated to make impression of the edentulous arches. The maxillary impression tray consisted of two attachable pieces, which could be inserted and reattached intra-orally in the correct position. Border moulding was done with green stick compound. Master impression was made using addition polyvinyl silicone and poured using Type IV stone. Two sectional cobalt chrome framework with interlocking segments were cast separately and connected together by three studs with parallel walls on the left overlapping onto three protruded structure on the right metal base. Wax rims were added on the metal framework to record the maxilla-mandibular relationship. Before the issue stage, a metal tube was also embedded in cold cure acrylic resin at the anterior buccal flange region to allow patient to lock in the two segments using a L-shape stainless steel wire for additional retention.

Discussion: Patients with microstomia tend to have difficulty inserting and removing their removable prostheses due to constricted mouth opening. Advantages of this technique as compared to other design include (1) cost effectiveness since no additional material such as hinges or attachments are required; (2) greater intraoral positioning precision and stability. The disadvantage for this technique include increase laboratory work and time for the technician.

Conclusion: Overall, the patient was satisfied with the treatment outcome, citing improved comfort and function when using his new set of dentures. The patient was able to insert and remove the dentures without difficulty. The need for regular follow-up and good denture hygiene was emphasized to the patient.

Clinical Implications: Sectional complete dentures can be cost effective yet providing good support, stability and retention in patients with microstomia.

FABRICATE A REMOVABLE PARTIAL DENTURE FOR A MICROSTOMIA PATIENT BY USING DIGITAL INTRAORAL IMPRESSION: A CLINICAL CASE REPORT

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Case Presentation: PATIENT: A 50-year-old microstomia woman presented for re-fabrication of her maxillary complete denture and mandible removable partial denture. In this case, the microstomia patient presented with the limited mouth opening after a fire disaster. Since the traditional tray was fail to put into the patient's mouth and take the mandible impression, the intraoral scanning was applied. To scan the remaining teeth and alveolar mucosa, TRIOS®3 Pod scanner (3Shape) was used while taking the digital impression. The denture base was virtually designed by 3shape dental system (3Shape) and printed by 3D system.

Discussion: Unlike conventional impression techniques, intraoral scanning is hard to be practiced because the soft tissue is easy to move. Once, one of the main shortcomings in digitalizing denture fabrication technology was that it was hard to produce customized denture teeth. Fortunately, now this shortcoming has been corrected gradually. This paper showed that the digital denture fabrication could provide customized denture teeth for optimize occlusion especially when traditional impression technology is not available.

Conclusion: This report demonstrated how digital removable partial dentures can be fabricated for microstomia patient.

EFFECT OF COLLIMATED AND FOCUSED LOW-INTENSITY PULSED ULTRASOUND STIMULATION ON BONE REPAIR

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Keywords: LICU, LIFU, Foam SiC

Purpose/Aim: The aim of this study was to evaluate the effect of low-intensity collimated pulse ultrasound (LICU) and low-intensity focused-pulse ultrasound (LIFU) stimulation on bone repair.

Materials and Methods: First of all, subcutaneous and subperiosteal temperature changes of LICU and LIFU were confirmed using temperature testing experiment. Then, silicon carbide (SiC) foam was implanted into the mandible of Japanese white rabbits, and changes in the amount and structure of bone were monitored by methylene blue–acid fuchsin staining and micro-CT.

Results: Subcutaneous and subperiosteal temperature changes caused by LICU and LIFU were less than 1°C and caused no damage to cells or tissues. The bone area increased and the structure of the bone tissue became more mature with increasing time, and both the bone area and the mean pore occupancy fraction (POF) of the LIFU group were significantly greater than those of the LICU group at 3, 6, and 9weeks post-implantation. Bone ingrowth in different directions showed that new bone formation in the mesial, distal, top, and lingual aspects of the implants in the LIFU group was greater than in the LICU group and the control group (without ultrasound treatment).

Conclusions: The results indicate that both LIFU and LICU could effectively promote bone formation. However, LIFU significantly accelerated bone formation not only in the buccal area but also in the lingual area of the scaffold.

THE CORRELATION BETWEEN CERVICAL AND BODY DAMAGES FROM USING OF THE MOBILE PHONE

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Keywords: cervical damages, cervical fusion, lordrosis etc.

Purpose/Aim: To determine the existing correlation between effects of using of mobile phone at the health problems, this in fact is damaging considerable the human body.

Materials and Methods: This transversal epidemiological study is carried out about for 6 months (October 2017 – March 2018). In our study are investigated strictly 145 subjects of the age group 18- 30 years old. The data are collected using a structured questionnaire, filling by subjects of our study, who are selected without any primary selection, and students and workers of Dental Medicine Faculty, as well as "Aldent University" in Tirana, Albania. The collected data were statistically analyzed.

Result and Discussion: The greater part of subjects study included in were female subjects (67,6%) The study results shown 75,9% of subjects involved in study have had problems with their neck and shoulders and their head was positioned in front of. The most of the subject involved in study carried out the radiography. Also, the study results shown about 52,4% of our subjects had fusion of the C3-C5 cervical vertebras and about 53,1% have declared with lordrosis. The study results shown a statistical significant correlation between genders and their neck pains, radiographies carried out, fusion of the cervical and lordrosis. In the same time do not concluded any strongly correlation between gender and neck and shoulders problems, where (?= 0,130).

Conclusions: It was our first study based in the shared and changed experiences and literature, which gives some data about the correlation between using of mobile phone and the neck and shoulders problems. The results of our study confirmed a correlation between gender and using of mobile phone. To avoid as soon as possible the cervical damages should established a stable strategy in using as least of mobile phone during the day, physical treatment, shoulders exercises and some other prevention measures in order to avoid such damages of the human body.

DELIVERY VEHICLE OF MUSCLE-DERIVED IRISIN BASED ON

SILK/CALCIUM SILICATE/SODIUM ALGINATE COMPOSITE SCAFFOLD FOR BONE REGENERATION

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Keywords: Biocompatible scaffold, Bone regeneration, Irisin

Purpose/Aim: Irisin is a cytokine produced by skeletal muscle and usually plays a pivotal role in inducing fat browning and regulating energy expenditure. In recent years, it was found that irisin might be the molecular entity responsible for muscle–bone connectivity and is useful in osteogenesis induction.

Materials and Methods: To study its effect on bone regeneration, we developed silk/calcium silicate/sodium alginate (SCS) composite scaffold based on an interpenetrating network hydrogel containing silk fibroin, calcium silicate, sodium alginate. Then we loaded irisin on the SCS before coating it with polyvinyl alcohol (PVA). The SCS/P scaffold was physically characterized and some in vitro and in vivo experiments were carried out to evaluate the scaffold effect on bone regeneration.

Results: The SCS/P scaffold was showed a porous sponge structure pursuant to scanning electron microscopy analysis. The release kinetics assay demonstrated that irisin was stably released from the irisin-loaded hybrid system (i/SCS/P system) to 50% within 7 days. Moreover, osteoinductive studies using bone marrow stem cells (BMSCs) in vitro exhibited the i/ SCS/P system improved the activity of alkaline phosphatase (ALP) and enhanced the expression levels of a series of osteogenic markers containing Runx-2, ALP, BMP2, Osterix, OCN, and OPN. Alizarin red staining also demonstrated the promotion of osteogenesis induced by i/SCS/P scaffolds. In addition, in vivo studies showed that increased bone regeneration with better mineralization and higher quality was found during the repair of rat calvarial defects through utilizing the i/SCS/P system.

Conclusions: These data provided strong evidence that the composite i/SCS/P would be a promising substitute for bone tissue engineering.

OPTICAL AND MECHANICAL PROPERTIES OF NOVEL ZIRCONIA

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Purpose/Aim: The purpose of this in vitro study was to assess and compare the translucency and flexural strength of two kind of novel zirconia.

Materials and Methods: Group 1(high-translucent zircoina): LavaTM Plus(3M), X-CERA ST(X-CERA), SHTC(Aidite); group 2(ultra-translucent zirconia): LavaTM Esthetic(3M), X-CERA SHT(Xiang Tong), Xuancai AT(Aidite); group 3(lithium disilicate):UP.CAD(Upcera). 126 disk-shaped specimens of 7 mm diameter and 3 levels of thickness(0.5mm, 1.0mm, 1.5mm, n=6) were prepared. 90 bar-shaped specimens were prepared with dimensions of 25mm x 4mm x 1.2 mm(n=15). A spectrophotometer was used to measure the translucency parameter. The flexural strength of the specimens was determined by using a 3-point bending test. Data wre analyzed using one-way ANOVA and SNK test(?=0.01).

Results: Significant differences were found among the materials concerning translucency and flexural strength($P<0.01$). 1.The highest mean translucency value was obtained in the UP.CAD group. No statistical differences was found between SHTC and Xuancai AT at the thickness of 0.5mm or 1.0mm, while the transluceny of Xuancai AT was superior to that of SHTC at the thickness of 1.5mm. The transluceny of LavaTM esthetic was superior to that of LavaTM at every level of thickness as well as X-CERA SHT to X-CERA ST. Among the 0.5mm specimens, SHTC, LavaTM esthetic and Xuancai AT produced the highest translucency value of their group. Among the 1.0mm specimens, X-CERA ST, X-CERA SHT and LavaTM esthetic produced the highest translucency value of their group. Among the 1.5mm specimens, X-CERA ST and X-CERA SHT produced the highest translucency value of their group. 2. The mean flexural strength of ultra-translucent group was superior to high-translucent one with the same brand. The highest mean flexural strength was obtained in X-CERA ST and X-CERA SHT of their group.

Conclusions: 1. The mean translucency value of ultra-transparent zirconia was not inferior to that of high-translucent with the same brand, and the difference was related to the thickness. 2. Glass-ceramics produced the highest translucency value. 3. The mean flexural strength of high-translucent zirconia was significantly superior to that of ultra-translucent, both of which were more than 300MPa.

HISTOLOGICAL CHANGE OF OSSIFICATION/OSSEOINTEGRATION WITHIN THE CENTER OF BMP-2 ENHANCED TISSUE-ENGINEERED BONE ON RABBIT MODELS

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Keywords: tissue engineering bone, AMPK-1, osseointegration

Purpose/Aim: To histomorphometrically analysis the osteogenesis/osseointegration within the inner core of a human bone morphogenic protein-2 (hBMP-2) overexpressing tissue engineered bone complex (TEBC) in maxillary sinus floor augmentation and immediate implantation.

Materials and Methods: Autologous adipose derived stem cells (ASCs) derived from New Zealand white rabbits were transfected with the BMP-2 gene by an adenovirus vector. Nine rabbits underwent bilateral sinus augmentation, each was randomized to one of the three groups as A: ASCs/?-TCP, B: AdGFP-ASCs/?-TCP, and C: AdBMP2-ASCs/?-TCP. Twenty-four rabbits underwent bilateral immediate implantation (48 implants). Four groups of TEBC as AA: ASCs/TCP-?; BB: AdGFP-ASCs/TCP-?; CC: AdBMP-2-ASCs/TCP-?, were randomized to support one implant in an oversized socket on rabbit femoral. Animals were sacrificed after 8 weeks. The 18 sinuses were processed to assess the area fraction of new bone (%NB), the trichromatic fluorolabelling (%fluorolabeling), and expression of hypoxia inducible factor 1 alpha (HIF-1?) and AMP-activated protein kinase-1 alpha (AMPK-1?) within the inner zone of the augmented sinus floor. %NB, %fluorolabeling, and mechanical test were applied to assess osseointegration.

Results: BMP-2 has been successfully transfected into ASCs and consistently expressed for 28 days. At week 8, a significant increase in %NB and %fluorolabeling was evident in the inner layer of group C when compared to the control. All groups showed a general expression of HIF-1?, only group C showed positive AMPK-1? expression. As in immediate implantation, the group CC demonstrated the largest osseointegration.

Conclusions: BMP-2 could promote the osteogenesis/osseointegration within the inner core of a TEBC with an activation of AMPK.

THE PEEL BOND STRENGTH BETWEEN 3D-PRINTING CUSTOM TRAY MATERIALS AND ELASTOMERIC IMPRESSION/ADHESIVE SYSTEMS

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Keywords: additive manufacturing, custom tray, peel bond strength

Purpose/Aim: The digital workflow of computer-aided design (CAD) and additive manufacturing (AM) has gained popularity in prosthodontic dentistry and shown promise in facilitating the fabrication of custom tray. The present study aimed to evaluate the bonding of three 3D-printing custom tray materials with three elastomeric impression/adhesive systems by peel test. The peel bond strength of the 3D-printed custom tray materials was compared with that of a conventional light-curing resin.

Materials and Methods: CAD-designed test blocks were printed by AM technologies including stereolithography (SLA), digital light processing (DLP), and fused filament fabrication (FFF) using the corresponding tray materials Dental LT, FREEPRINT tray, and polylactide (PLA). The reference test blocks were conventionally fabricated with a light-curing resin, Zeta Tray LC (n = 12). Through scanning electron microscopy (SEM) analyses and roughness measurements, the surface topographies of the four tray materials were investigated and 3D-reconstructed. Impression materials including Vinylsiloxanether (VSXE), Vinyl polysiloxane (VPS), and Polyether (PE) were bonded to the tray materials using the manufacturer-recommended adhesives. The force at failure in the peel test was recorded to calculate the bond strength between each tray material and impression/adhesive system. The failure mode and rupture site were identified by comparatively examining the peeled surfaces of both tray and impression material using a microscope.

Results: The four tray materials showed featured surface topography. Dental LT had a smooth surface with the best surface finish. Surface textures could be found on both surfaces of FREEPRINT tray and PLA, but the texture orientations of the two were opposite and perpendicular to each other. The reference light-curing resin exhibited a porous surface with numerous valleys and few peaks. The four tray materials did not statistically differ in peel bond strength with VSXE and PE, but PLA and reference showed higher peel bond strength with VPS than Dental LT and FREEPRINT tray ($p < 0.05$). For peeling from VSXE and VPS, the mixed failure ratios of PLA and reference were higher than those of Dental LT and FREEPRINT tray. For peeling from PE, the failure modes of the four tray materials were all mostly adhesive failure. Cohesive failures could only be found in the VSXE groups. The rupture site of adhesive

failure in all groups was partly at the adhesive-impression material interface and partly within the adhesive, but never at the adhesive-tray material interface.

Conclusions: The tray materials influenced the bonding physically but not chemically. The 3D-printed tray materials could be good alternatives to the conventional light-curing resin when the VSXE or PE impression/adhesive system is used. For bonding with VPS impression/adhesive system, PLA seems an ideal tray material, whereas Dental LT and FREEPRINT tray may need further surface roughening.

THE APPLICATION OF INDIVIDUALIZED ABUTMENT-CROWN INTEGRATED PROVISIONAL RESTORATION IN OPTIMIZING THE PERI-IMPLANT SOFT TISSUE CONTOUR

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Keywords: dental implant, emergence profile, CAD-CAM

Case Presentation: Background: Single-unit implant restoration in the esthetic zone still remains challenging. The soft tissue conditioning plays a critical role in optimizing the esthetic outcome of anterior single-tooth implant restoration. The most common method to condition peri-implant soft tissue is using the commercial prefabricated healing abutments, which have a standard cylindrical shape and are unable to mimic the emergence profile of the natural teeth individually. Another common way to condition the soft tissue is using the implant-supported provisional restoration, most often handmade of acrylic resin, and usually need to be modified for several times. The modification process greatly relies on the clinician's experience and takes several visits of the patients. Therefore, an individualized provisional restoration which can mimic the emergence profile of the natural teeth individually and with no need for multiple modifications is needed.

Technique: The stage-two surgery was carried out 3 months after the implant placement at the tooth 11 position of a 35-year old female (Fig a). By merging the DICOM-data of CBCT scanning and the STL-file of the optical scanning of the plaster model together, the individualized abutment-crown integrated provisional restoration was designed and fabricated in the laboratory, with its emergence profile mirroring that of the contra-lateral natural tooth (Fig b, c). After the provisional restoration was fixed on the implant (Fig d), the peri-implant soft tissue architecture was evaluated and the Pink Esthetic Score (PES) was recorded immediately. Three months later, the provisional restoration was removed and the tissue profile presented a pleasant shape, so did the papillae (Fig e, f). Then the definitive ceramic abutment and crown were fabricated and fixed on the implant (Fig g, h). The PES was recorded immediately, 6- and 12-months later.

Discussion: The individualized abutment-crown integrated provisional restoration has an emergence profile which mimics that of natural tooth, and shapes the soft tissue contour properly, without the need for multiple visits of patients, and saves amount of hand labor of the technicians and clinicians. Besides, comparing with the individualized healing abutment which may result in the "black triangle" at the papillary areas due to the absence of intact crown part, the individualized abutment-crown integrated provisional restoration is better in recreating the papillae.

Conclusion: With the help of digital approach, a novel solution for shaping the peri-implant soft tissue morphology in the esthetic zone with an individualized abutment-crown integrated provisional restoration is successfully established.
Clinical implications: The individualized abutment-crown integrated provisional restoration with the emergence profile mimicking that of natural teeth was fabricated and successfully used in conditioning the peri-implant soft tissue contour. The esthetic evaluation by PES confirmed the promising effect of this provisional restoration on the esthetics of anterior single-tooth implant restoration.

RESVERATROL PRETREATMENT IMPROVES DENTIN BONDING DURABILITY

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Keywords: resveratrol, dentin, adhesive

Purpose/Aim: Poor bonding stability remains the "Achilles' heel" of dentin bonding, a simple and effective approach to inhibit the activities of both exogenous collagenases and endogenous MMPs, and prevention of the growth of bacterial biofilm is therefore highly demanded. The purpose of this study is to evaluate the effect of resveratrol pretreatment on resin-dentin bonds, and to provide theoretical basis for the potential application of resveratrol in clinical dentin bonding.

Materials and Methods: Sixty four non-caries third molars were sectioned, polished, and randomly divided into four groups (n = 16), and then pretreated with one of the following resveratrol/ ethanol solution: group 1, 0mg/ml (control group), group 2,1mg/ml, group 3, 10mg/ml, group 4, 20mg/ml. A universal adhesive was then used, followed by the resin composites building. All the samples were divided into three subgroups: immediate group, collagenase aging group and thermocycling group. The microtensile bond strength (MTBS), failure modes, interfacial nanoleakage and in situ zymography were used to measure the physicochemical properties of the adhesive–dentin interfaces respectively, while additional dentin slices were prepared for the evaluation of S. mutans biofilm formation by CLSM and MTT assay.

Results: Both pretreatment method ($P < 0.05$) and aging approach ($P < 0.05$) significantly affected bond strength. Irrespective of collagenase aging or thermocycling, the 20mg/ml resveratrol/ethanol pretreatment group (group 4) present significantly higher ($p < 0.05$) MTBS and the lower ($p < 0.05$) expression of nanoleakage than control group, and shows better Inhibitory effect of MMPs and S. mutans activity. Meanwhile, cohesive failure in dentin decreases gradually with the increase content of resveratrol.

Conclusions: The resveratrol/ethanol solution has the potential to act as a simple but versatile dentin primer, which could improve dentin bonding durability and prevent secondary caries.

THE EFFECT OF CYCLIC LOADING ON CAD-CAM ABUTMENT IN MORSE TAPER INTERNAL TYPE IMPLANT

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Keywords: CAD-CAM abutment, axial displacement, cyclic loading

Purpose/Aim: The purpose this in vitro study was to evaluate the influence of the use of CAD-CAM customized abutments on the axial displacements, the reduction of removal torque values (RTVs) and the tensile removal forces after cyclic loading compared to prefabricated abutments in Morse taper internal connection type implants.

Materials and Methods: The study was conducted using implant-abutment assemblies with internal hexagonal and Morse taper connection manufactured by two different manufacturers (Group Os, De). Fourteen assemblies were prepared for each manufacturer group and divided into 2 groups (n=7): prefabricated abutments (Os-P, De-P) and CAD-CAM customized abutments (Os-C, De-C). The amount of axial displacement, the removal torque values (RTVs) were measured before and after cyclic loading (1 million cycles, 3Hz with 150N), and the tensile removal force to dislodge the abutments were measured after cyclic loading. A repeated measures ANOVA and a pattern analysis based on the logarithmic regression model were conducted to evaluate the effect of cyclic loading on the axial displacement of the abutments. The Wilcoxon signed-rank test was performed to compare before and after RTVs within each group, and the Mann-Whitney U test was conducted for comparison of RTV reduction rates and tensile removal forces between the groups. Pearson correlation analysis was performed to analyze the correlation between axial displacement value, RTV reduction rate and tensile removal torque.

Results: In all groups, axial displacement occurred and the RTVs decreased after cyclic loading. CAD-CAM abutments were not significantly different from prefabricated abutments in the amount of axial displacement and tensile removal force, however, significantly greater RTV reduction% was observed after cyclic loading ($p<.05$). The correlation among the axial displacement, the RTV and the tensile removal force was not significant.

Conclusions: The use of CAD-CAM abutment did not affect significantly the amount of axial displacement and tensile removal force, however, presented a significantly greater removal torque reduction% than prefabricated abutments. The connection stability due to the friction at the abutment-implant interface of CAD-CAM abutments may not be different from prefabricated abutment.

COMPARISON OF CROWN FITNESS AND USER-FRIENDLINESS BETWEEN TOOTH PREPARATION WITH ELECTRIC AND AIR-TURBINE HANDPIECES

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Purpose/Aim: Tooth preparation of precise and accuracy is demanded in contemporary all-ceramic crown restoration. As one of the indispensable instruments, dental handpiece can influence the accuracy of tooth preparation. Compared with the traditional air-turbine handpiece, the electric handpiece, which has been introduced as an alternative, needs to be evaluated on its performance in tooth preparation. The study aimed to evaluate the user-friendliness and the tooth preparation performance using electric and air-turbine handpieces by comparison of the self-report user comfort, noise intensity, surface roughness and crown fitness.

Materials and Methods: Twenty dentists were asked to use the air-turbine and electric handpieces respectively. Feedbacks of noise, weight, hand grip feeling, flexibility and tooth preparation feeling in general were scored according to a Visual Analogue Scale (VAS). Moreover, the dentists were asked to complete a questionnaire on the preference of handpiece during tooth preparation. Noise emitted by the two handpieces was detected with a precision sound level meter. After tooth preparation with air-turbine and electric handpieces, the surface roughness of ten teeth was measured with a profilometer. The other eighteen teeth were prepared as abutments to measure the marginal and internal fitness of all-ceramic crowns via replica technique using the silicone rubber impression material. Results of noise intensity and the VAS scores of user-friendliness were analyzed with the Mann–Whitney U test. Chi-square test were used to compare the ratio of preferred handpiece. The surface roughness, marginal and internal fitness were analyzed with t-test to determine significant differences (all ?=.05).

Results: Electric handpiece had heavier weight (P = .000), produced lower noise (P = .000) and was preferred in the finishing stage with greater smoothness (P = .009). Noise produced by electric handpiece was lower tested during both idling and teeth preparation at 15 cm, 30 cm and 45 cm, respectively (P < .05). Electric handpiece produced similar surface roughness values (Sa) to air-turbine handpiece (P = .377). There were no significant differences on the marginal and internal crown fitness between the air-turbine handpiece and electric handpiece groups (P > .05).

Conclusions: Despite heavier weight, electric handpiece emitted lower noise and was preferred in the finishing step of tooth preparation with greater smoothness than the air-turbine handpiece. The surface roughness of prepared teeth and crown fitness between tooth and all-ceramic crown were not affected by the use of air-turbine and electric handpieces. The electric handpiece is significantly quieter and smoother than the air-turbine handpiece making it being more recommended in precise tooth preparation.

TISSUE SURFACE ADAPTATION OF 3D-PRINTED COMPLETE DENTURE BASE: IN-VIVO STUDIES

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Keywords: digital light processing, denture base, tissue surface adaptation

Purpose/Aim: The purpose of this study was to evaluate the in-vivo tissue surface adaptation of complete denture bases using three different manufacturing techniques: digital light processing (DLP), 5-axis milling (MIL), and conventional pack and press (PAP).

Materials and Methods: the complete denture bases with occlusal rims were fabricated for 10 edentulous arches (maxilla or mandible) in the predetermined jaw relationship using DLP, MIL, and PAP techniques. For the DLP base, the build angle was set as 100-degree. The denture bases were inserted in the patient's mouth to clinically evaluate the tissue surface adaptation, checked with silicon registration material. The Mann-Whitney test, McNemar's test, and Kruskal-Wallis analysis of variance (a=.05) were used for statistical analyses.

Results: no significant differences in tissue surface adaptation were detected among the MIL, DLP, and PAP bases for both maxilla and mandible. However, compared with PAP base, MIL base tends to be loose in tissue surface adaptation at the maxillary ridge crest, while DLP base slightly compress the tissue. Both DLP and MIL base tend to be loose in mid palatal-area and compress the posterior palatal seal area. In mandible, both MIL and DLP bases tends to compress the lingual slope area compared with PAP base.

Conclusions: The DLP or MIL denture base can replace the conventional PAP denture base with clinically acceptable tissue surface adaptation. Clinically, possible areas of tissue compression or space of DLP or MIL denture base need to be examined.

COMPARISON OF THREE CONSERVATIVE TREATMENTS FOR MYOFASCIAL PAIN WITH LIMITED MOUTH OPENING: A RETROSPECTIVE STUDY

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Keywords: myofascial pain, physiotherapy, splint therapy

Purpose/Aim: Conservative treatment modalities are recommended to manage the myofascial pain with limited mouth opening (MPWLMO) in subjects with temporomandibular disorders (TMDs). The aim of this study was to compare the effectiveness of three conservative modalities including splint therapy, physiotherapy and manipulation therapy.

Materials and Methods: 168 patients who had MPWLMO were retrospectively observed in this study. Between January 2014 and December 2016, 63 patients received splint therapy (Group1), 35 patients received manipulation following electro-physiotherapy (Group2), 33 patients received combination of splint therapy and manipulation following electro-physiotherapy (Group3), 37patients received counseling only (Group4), and all subjects were received following twelve weeks recall visits. Clinical assessments included intensity of spontaneous pain of masticatory musculature, palpation pain, chewing pain and pain-free maximal mouth opening. Differences of intragroup and intergroup were examined by using analysis of variance (ANVOA) and Kruskal-Wallis test.

Results: Spontaneous pain of masticatory muscles was relieved significantly in all groups since the six-week visit (P<0.05) and no significant difference was found among all groups (P>0.05). For palpation pain, it was relieved significantly no later than the nine-week visit in group1,2,3 (P<0.05), and in group4, twelve weeks was needed. Chewing pain was relieved significantly since the six-week visit in group1,2,3(P<0.05), yet no significant change compared to baseline was observed in group4 at each interval (P>0.05). Significant increase of maximal pain-free mouth opening was observed since the nine-week visit in group1, and since the three-week visit in group 2 and 3 (P<0.05). Nevertheless, no significant change of mouth opening was found during the whole follow-up interval in group4 (P>0.05).

Conclusions: Each included treatment modality could reduce the spontaneous pain and palpation pain during the recalling intervals. Combined approach of stabilization splint and manipulation integrated with electro-physiotherapy could promote the process of relieving chewing pain and improving pain-free mouth opening.

EFFECTS OF STAINING BEVERAGES ON THE EFFECTIVENESS OF IN-OFFICE TOOTH BLEACHING: A RANDOMIZED CONTROLLED TRAIL

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Keywords: Tooth bleaching, Effectiveness, Staining beverages

Purpose/Aim: To evaluate the effects of the staining beverages (coffee and tea) on the effectiveness of the in-office tooth bleaching.

Materials and Methods: A randomized controlled clinical trial was performed registered in the Clinical Trials Registry (NCT NCT03933527). The participants was randomly divided into 3 groups according to the staining beverages consumed during and after the in-office bleaching treatment: control group (no beverages consumed), coffee, and tea. All participants received 2 sessions of the in-office bleaching treatment with 40% hydrogen peroxide gel. For groups coffee and tea, the participants were asked to rinse with coffee or tea for 30 s, 4 times daily for 4 weeks. The color evaluation of 6 maxillary anterior teeth was assessed using a spectrophotometer (Easyshade, Vita ZahnFabrik, Germany) employing the (CIE) L*a*b* system at baseline (T0), immediately after the first bleaching session (T1), immediately after the second bleaching session (T2), 1 week after the end of bleaching procedure (T3), and 3 weeks after the end of bleaching procedure (T4). Data were analyzed by two-way analysis of variance and the Turkey tests (?=0.05).

Results: Sixty participants completed the study (n=20 per group). Compared with the baseline assessment, no significant differences were observed in the ?E value among 3 groups at all time intervals. However, ?L* value in the control group was significantly higher than the groups coffee and tea at T3 (P = 0.038, and P = 0.012) and T4 (P = 0.002, and P < 0.001), respectively.

Conclusions: Exposure to coffee or tea during the bleaching treatment does not affect the effectiveness of the in-office bleaching treatment. However, after tooth bleaching, brighter tooth color was observed in the participants who did not consume the staining beverages.

ENHANCED OSSEOINTEGRATION AROUND BIOFUNCTIONAL POLYETHERETHERKETONE FABRICATED BY ELECTRON BEAN EVAPORTION

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Purpose/Aim: Polyetheretherketone (PEEK) is a tooth colored material with excellent biomechanical properties, which has the potential to serve as an aesthetic dental implant material. However, the bioinertness and poor osteogenic properties of PEEK limit its clinical application as dental implants. In this work, bioactive elements (Silicate and Strontium) were introduced energetically into PEEK by electron beam evaporation (EBE) in order to achieve rapid osseointegration.

Materials and Methods: Scanning electron microscopy (SEM) and X-ray photoelectron spectroscopy (XPS) were used to investigate the microstructure and composition of the modified PEEK. In vitro, the effects of the modified PEEK on osteogenic differentiation of bone marrow mesenchymal stem cells derived from ovariectomized rats (rBMSCs-OVX), and angiogenic differentiation of human

umbilical vein endothelial cells (HUVECs) were investigated. Furthermore, the rat femur model was used to evaluate the osseointegration ability of EBE-modified PEEK implants in vivo.

Results: The in vitro results showed that EBE-modified PEEK enhanced cell viability, alkaline phosphatase activity, and mRNA expression levels of osteoblast-related genes of rBMSCs-OVX and expression of vascular endothelial growth factor without addition of extra osteogenic and angiogenic reagents. Furthermore, the SrSi-modified group effectively stimulated HUVECs proliferation, migration and angiogenesis process. The in vivo experiments revealed that the dual ions doped implants dramatically stimulated osseointegration in the OVX rat femur model after 8 weeks.

Conclusions: Our results demonstrate that a surface with multifunctional biological properties can be produced by EBE technology and application of PEEK to dental implants can be broadened and expedited based on this scheme.

INFLUENCE OF TWO PLANTING METHODS ON STRESS DISTRIBUTION WITHIN INSUFFICIENT AVAILABLE BONE WIDTH

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Keywords: Oral Implant, Stress Distribution in Alveolar Bone, 3D Finite Element Analysis

Purpose/Aim: To study stress distribution in bone when inserted implants in lingual offset location, with a vertical or inclined direction.

Materials and Methods: By means of finite element analysis, solid models were assembled into two groups. Experimental group was placing the implant in lingual offset location with or without inclining, where available bone width was insufficient and control group was inserting the implant vertically in the middle. Three 100N loads in different directions were applied to the crown .The model's mathematical result were solved by ANSYS software and compressive stress and tensile stress distribution in bone around implant were analyzed.

Results: The maximum compressive stress and tensile stress in cervical cortical bone and cancellous bone of model A was the smallest in the four models. Compared with model A, the maximum compressive stress of cervical cortical bone of model B,C,D increased by 0.75-0.79?0.94-1.20?1.79-2.12 times respectively, and the maximum tensile stress increased by 0.13-5.91?0.22-17.42?12.58-85.34 times, respectively. Compared with model A, the maximum compressive stress of cancellous bone of model B,C,D increased by 0.69-0.82?1.84-2.03?2.06-3.52 times respectively, and the maximum tensile stress increased by 0.89-3.95?2.67-8.87?6.20-16.06 times, respectively.

Conclusions: With the limitation of this study, implants in lingual offset location, with linguoclination was more beneficial for modulating bone growth than with vertical direction due to its tensile stress increased more greatly, and both were better for bone remodeling than tilting buccally.

THERAPEUTIC APPROACHES, THE TREATMENT AND FOLLOW-UP OF HEAVY BRUXERS WITH FULL MOUTH REHABILITATIONS

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Keywords: Heavy bruxers, Vertical dimension, peri- implantitis

Case Presentation: Background:
Bruxism is a repetitive jaw activity which can occur during sleep or during wakefulness. Sleep and awake bruxism are potential risk factors for oral hard tissue damage, failure of dental restorations and temporomandibular disorders. I will present a 13 years follow up of 2 heavy bruxers that were treated with a full fixed dental prosthesis on teeth and on implants. There were several clinical dilemmas concerning the treatment plan that will be discussed:
Adaptation to increased vertical dimension
Establishing posterior occlusal support with the desired excursive guidance
Preserving teeth with poor prognosis versus extracting them and placing implants
Splinting of teeth versus single crown restorations
Placing implants in heavy bruxers

Choice of material of the final restoration.

While all teeth with poor prognosis that were preserved survived, implants with excellent conditions developed a peri-implantitis. Splinting of fixed dental prosthesis in heavy bruxers is considered to be a risk factor for cement wash out. The presentation demonstrates both splinting and single crown restorations, regarding the endodontic status of the abutments. Both options showed success. There is no ideal material for the final restoration. I represent both PFM and Zirconia (monolithic and bilayer) restorations and show advantages and complications of each material. complications like porcelain chipping and abrasion of natural teeth opposing the restorations. An alternative for restoring abraded teeth is with a direct Glass Ionomer restorations with the advantage of minimum cost and minimum chair time.
Discussion: The survival of the rehabilitation of the 2 heavy bruxers after 13 years was good. Minor maintenance was needed. Teeth with poor prognosis survived, while implants with ideal properties developed peri- implantitis and require surgery and further prosthodontic treatments.

Conclusion: It is possible to treat heavy bruxers with Fixed dental prosthesis with good prognosis when the posterior occlusal support is established and forces of excursive guidance are balanced. It is possible to use Monolithic Zirconia restorations to avoid bilayer Porcelain chipping. It is crucial to maintain a meticulous oral hygiene measures. Probing around implants on regular check ups is important in order to detect peri-mucositis in time, and to try to prevent peri- implantitis. Teeth with a poor prognosis showed a good clinical performance in time and it is advised to preserve teeth when possible.

Clinical implications: Despite the risk factors that heavy bruxers represent, it is possible to treat these cases with high predictability.

COMPARISON OF SUPPORTING-AREA OF COMPLETE DENTURES IN PATIENTS WITH DIFFERENT DEGREES OF BONE RESORPTION

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Keywords: complete denture, supporting area, bone resorption

Purpose/Aim: The purpose of this in vitro study was to develop a digital method to evaluate the relationship between morphological changes in upper and lower supporting areas with the residual bone resorption.

Materials and Methods: The panoramic radiographs from twenty-nine edentulous patients (15 males and 14 females) were taken and used to measure the residual bone height. All the samples were classified by the American College of Prosthodontics system to generalize three groups and completed the digitized definitive complete dentures. Eight regions in upper and lower dentures were extracted by a 3D modeling software (Meshmixer) and imported into the inspecting software (Geomagic Control). All the geometric values were recorded and used to calculate the 14 area ratios further. In addition, denture tissue height was measured at the mandibular 1st molar cross-section view. Data were analyzed with the one-way ANOVA and nonparametic test to detect differences in variables among three groups, multiple comparisons with LSD. Independent test and Mann-Whitney U were used performed for gender ($p=0.05$). The correlation coefficients were evaluated in variables of each other, including the 8 areas and 2 heights.

Results: Patients with most severe bone resorption had the smallest lower and upper supporting areas and lowest denture tissue height. The changes in rates of lower to upper resorption were significantly different ($p<0.05$), except the total projected areas (LAP/UAP, $p>0.05$). For patients with a mandible height of more than 16 mm, the size of the upper and lower alveolar ridges is approximately equal (LAS/URS, 99.46% in group1 and 98.18% in group2). However, the area of the lower alveolar ridge was significantly smaller than that of the upper jaw with severe bone resorption, and the area ratio between group1 (99.46%) and group3 (69.91%) decreased by about 30%.Surficial areas had the largest positive coefficient with parameters related to the projected areas. Lower alveolar ridge surficial area (LAS) existed a statistically significant positive correlation with DH ($r=0.813$, $p<0.001$). There were significant correlations between lower and upper supporting areas.

Conclusions: As the denture tissue surface derived from the residual alveolar ridge duplicated, the morphology of denture tissue surface may describe the shape of residual ridge. As the bone atrophy increased, the sizes of supporting areas in ridge were gradually smaller, but not obvious for palate. The mandibular ridge resorption was more rapid than that of in maxilla.

CONSERVATIVE MANAGEMENT OF DISCOLORED ANTERIOR TEETH: A CASE REPORT

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Keywords: Endodontically treated teeth, Anterior, CAD/CAM

Case Presentation: Discoloration of anterior teeth is one of the most frequent reason why a patient seeks dental care. In the management, multiple treatments are available to enhance the esthetic outcome, from noninvasive external/internal bleaching to more complex prosthetic solutions such as veneers or crowns. Moreover, the knowledge of the mechanisms behind tooth discoloration can influence the treatment plan. Innovative digital technology, including computer-aided design/computer-aided manufacturing (CAD/CAM) chairside technologies, digital scanner/articulator, and the introduction of novel high translucency zirconia blocks coupled with modern adhesive strategies have reduced both biological and financial costs compared to the conventional analog approach. The aim of this case report is to show how these new materials and technology can be used in association with noninvasive/minimal invasive approaches to restore the discolored, previously restored, anterior teeth.This case report presents a combination of novel digital technology, such as CAD/CAM manufacturing, digital articulator, virtual wax-up, and their applications in the high-quality restoration of discolored anterior teeth.

KERATINIZED MUCOSA AUGMENTATION BEFORE IMPLANT PLACEMENT?—— AN EXPERIMENTAL STUDY IN CANINE MODEL

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Keywords: dental implant, keratinized mucosa augmentation, revascularization

Purpose/Aim: The aim of this experiment is to investigate the differences of blood supply and tissue structures of the receiving site for free gingival graft (FGG), in order to provide more evidences for the optimal timing of FGG.

Materials and Methods: Six beagle dogs were used in this study. The split mouth design was involved, in which 3 sites of each side of the maxilla were used as the surgical sites. One side of the maxilla was chosen randomly as test group and the full thickness mucoperiosteal was elevated, while the other side was left untreated. 2 months later, keratinized mucosa augmentation operations with FGG were performed on both sides. The samples were harvested after 1, 2, and 4 weeks after FGG surgery .The histological analyses with Hematoxylin Eosin (HE), Masson's trichrome and Picric acid- Sirius red stainings were performed to analyze epithelium reconstruction and the degree of tissue fibration. The histochemistry investigations on CD31 and vascular endothelial growth factor (VEGF) expressions were performed to evaluate revascularization of the grated sites.

Results: Statistical analysis of the epithelial thickness and the density of collagen fiber showed no significance between test and control group at 1, 2 and 4 weeks. Expressions of CD31 and VEGF were significantly higher in the control group at 1 and 2 weeks, while no difference at 4 weeks.

Conclusions: In this animal model, keratinized mucosa augmentation with FGG should be performed at least 4 weeks after surgery procedure with flap elevation, in order to achieve better the tissue regeneration and blood supply.

DIGITALLY DESIGNED AND THREE-DIMENSIONAL PRINTED DIE FOR FIXED DENTURE FABRICATION

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Keywords: 3D printing, artificial gingiva, digital design

Purpose/Aim: Removable nail die systems are the main strategy for the manufacture of fixed denture. However, there are many drawbacks in the traditional hand making technique of the die. It is time-consuming and laborious complex work. High technical requirements and cutting error still remain problems. Recently digital design and three-dimensional (3D) printing has been more and more reported in Prosthodontics. In this study, we raised a new strategy, together with digital design and 3D printed die and replaceable artificial gingiva for fixed denture fabrication.

Materials and Methods: 1. The digital data of the prepared teeth and the opposing arch was collected using an intraoral scan (3Shape).
2. The edge line surrounding the digital cast of alveolar bone area was designed. The region of the die around the abutments' cervical margin was established. Two oblique planes to prevent die's rotation were designed.
3. The virtual cutting lines between abutment and adjacent teeth were designed on the digital model. And then the abutments were digitally separated from the model base. The space for making artificial gingival around the abutments had been left before the dies design was finished.
4. The dies and cast were separately printed based on 3D printing technique.
5. The artificial gingiva which was removable was formed using silicone rubber impression according to the patients' current intraoral state.

Results: A case of patient who had received crown lengthening surgery and papilla reconstruction was introduced using this technology. After correcting the gingival shape of two maxillary central incisors by using temporary crown, 3D printed die and artificial gingival was fabricated. Ceramic crowns were then precisely created and significantly improved patient appearance.

Conclusions: The digital design and fabrication will be widely applied in fixed denture fabrication. Therefore the digital die fabricating technology of the distinctive design and design for artificial gingiva should be improved. In some cases the die and artificial gingiva need to be carefully designed to accurately simulate the position and elasticity of the gingiva after crown lengthening surgery and papilla reconstruction. In the described technique, the part of artificial gingiva is changeable as the change of patient's intraoral condition and doctor's decision. The accurate fabrication of the final prosthesis was achieved based on the more stable and precise digital design of the die.

AN ANTHOPOMETRIC STUDY OF CRANIOFACIAL MEASUREMENTS AND THEIR CORRELATION WITH VERTICAL DIMENSION OF OCCLUSION

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Keywords: Verical dimension of occlusion, craniofacial dimensions

Purpose/Aim: The aim of the study was to find any correlation of vertical dimension of occlusion with the rest of the craniofacial dimensions in dentate subjects.

Materials and Methods: The study included 36 participants of both sex, students of 5th year of School od Dental Medicine in Belgrade, Angle class I occlusion and not demaged dentition. 10 craniofacial measurements were recorded using special constructed divider for that occasion. The results were analysed by using computer progromme SPSS.

Results: The results have shown the statistic significance in measurements of some parameters between male and female. Also there is strong correlation between value of VDO and the height of the ear.

Conclusions: Considering the obtained results, it may be concluded that there is correlation of VDO and craniofacial measurements among the dentate patients. However, if we want to use these results in clinical conditions when restoring VDO in edentulous patients further survey is needed in order to establish correlation between parameters in edentulous patients.

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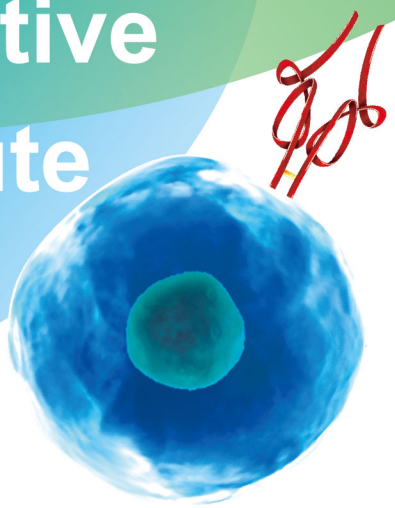

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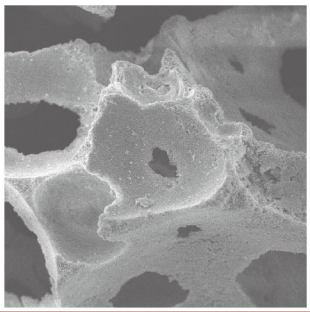

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