2015 CONFERENCE PROGRAM

32nd Year of the ICP & 16th Biennial Meeting of the

International College of Prosthodontists

Seoul, Korea | September 17-20, 2015

With generous support from our Global Partners

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ICP Welcomes our Colleagues and Guests to Seoul, Korea

Special thanks to our local Conference Organizing Committee:
Dong-Hoo Han, Jung-Suk Han, Seong Joo Heo & Sang-Wan Shin

16th Meeting of the

International College of Prosthodontists

Seoul, Korea
September 17-20, 2015

International College of Prosthodontists
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International College of Prosthodontists

Supporting Institutions & Organizations

The following Institutions & Organizations are in cooperation with this year's ICP meeting in Seoul, Korea

Local Support

Korean Academy of Prosthodontics

Korean Federation of Science and Technology Societies

Korea Tourism Organization

Seoul Tourism Organization

The Korean Academy of Oral & Maxillofacial Implantology

The Korean Academy of Geriatric Dentistry

Korean Academy of Digitalized Dentistry

The Korean Academy of Conservative Dentistry

The Korean Academy of Implant Dentistry

The Korean Academy of Periodontology

Korean Academy of Stomatognathic Function and Occlusion

International Support

International Society for Maxillofacial Rehabilitation (ISMR)

Advanced Digital Technology in Head & Neck Reconstruction (ADT Foundation)

ICP Organizational Members

Academy of Australian and New Zealand Prosthodontists
http://www.ada.org.au/about/affiliates/aanzp.aspx

Academy of Prosthodontics of South Africa
http://www.academyofprosthodontics.co.za/

American College of Prosthodontists
http://www.prosthodontics.org

American Prosthodontic Society
http://www.prostho.org

Association of Prosthodontists of Canada
http://www.prosthodontics.ca

Australian Prosthodontic Society Inc
http://www.prosthodontics.com.au

British Society of Prosthodontics
http://www.bsspd.org

Canadian Academy of Restorative Dentistry and Prosthodontics
http://www.cardp.ca/

Chinese Society of Prosthodontics of the Chinese Stomatological Association
http://www.cndent.com/

DGPro Deutsche Gesellschaft für Prothetische Zahnmedizin und Biomaterialien
http://www.dgpro.de

Dutch Society for Prosthetic Dentistry and Orofacial Pain
http://www.nvgpt.nl

Florida Prosthodontic Association
http://www.thefpa.org

Indian Prosthodontic Society
http://www.ipsonline.in/

International Society for Maxillofacial Rehabilitation
http://www.ismr-org.com/

Iranian Association of Prosthodontists
http://www.irden.com/site/tashakol/protez

Israeli Society of Prosthodontics
http://www.dental.org.il

Italian Academy of Prosthetic Dentistry
http://www.aiop.com

Japan Prosthodontic Society
http://www.hotetsu.com/e.html

Korean Academy of Prosthodontics
http://www.kap.or.kr/

Norwegian Association of Oral Prosthodontists

Philippine Prosthodontic Society Inc.
http://www.philippineprosthodonticsociety.org/

Prosthodontic Society Singapore
http://prosthodontics.org.sg/

Sociedad de Protesis y Rehabilitación Oral de Chile
http://rehabilitacionoral.cl

Sociedad Peruana de Protesis Dental y Maxilo Facial
http://www.sociedadperuanadeprotesis.org

Spanish Society of Prosthodontics and Aesthetic Dentistry
http://www.sepes.org

Swedish Society of Oral Prosthetics
http://www.sfop.se/

The Academy of Prosthetic Dentistry, ROC Taiwan
http://www.prosthod.org.tw

The ICP wishes to thank our Organizations for their continued support and contributions to the art and science of prosthodontics around the world. We encourage our delegates to visit their respective web site for meeting announcements and news.

Welcome Letter from the ICP Presidents

On behalf of the International College of Prosthodontists (ICP), we welcome all our colleagues to Seoul, Korea and the 16th Biennial Meeting of the ICP. As the only international organization dedicated to prosthodontics, we are proud of our long history of successful meetings and membership development. We now have over a thousand members representing more than 70 countries. Our meetings provide the opportunity to learn from the foremost leaders in the specialty of prosthodontics and to network with our colleagues from around the world.

The COEX Convention & Exhibition Center is an ideal venue for a successful conference, and thanks to our program chairs, Dr. Ken Malament and Dr. Seong-Joo Heo the program promises another memorable ICP meeting with its special bouquet of expertise, experience, scholarship, science and clinical art.

There are significant developments in many areas of Prosthodontics and we are pleased that the world's leading prosthodontists will address these new developments with state of the art presentations. We are continuing the tradition of concurrent sessions to allow our members to make oral presentations, and of course to compete for poster presentations. We have continued with a dedicated session to maxillofacial prosthodontics, with lectures and a discussion period, as well as a session for geriatric dentistry as requested by the membership at the ICP meeting in Italy.

A session will also give the opportunity for graduate student presentations of patient treatment and treatment planning. Please join the session and scheduled discussions to add to the educational experience for all.

We extend our personal invitation to work, network, socialize, exchange ideas and address the most recent prosthodontic techniques and research with others of like mind. Take home knowledge to benefit your patients and memories to last a life time.

Yours Sincerely,
Dr. Rhonda Jacob and Dr. C Peter Owen

Dr. Rhonda Jacob

Private Practice
Houston, TX United States

Dr. C Peter Owen

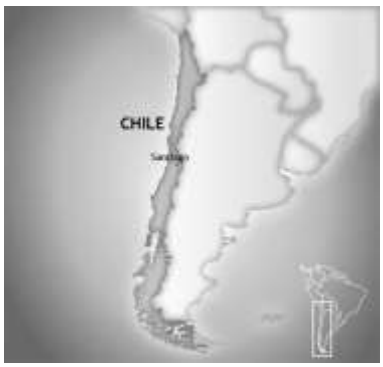
Professor Emeritus
Department of Oral Rehabilitation
School of Oral Health Science
Faculty of Health Sciences
University of the Witwatersrand
Johannesburg, South Africa

Santiago, Chile

On a clear day, fresh after winter showers, Santiago basks in one of the most spectacular settings of any city in the world. A glance through the downtown blocks reveals a mighty circle of mountains - the snowcapped Andean peaks to the east, and a smaller coastal range to the west - that frames the Chilean capital.

Santiago is cultured, quirky and ambitious. The city rewards the patient traveler. Beyond the conservative conformity of Santiago Centro, and the soulless towers of the Las Condes financial district, there are thriving culinary and artistic enclaves that are a joy to uncover.

Gourmets feast on world-class cuisine in Bellavista and Providencia, bohemians gather in the charming old district of Barrio Brasil, while the city is dotted with fine museums and a flourishing arts scene. With a booming café culture and leafy, exotic suburban parks, Santiago has an infectious energy and a growing confidence.



Santiago is close in proximity to both the coast and the mountains. One hour east of Santiago into the Andes there are ski resorts for your entertainment, there should still be snow in September if you like to "Hit the Slopes"and one hour west are the beautiful cities of Valparaiso and Viña del Mar on the Chilean Pacific Coast.

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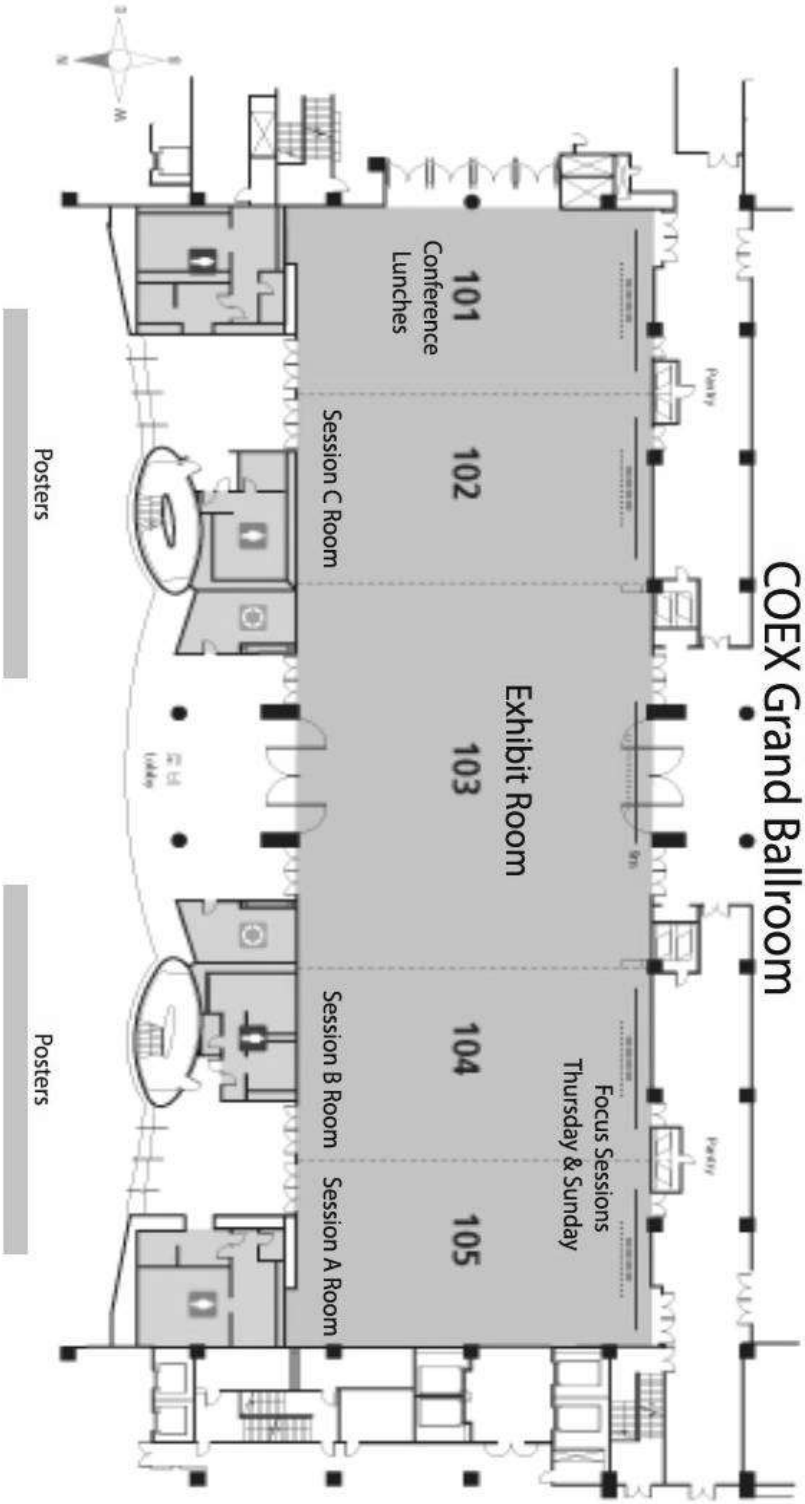
Congress Center Map



Conference Social Events

Wednesday, September 16
17:00 – 18:30 Registration & Welcome Reception

We encourage all delegates to arrive early, pick-up your program book, conference credentials and review our industry partner booths.

No fee required for delegates
Accompanying Guest/s requires "Guest Fee"
Location: Exhibit Area GBR 103
Dress: Casual

Wednesday, September 16
18:30 - 20:00 YPE Reunion

Past delegates who have attended **Young Prosthodontic Educators**' (YPE) workshops are invited to meet for a "class reunion".

Invitation Only- Past YPE workshop delegates and guests
Meeting at the Reception at Coex Grand Ballroom and walk (10 min) to Dong-sung building in front of the City Air Terminal
Dress: Casual

Thursday, September 17
18:15 Poster Session & Exhibit Reception

Support your colleagues by reviewing their posters. Posters will remain up through the Exhibit Reception for all to review.

The ICP encourage all delegates to visit our industry supporters. This is an excellent opportunity to network with your colleagues and review the latest in products and services.

No fee required for delegates
Accompanying Guest/s requires "Guest Fee"
Location: Exhibit Area GBR 103
Dress: Business Casual

Friday, September 18
15:15 ICP Social Outing

Minsok Village

Minsok Village is a living museum type of tourist attraction in the city of Yongin. The purpose of the village is to display elements of traditional Korean life and culture. There are multiple sections to the park with numerous replicas of traditional houses of the different social classes from various regions. The park consists of traditional street markets, dances, equestrian skills, marriage ceremonies and recreational activities. You will not want to miss this special outing at Minsok Village!

Reservations Required
Social Outing Fee: $100 per person /Accompanying Guest require "Guest Fee"
Departure at 15:15 from the Intercontinental Seoul Hotel Lobby
Dress: Business Casual

Conference Social Events

Saturday, September 19
18:15 ICP Reception & Banquet

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 and dinner are included in this banquet event.

Reservations Required
Banquet Fee: $100 per person
Accompanying Guest/s requires "Guest Fee"
Location: Intercontinental Seoul Hotel, Diamond Ballroom
Dress: Black Tie Optional

Elective Events

Thursday, September 17

Daily Spouse/Guest Tour:
Han River Cruise, Insadong and N. Seoul Tower

Time: 8:00am to 5:00pm
Price Per Person: $100.00 USD
Rate Includes: Transportation, English speaking guide, meals, entrance fees

8:00am- Pick up at the Grand Intercontinental Seoul Parnas Hotel. You will be transferred to the Gyeongbokgung area where you will arrive at the Presidential Blue House before going on the Han River cruise.

12:30pm- Lunch with Bibimbap (traditional Korean food)

2:00pm- Visit Insadong, a traditional street market, followed by a trip to the N. Seoul Tower

5:00pm- Transferred back to the Grand Intercontinental Seoul Parnas Hotel

Elective Events

Friday, September 18

Daily Spouse/Guest Tour:
Gyeongbokgung Palace and Bukchon Hanok Village

Time: 8:00am to 12:00pm
Price Per Person: $75.00 USD
Rate Includes: Transportation, English speaking guide, entrance fees

8:00am- Pick up at the Grand Intercontinental Seoul Parnas Hotel. You will be transferred to the site of the Gyeongbokgung Palace and will have time to explore the Bukchon Hanok Village.

12:00pm- Transferred back to the Grand Intercontinental Seoul Parnas Hotel

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Saturday, September 19

Daily Spouse/Guest Tour:
Leeum Museum, Namsan Walk, Bibimbop Lunch

Time: 10:00am to 4:00pm
Price Per Person: $75.00 USD
Rate Includes: Transportation, English speaking guide, meals, entrance fees

10:00am- Pick up at the Grand Intercontinental Seoul Parnas Hotel. You will be transferred to the Leeum Museum.

12:00pm- Transfered to Namsan followed by a Bibimbap (traditional Korean food) lunch.

2:00pm- Visit Traditional Furniture Museum

4:00pm- Transferred back to the Grand Intercontinental Seoul Parnas Hotel

Welcome from the Korean Academy of Prosthodontics

On behalf of the Korean Academy of Prosthodontics, I would like to welcome all of our colleagues to Seoul, Korea and the 16th Biennial Meeting of the ICP. It is my pleasure that Seoul plays host for ICP, which is one of the most important dental meetings in the world, and all of the 30,000 Korean dentists are very proud of that.

Seoul has a profound history with lots of ancient monuments and UNESCO world cultural heritages like Chang duk gung (palace), Kyung bok gung, Duk soo kgung and Nam dae mun. Seoul was also a capital city of ancient Korea for a long time, of which Ancient Baek jae was for 500 years since BC 18 and Chosun dynasty for 600 years since 1394.

Now Seoul became one of the most developed and industrialized modern cities, which has many high-rise buildings and fastest internet network. So you can find a wonderful harmony of tradition and modern technology in Seoul. Seoul is also famous for hosting many big events. Seoul successfully hosted Summer Olympic in 1988 and FIFA World cup in 2002. Pyung chang city, located east to Seoul, will be hosting winter Olympic in 2018.

Seoul plays a crucial role as a dental hub of the nation. Three out of 11 Korean dental schools are located in Seoul. They have many affiliated and associated dental hospitals all over the metropolitan area and more than 40 Prosthodontic professors work for the hospitals. It is only 100 years since modern dentistry started in Korea but now we are very proud to take rank with world class dentistry.

I hope that 2015 ICP Seoul conference can be successful and I express my sincere appreciation to all the committee members, supporting organizations, many contributors, session chairs and invited speakers.
Lastly, I also hope that everyone participating ICP meeting can have a chance to look around the past and the present of cosmopolitan city, Seoul and enjoy the beautiful natures and heritages in Korea. I also wish that you can make many good friends here in Korea.

Sincerely;

President of Korean Academy of Prosthodontics
Dong-Hoo Han
Professor, Department of Prosthodontics
College of Dentistry, Yonsei University
Seoul, Korea

2014-2015 Scientific Program Chair Welcome Letter

Dear Colleagues,

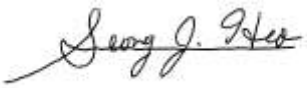
It is a high honor to have served the International College of Prosthodontists as your Program Chairpersons.

The College is a treasure and over so many years has brought us together as an international community to learn and to be inspired to reach our professional dreams. We learn to improve our patient care, our students' education and understanding and to improve our educational universities.

The ICP has always had great leadership and the finest Journal within Prosthodontics. All of us are indebted to the excellence and vision so many of these outstanding individuals have given us and that has led us to Korea for this Meeting.

We sincerely hope that this Scientific Program will serve as a stimulus to foster and maintain the highest standards of achievement in the Art and Science of Prosthodontics. We encourage you to participate this week and engage in our international community so that we can learn and grow together.

Sincerely,



Kenneth A. Malament, DDS, MSc.D
Tufts University School of
Dental Medicine
Clinical Professor
Boston, MA United States

Seong-Joo Heo, DDS, MS, PhD
Seoul National University
School of Dentistry, Professor
Seoul, Korea

Thursday, September 17th

Focus Session I: Keynote Presentations
GBR 104 & 105 *(Morning)*
Dr. Kenneth Malament (9:00-12:30)
Dr. Seong-Joo Heo (9:00-12:30)

Concurrent Session: Geriatrics
GBR 105 *(Afternoon)*
Dr. George Zarb (14:00-18:00)
Dr. Moon-Kyu Chung (14:00-15:40)
Dr. Jae-Heon Jeong (16:20-18:00)

Concurrent Session: Practice
GBR 104 *(Afternoon)*
Dr. Nicola Zitzmann (14:00-18:00)
Dr. Kwang-Yeob Song (14:00-18:00)

Concurrent Session: Graduate Students
GBR 102 *(Afternoon)*
Dr. Iven Klineberg (14:00-18:00)
Dr. Dale Howes (14:00-18:00)

Friday, September 18th

Concurrent Session: Implant Prosthodontics
GBR 105 *(Morning)*
Dr. Steven Eckert (9:00-12:36)
Dr. Dong-Hoo Han (9:00-10:36)
Dr. Sung-Am Cho (11:12-12:36)

Concurrent Session: Implant Prosthodontics
GBR 104 *(Morning)*
Dr. Kioshi Koyano (9:00-12:36)
Dr. Hye-Won Cho (9:00-10:36)
Dr. Hee Jung Kim (11:12-12:36)

Concurrent Session: Occlusion
GBR 102 *(Morning)*
Dr. Harold Preiskel (9:00-12:36)
Dr. Dong Wan Kang (9:00-10:36)
Dr. Jung-Bo Huh (11:12-12:36)

Concurrent Session: Implant Prosthodontics
GBR 105 *(Afternoon)*
Dr. Petra Guess (13:36-15:00)
Dr. Kung-Rock Kwon (13:36-15:00)

Concurrent Session: Implant Prosthodontics
GBR 104 *(Afternoon)*
Dr. Sreenivas Koka (13:36-15:00)
Dr. Sangwon Park (13:36-15:00)

Friday, September 18th *(continued)*

Concurrent Session: Occlusion
GBR 102 *(Afternoon)*
TBD (13:36-15:00)
Dr. Ju-Mi Park (13:36-15:00)

Saturday, September 19th

Concurrent Session: Ceramics
GBR 105 *(Morning)*
Dr. Ami Smidt (9:00-12:36)
Dr. Sang-Wan Shin (9:00-10:36)
Dr. Sung-Hun Kim (11:12-12:36)

Concurrent Session: CAD CAM
GBR 104 *(Morning)*
TBD (9:00-12:36)
Dr. Keun-Woo Lee (9:00-10:36)
Dr. Hyeong-Seob Kim (11:12-12:36)

Concurrent Session: Maxillofacial Prosthodontics
GBR 102 *(Morning)*
Dr. Rhonda Jacob (9:00-12:36)
Dr. Cheong-Hee Lee (9:00-12:36)

Concurrent Session: Ceramics
GBR 105 *(Afternoon)*
Dr. Tom Tyalor (14:00-18:00)
Dr. Pilkou Park (14:00-15:24)
Dr. Jai Young Koak (16:00-18:00)

Concurrent Session: Evidenced Based Dentistry / Tissue Engineering
GBR 104 *(Afternoon)*
Dr. Nico Creugers (14:00-18:00)
Dr. Sunjai Kim (14:00-15:24)
Dr. Eun-Jin Park (16:00-18:00)

Concurrent Session: Fixed & Removable Prosthodontics
GBR 102 *(Afternoon)*
Dr. David Bartlett (14:00-18:00)
Dr. Young-Jun Lim (14:00-15:24)
Dr. Lee Kyu Bok (16:00-18:00)

Sunday, September 20th

Focus Session II: Keynote Presentations
GBR 104 & 105
Dr. Mario Bresciano (9:00-12:40)
Dr. Brian Fitzpatrick (9:00-12:40)

Conference Program Schedule

Conference Topics

Dental Implants | Fixed & Removable Prosthodontics | Occlusion | TMD | Geriatrics | Evidence Based Dentistry | Esthetics and Ceramics

Tuesday, September 15

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

Wednesday, September 16

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

17:00 - 18:30 Welcome Reception- Registration Opens

18:30 - 20:00 YPE Reunion *(Past YPE Delegates- Invitation Only)*

Thursday, September 17

09:00 - 12:30 **Focus Session I- Keynote Presentations** *Location: GBR 104 & 105*

09:00	**Steven Eckert (US)-** *What Constitutes Meaningful Research in Implant Dentistry?*
09:45	**Hans-Peter Weber (US)-** *Implant Restorations in the Esthetic Zone: Challenges and Solutions*
10:30	AM Break / Exhibit Review
11:00	**Joerg Strub (DE)-** *Interactive Treatment Planning*
11:45	**Van Thompson (UK)-** *Ceramic and Ceramic-Like Materials and Why Enamel is Hard to Beat*

12:30 - 14:00 Conference Luncheon *Location: GBR 101 & 103*

14:00 - 18:00	Geriatrics	Practice	Graduate Students
	Location: GBR 105	*Location: GBR 104*	*Location: GBR 102*
14:00	**George Zarb (CA)-** *Age and Frailty in Prosthodontics*	**Nicola Zitzmann (CH)-** *Handling Implant Complications and Alternative Treatment Options for Single Tooth Replacement*	**Sagar Abichandani (IN)-** *Ceramic Veneers - Visualize Before You Actualize!*
14:20	**Seong Joo Heo (KR)-** *How Age-Related Oral Changes Influences Prosthodontics*	**David Felton (US)-** *Does Edentulism Lead to Systemic Co-morbid Disease?*	**Noland Naidoo (ZA)-** *An Innovative Approach to Zygomatic Implant Placement in Maxillectomy Defects*
14:40	**Dominique Niesten (NL)-** *How Frailty Influences Oral Healthcare Behavior and Perspectives of Elders*	**Tony Rotondo (AU)-***Morphology First, a Technique for Simplifying Space Appropriation in the Inter-disciplinary Case*	**Mahmoud Elbashti (JP)-** *Digital Treatment Planning in Maxillofacial Prosthetics: A Case Report*
15:00	**Qian Zhang (NL)-** *Prosthodontic Status of a Chinese Institutionalized Dentate Elderly Population*	**Paolo Vigolo (IT)-** *Evaluation of Therapeutical Choices in Implant Prosthodontics*	**Michael Michael (ZA)-** *Immediately-Loaded Prostheses in the Edentulous Patient: Novel Diagnostic Information Transfer*
15:20	**Gunnar Carlsson (SE)-** *Dental Status and Chewing Ability in Elderly Subjects in Sweden*	**Harold Preiskel (UK)-** *The Prosthodontic Dilemma- Is The Tail Wagging The Dog?*	**Discussion**
15:40	**PM Break / Exhibit Review**		

16:20	**C Peter Owen (ZA)-** *Prosthodontic Challenges in an Aging Global Population*	**Radek Mounajed (CZ)-** *Marginal Gap: What is Reality and What is Goal*	**Jing-Fen Wu (CN)-** *Using Dental Implants as Orthodontic Anchorage*
16:40	**Yoshinobu Maeda (JP)-** *Prosthodontic Materials for Eldercare*	16:35- **Mario Bresciano (IT)-** *Evidence-Based Restoration of Endodontically Treated Teeth* 16:50- **Najla Chebib (US)-** *Treating the Discolored Teeth*	**David Goh (AU)-** *Complex Restorative Management of a Patient with Hypersensitive Pharyngeal Reflex*
17:00	**Frauke Muller (CH)-** *Prosthodontics for Multimorbid and Frail Elders*	17:05- **Ami Smidt (IL)-** *Unconventional Implant Placement Through Impacted Upper Canines with the use of Computer Guidance: A Novel Two-Stage Approach* 17:20- **Francesco Bassi (IT)-** *North-Italian Access to Oral Health After the Economical Global Crisis*	**Qin Zhang (CN)-** *An Implant-Supported Locator and Magnetic Overdenture Case*
17:20	**Brian Fitzpatrick (AU)-** *Accommodating Frail Patients in a Prosthodontic Practice*	17:35- **Jin-Keun Dong (KR)-** *The Criteria of an Attractive Smile*	**Shim Ji-Suk (KR)-** *Prosthodontic Rehabilitation for the Patient Suffered from BRONJ*
17:40	**Discussion**		
18:00	**Session Adjourns**		
18:15	**Poster Session & Exhibit Reception**		*Location:GBR 103 & Foyer*

Friday, September 18

09:00 - 15:00	**Implant Prosthodontics**	**Implant Prosthodontics**	**Occlusion**
	Location: GBR 105	*Location: GBR 104*	*Location: GBR 102*
09:00	**Richard Leesungbok (KR)-** *Brain-guided & Computer-guided Implant Dentistry*	**Ryuji Hosokawa (JP)-** *Minimally Invasive Interventions for Replacing Missing Teeth with Implants: Current Status and Future Directions*	**Yoshihiro Tsukiyama (JP)-** *Occlusal Dysesthesia-Clinical Features and Underlining Mechanisms*
09:24	**Jung-Suk Han (KR)-** *Micro-Mechanical Properties of Peri-Implant Bone in Retrieved Dental Implants*	**Jeong-Yol Lee (KR)-** *RCT of Mandibular Implant Overdentures with Ball Attachments for 3-Year*	**Balendra Pratap Singh (IN)-** *Effect of Advancement Device and Occlusal Splint on Sleep Bruxism*
09:36	**Leslie Laing (CA)-** *Sjögren's and Implants: Good News and Bad News*	**Su Jung Park (KR)-** *Analysis of Deformation Characteristics of Implant Complexes Under Static Loading*	**Eva Karin Korduner (SE)-** *Decision Making with Focus on the Shortened Dental Arch*
09:48	**Sunyoung Ma (NZ)-** *Clinical Success of Zirconia Implant Abutments: 5-Year Results*	**Murali Srinivasan (CH)-** *Effect of Implant Angulation on Retentive Force of Overdenture Attachments*	**Iven Klineberg (AU)-** *Occlusion, Rehabilitation and Cognition*
10:00	**David Chvartszaid (CA)-** *The Challenge of Complex Care Delivery Within a Learning Environment*	**Stefan Holst (CH)-** *The Importance of Interface Precision in Conical Connection Implant Systems*	
10:12	**Steve Parel (US)-** *The Circularity of Osseointegration: A Retrospective of Over 30 Years with Integrated Implants*		

10:36	**AM Break / Exhibit Review**		
11:12	**Jong-Cheol Kim (KR)-** *With the Aim of Full Digital Dentistry; From Virtual Planning to Final Prosthesis*	**Glenn Wolfinger (US)-** *High Tech Digital Prosthodontics: From Diagnosis and Treatment Planning to Fabrication of the Final Restoration*	**Xinquan Jiang (CH)-** *The Use of Stem Cells and Biomaterials for Maxillofacial Bone Regeneration*
11:36	**Sun Jong Kim (KR)-** *Prospective Study on PRF and BMP for Treatment of BRONJ*	**Olivier Hue (FR)-** *Lefort I and Zygmatic Implants*	**Jae Hoon Lee (KR)-** *Effects of H-Transcript Factor on Bone Formation Around Implant in Diabetic Mouse*
11:48		**Baris Guncu (TR)-** *Marginal Fit of Implant-Supported Crowns with Different Antirotational Abutment Features*	
12:00	**Ralf Kohal (DE)-** *Effects of Cyclic Loading on Resistance of Different Zirconia Implants*	**Woon Ji (KR)-** *10-Year Clinical Outcome of Warantec Oneplant System Implants*	**Hidefumi Itoh (JP)-** *Evaluation of a New Mandibular Movement Theoretical Formula and Deployment*
12:12	**Thomas Taylor (US)-** *Zirconia Failures in Implant Prosthodontics: What Gives?*	**Frank Tuminelli (US)-** *A Symphony Can Create Music Through Harmony, Otherwise It's Just Noise*	**Limor Avivi-Arber (CA)-** *Dental Occlusion: Translating Principles of Neuroplasticity into Evidence-Based Practice*
12:36-13:36	**Conference Lunch** *Location: GBR 101 & 103*		
13:36	**Gianluca Paniz (IT)-** *Key Prosthetic Factors on Implant Esthetics*	**Sreenivas Koka (US)-** *Patient Safety and Harm in Implant Dentistry*	**Seong-Kyun Kim (KR)-** *Implants in Conjunction with Removable Partial Denture: Fantasy & Reality*
14:00	**Matthias Kern (DE)-** *Better One than None: The Single Mandibular Midline Implant*	**Jung-Bo Huh (KR)-** *Pre-clinical Studies on Dental Implant Applying the Controlled Releasing System of Growth Factors*	**Hiroshi Egusa (JP)-** *iPS Cells and their Expected Role in the Future of Prosthodontics*
14:24	**Shiela Campana (KR)-** *Implant- supported Overdentures for Maxilla: A Systematic Review*	**Megumi Watanabe (JP)-** *Magnetic Fields Enhanced Osteoblast Differentiation via ERK Pathways*	**Takahiro Ono (JP)-** *Removable Prosthesis for Elderly Patients with Functional Disturbances*
14:36	**Roxana Stegaroiu (JP)-** *3D-FEM Model Using Cone-beam CT for Stress Prediction Around Implants*	**Duygu Karasan (TR)-** *Resistance to Fracture of Zirconia Implant Abutments Supporting Cantilevered FDPs*	
14:48	**Jinhong Park (KR)-** *A 10-Year Retrospective Clinical Study of the Dentium® Implants*	**Adrian Carlos Manaloto (PH)-** *Treatment Outcomes of Peri-Implantitis Interventions: a Systematic Review and Meta-Analysis*	**Byung Kee Choi (KR)-** *CBK (Cranial Balancing Key) Splint & Anti-Aging Effect*
15:00	**Session Adjourns**		
15:15	**ICP Social Outing - Minsok Village** *Buses Depart from Intercontinental Seoul Hotel Lobby*		

Saturday, September 19

09:00 - 18:00	**Ceramics**	**CAD CAM**	**Maxillofacial Prosthodontics**
	Location: GBR 105	*Location: GBR 104*	*Location: GBR 102*
09:00	**Jean-Francois Roulet (US)-** *Ceramic Restorations Cementing or Bonding?*	**Wael Att (DE)-** *3D Engineering in Implant Prosthodontics*	**Rhonda Jacob (US)-** *Anatomy of the Maxilla*
9:24	**Pervin Imirzalioglu (TR)-** *Improvement of Zirconium Oxide Surfaces Bonding Characteristics to Resin Cement*	**Carlo Marinello (CH)-***Simple, Fast and Payable. CAD-CAM for Edentulism*	9:12 **John Beumer (US)-** *Restoration of Acquired Oral Defects with Osseointegrated Implants*
9:36	**Mami Higashi (JP)-** *Effects of Sandblasting/Silanization on the Long-Term CAD/CAM Resin Bonding*		**Matshediso Mothopi-Peri (ZA)-** *Maxillofacial Prosthodontics in the Real World*
9:48	**Anas Aloum (UAE)-** *From Planning to Execution. A Success Story*	**June-Sung Shim (KR)-** *Clinical Implication of CAD/CAM in Conventional Fixed Prosthodontics in Korea*	10:00 **Dale Howes (ZA)-** *Functional Maxillectomy Rehabilitation - Removable Obturation vs Vascular Free Flap Tissue Transfer*
10:12	**Petra Guess (DE)-** *Minimal Invasive Treatment Concepts: Facts and Visions*	**Discussion**	10:24 **Caroline Nguyen (CA)-** *The Impact of Oncologic Treatments on Prosthetic Rehabilitation*
10:36	**AM Break / Exhibit Review**		
11:12	**Mohammed Zahran (SA)-** *Fatigue Resistance of Zirconia-based Crowns: Core Thickness and Design Effect*	**Hiroshi Hirayama (US)-** *Digital Prosthodontics: What is Coming Next?*	**James Kelly (US)-** *Osteocutaneous Flap Reconstruction of the Maxilla: Advantages and Complexities*
11:24	**Sungwoo Park (KR)-** *Microtensile Bond Strength Between PICN and Composite by Etching Time*		
11:36	**Hakan Akin (TR)-** *Fracture Strength of Different Types of CAD/CAM Monolithic Crowns*	**Ji-Man Park (KR)-** *Scanning Accuracy and Learning Curve of 3D Intraoral Scanners*	**Harry Reintsema (NL)-** *Digital Planning and Prefabrication in Combined Maxillary Reconstructions Combined with Implant Supported Rehabilitation*
11:48	**Terry Walton (AU)-** *Making Sense of Complication Reporting for Fixed Implant and Tooth-supported Dental Prostheses*	**Shin Jun Hyouk (KR)-** *CAD/CAM Beyond Its Limitation*	
12:12	**Kenneth Malament (US)-** *Integrating Ceramic Science in Routine and Complex Prosthodontics*	**Radi Masri (US)-***Innovative Drug Delivery Methods for the Treatment of Dental Disease*	12:00 - **Discussion**
12:36-14:00	**Conference Lunch** *Location: GBR 103 and Foyer*		
12:36-14:00	**ICP Business Lunch *(Members only)*** *Location: GBR 101*		

	Ceramics	Evidenced Based Dentistry / Tissue Engineering	Fixed & Removable Prosthodontics
	Location: GBR 105	*Location: GBR 104*	*Location: GBR 102*
14:00	**Kostas Michalakis (GR)-** *Predictably Addressing Patients' Esthetic Needs: A Real Challenge*	**Alon Preiskel (UK)-** *The Relevance of Dental Research in Clinical Practice*	**Ho-Beam Kwon (KR)-** *Computer Simulations for Maxillofacial Prosthodontics*
14:24	**Yongsheng Zhou (CN)-** *Digitization- How Long Can We Go in Prosthodontics?*	**Stefano Del Monte (IT)-** *Evidence-Based Esthetics of the Smile: A Systematic Review*	**Kwantae Noh (KR)-** *Optimal Denture Coverage Over Retromolar Pad for Lower Denture Retention*
			14:36 - **Tsung-Chieh Yang (CN)-** *ATBC, TBC and Hyperbranched-Polyester Improved Viscoelastic Stability of Tissue Conditioner*
14:48	**Aris Tripodakis (GR)-** *Are the Ceramic Abutments the Sole Way to Trans-mucosal Implant Esthetics?*	**Janghyun Paek (KR)**- *Life Quality Assessment Depending on Personal Characteristic and Denture Installation*	**Daria Bulycheva (RU)-** *Speech Function Evaluation in the Dentist-Orthopedist Practice*
		15:00- **Shanshan Liang (CN)-** *Effects of RDP on Masticatory Performance in SDA*	15:00 - **Ting Jiang (CN)-** *Case Report of Full Mouth Rehabilitation by CAD/CAM Overlay Restorations*
15:12	**Tunde Radics (HU)-** *Influence of Ceramic Primers on the Bond strength to Zirconia*	**Yan Wang (CN)-** *Platelet Adhesion Behaviors on 5 Different Modified Pure Titanium Surfaces*	**Discussion**
15:24	**PM Break / Exhibit Review**		
	Ceramics / TMD	**Implants / Occlusion**	**Fixed & Removable / Max Face Prosthodontics**
	Location: GBR 105	*Location: GBR 104*	*Location: GBR 102*
16:00	**Fariba Motevasselian (IR)-** *Conservative Restorative Management of Worn Dentition Using Dahl Concept*	**Barsha Ghimire (NP)-** *Cement Shade Effect on the Colour of Porcelain Veneering Materials*	**Ayşe Yalnız (TR)-** *Evaluating Shear Bond Strength of Opaquers Between Titanium and Composites*
16:12	**Takashi Matsuura (JP)-** *A 3D Keratinocyte Culture Model Creating a Keratinized Epithelial Equivalent*	**Myungho Lee (KR)-** *Precision Surgical Guide Stent with the Top-down Approach for Edentulous*	**Winfried Walther (DE)-** *20-Year Outcome of Cases Treated with Double Crown Restorations*
16:24	**Asuka Kawaguchi (JP)-** *Effects of Ultrasonic/Acid Cleaning on the Long-Term CAD/CAM Resin Bonding*	**Hitoshi Oguchi (JP)-** *Responses of Interface Between New Bioglasses Using HOC by TEM*	**Bulem Yuzugullu (TR)-** *Effect of Cleansers on Surface-Roughness and Microhardness of Artificial Teeth*
16:36	**Keisuke Kumashiro (JP)-** *Effect of Chronic Myalgia in TMD Patients on Sleep Status*	**Raghuwar Dayal Singh (IN)-** *Evaluation of Esthetic Outcome after Immediate Loading of Dental Implants*	**Jordi Izzard Landayan (PH)-** *Flow Property of PVS Impression Materials by Shark Fin Testing*

16:48	**Discussion**	**Marcio Grossi (BR)-** *Stress Distribution using FEM in Three Different Mandibular Protocol Prostheses*	**Mohamed Said (JP)-** *Masticatory Function and Health-Related Quality of Life in Maxillectomy Patients*
17:00		**Higaki Nobuaki (JP)-** *Brain Function on Modulation of Occlusal Force and Sensory Integration*	**Christina Sim (SG)-** *Salivary Gland Volume/Saliva Flow Relationship Following Irradiation of Nasopharyngeal Carcinoma*
17:12		**Takaharu Goto (JP)-** *Functional Significance of the Main Occluding Area for Partially Edentulous*	**Pooran Chand (IN)-** *Video-Endoscopic Evaluation of Mandibular Advancement Device in OSA*
17:24		**Sagar Abichandani (IN)-** *Timing of Occlusal Contacts - Get the Timing Right Everytime!*	**Rama Shanker (IN)-** *Efficacy of Shielding Stents in Buccal Carcinoma Patients*
17:36		**Shunji Fukushima (JP)-** *Occlusal Reconstruction in a Patient with Deformed and Unstable Condyles*	**Idah Mmutlana (ZA)-** *Rehabilitation of a Maxillary Defect Using a Free Fibula Flap*
17:48		**Discussion**	**Discussion**
18:00	**Session Adjourns**		
19:30	**ICP Reception & Banquet**	*Location: Intercontinental Seoul Hotel / Diamond Ballroom*	

Sunday, September 20

09:00 - 13:00	**Focus Session II- Keynote Presentations**	*Location: GBR 104 & 105*
09:00	**Irena Sailer (CH)-** *Fixed Prosthodontics 2020: New Technologies, More Materials - Unlimited Possibilities?*	
09:45	**Danielle Layton (AU)-** *Lost in the Shadows of the Forest: How Systematic are Systematic Reviews?*	
10:30	AM Break / Exhibit Review	
11:10	**Don Curtis (US)-** *Frail Elder Caries: Risk Assessment and Management*	
11:55	**Dean Morton (US)-** *Implant Assisted Planning and Treatment Options for Edentulous Arches: Finding Success and Avoiding Complications*	
12:40	Conference Announcements	
13:30 - 15:00	ICP Board Meeting *(Councilors only)*	

Program times are subject to change.

Views expressed by the presenters at the ICP Meeting are solely their own and do not necessarily reflect the positions or policies of the ICP.

Poster Abstracts

ICP Poster Session / Thursday, September 17 at 18:15 *Location: GBR Foyer*

Poster #	Last, First Name	*Abstract Title*
1	Abe, Manami	*Three Dimensional Controlling Capability Of Biting Force*
2	Abe, Yuka	*Serotonin Receptor Gene Polymorphism In Sleep Bruxism: A Polysomnographic Study*
3	Abichandani, Sagar	*Preliminary Study On The Effect Of Evaporation On Diespacer Thickness*
4	Alharbi, Nawal	*The Influence of Build Orientation on Accuracy of 3D-printed Restorations*
5	Arroyo, Joseph Angelo	*Mandibular Implant-Supported Overdentures With Two Different Mini-Implant Systems: Case Report*
6	Aswehlee, Amel	*Prosthodontic Rehabilitation Of A Patient With Osteomyelitis: A Case Presentation*
7	Ayyildiz, Simel	*Observation of Soft Tissue and Vertical Dimension Changes Using 3dMD*
8	Baba'ier, Ru'a	*3D Accuracy of Fit of Implant-Supported Resin Nano Ceramic Crowns*
9	Bennie, Karen	*The Multidisciplinary Management Of Craniofacial Defects: Dealing With Complications*
10	Berteretche, Marie Violaine	*Impressions For Immediate Denture : Procedures Related To Clinical Characteristics*
11	Bwerinofa, Dikhabiso Vivian	*The Impact Of Changes To Saliva On Prosthodontic Management*
12	Celebic, Asja	*Factors Improving OHRQoL by Conventional and Implant Complete Denture Therapy*
13	Chang, Yuanhan	*Stress Distribution On Alveolar Ridge With Different Border Molding Materials*
14	Chen, Hui	*A Functional Analysis Of Medial Pterygoid Muscle In Humans*
15	Cheng, huijuan	*Fitness And Occlusal Contact Of Crown Fabricated By 3DP Technique*
16	Choi, Changhun	*Surface Cleanliness Of Customized Abutments After Clinically Different Cleaning Procedures*
17	Chunduru, Sravan	*Effect Of Surface Treatment And Ageing On Strength Of Zirconia*
18	Daya Roopa, Variza	*The Calibration Of A Software Programme To Assess Ceramic Crown Preparations In A Pre-Clinical Setting*
19	Elbashti, Mahmoud	*The Role Of Digitization In Rapid Reproduction Of Obturators*
20	Eom, Sangho	*An Application Of A Newly-Designed Abutment For Screw-Retained Implant Prosthesis*

Poster #	**Last, First Name**	***Abstract Title***
21	Fan, Hsin Yuan	*Correlations Between Different Implant Stability Parameters – A Sawbone Study*
22	Fokkinga, Wietske	*Alginate Vs. Polyvinylsiloxane Impressions- Fit Of Conventional RDPs- A Pilot*
23	Gerritsen, Anneloes	*Attitudes Of Shortened Dental Arch Patients Towards Their Dental Condition*
24	Gonda, Tomoya	*Evaluation Of Preventive Measures Based On Denture Repair Survey*
25	Grossi, Marcio	*Depression, Somatization, And Sleep Disorders Versus Tmd: Population Case-Control Study*
26	Han, KyeongHwan	*Implant Supported Prostheses*
27	Hanlin, Suzanne	*Self-Perception Of Undergraduate Dental Students About Preparedness In Restorative Dentistry*
28	Hattori, Mariko	*Facial Prosthesis Made By Dental Materials On Exposed Reconstruction Plate*
29	Heo, Yu-ri	*Antimicrobial Activities Of Dendropanax Morbifera Extract For Denture Cleaner Solution*
30	Hirata, Kiyotaka	*Influence Of Abutment Angle On Implant Supporting Removable Dental Prosthesis*
31	Hokama, Hiromichi	*The Effects Of Biofeedback On Sleep Bruxism And Stress*
32	Huang, Bing-Wei	*The Effect Of Palatal Coverage On Maxillary Implant Overdenture*
33	Huang, Cui	*Cordless Versus Cord Techniques Of Gingival Retraction: A Systematic Review*
34	Ikawa, Tomoko	*Computer Assisted Mandibular Reconstruction Using A Custom-Made Titan Mesh Tray*
35	Ikeya, Kenji	*Inhibition Of Denture Plaque Accumulation By MPC Polymer Coating*
36	Imai, Yu	*Presurgical Estimation Of The Primary Stability Of Simultaneous Implant Placement*
37	Ishiura, Yuichi	*Converting Radiographic Guide Into Temporary Denture In A Emergency Case*
38	Iuliia, Alpateva	*Measuring Of Occlusal Vertical Dimension Using Interoral Gnathometer*
39	Jung, Hyun Jung	*Effect Of Polishing Method On Surface Roughness And Bacterial Adhesion*
40	K Alzarea , Bader	*Prevalence Of Temporomandibular Disorders In Completely Edentulous Patients*
41	Kanazawa, Manabu	*Immediate Loading Of Two-Implant Mandibular Overdentures: 3-Year Prospective Study*
42	Karasan, Duygu	*Implant Prosthetic Rehabilitation With Vascularised Iliac Graft: A Clinical Report*
43	Kato, Hiroki	*Enamel Antagonist Wear Of New Hybrid Ceramic*

Poster #	**Last, First Name**	***Abstract Title***
44	Kato, Tokinori	*Influence Of Different Implant Operative Procedures*
45	Kazuhiko, Suese	*Study On Precision Of Intraoral And Extraoral Digital Scanners*
46	Khan, Sadika	*Restoration Of Reduced Posterior Dental Arches: A Clinical Trial*
47	Kim, Ha-Young	*Standardizing Evaluation Criteria On Treatment Outcomes Of Mandibular Implant Overdentures*
48	Kim, Hee-jung	*Using Magnetic Attachment With Stressbreaker Overdenture For 10 Years*
49	Kim, Jong-Eun	*Functional And Esthetic Rehabilitation Using Hybrid CAD/CAM Polymer Block*
50	Kim, Joohyoung	*Comparison Of Mandibulr Complete Denture By Conventional Vs Suction-Effective Technique*
51	Kim, JoongHyun	*Bone And Soft Tissue Formation By BMP And FGF-2*
52	Kim, Min-Kyung	*Emergence Profile Regeneration With CAD/CAM Abutment And Soft Tissue Graft*
53	Kim, Sun Jong	*Novel Self-Inflating Tissue Expander For Vertical Augmentation*
54	Kim, Taehyeon	*Effect Of The Combination Of BCP With BMP-2 And FGF-2*
55	Koak, Jai-Young	*Effect Of Cyclic Loading On Internally-Connected Iti® Implant Abutment*
56	Komagamine, Yuriko	*Prognoses Of New Complete Dentures From Patients' Denture Assessment (PDA)*
57	Kosalram, Kirthi	*A Investigation Of Risk Factors Associated With Tooth Surface Loss*
58	Koshino, Hisashi	*The Effect Of Mastication On GLP-1 In Diabetic Mice*
59	Kwon, Tae-Min	*Esthetic Restoration Of Malpositioned Anterior Teeth By Tooth Shape*
60	Lee, Bora	*Mandibular Fixed Bone-Anchored Prosthesis : A 22-Year Follow-Up Case Report*
61	Lee, Duhyeong	*Guide Template With Handpiece Sleeve To Locate Abutment Screw Position*
62	Lee, Hakjoo	*Oral Rehabilitation Of A Patient With Medication-Related Osteonecrosis Of Jaw*
63	Lee, Jaerim	*Implant Assisted Removable Partial Denture: A 3-Year Follow-Up Case Report*
64	Lee, Junghaeng	*Osteogenic Activity Of Implant Surfaces With Gold Nano Particles*
65	Lee, Ki Sun	*Reverse Engineering Based Evaluation For Impression Accuracies In Angulated Implants*
66	Lee, Myungho	*Solution For Sinus Rupture By Using PRP (Platelet Rich Plasma)*

Poster #	**Last, First Name**	***Abstract Title***
67	Lim, Hyun-Pil	*Complete Dentures For A Patient With Unstable Mandibular Movement*
68	Liu, Chang Yen	*Bonding Strength Measurement Of Tissue Conditioner Using ATBC And TAH*
69	Lu, Yi	*The Effectiveness Of Multimedia Patient Education On Alginate Impression Taking*
70	Maniewicz Wins, Sabrina	*MCI Patients Present Less Chewing Efficiency Impairment Than Dementia Patients*
71	Miura, Shoko	*Finite Element Analysis Of Zirconia All-Ceramic Crowns On Stress Distribution*
72	Miyayasu, Anna	*Immediately Loaded Mandibular Two-Implant Overdentures: Cost-Analysis*
73	Mmutlana, Idah	*Rehabilitation Of A Maxillary Defect Using A Free Fibular Flap*
74	Nakamura, Shiori	*Effective Analysis To Prevent Dementia Focusing On Individual Oral Sensibility*
75	Nakano, Yoshiro	*Translucency And Aging Resistance Of Silica-Doped Dental Zirconia*
76	Niitsuma, Akinori	*Effect Of MDP Primer On Bond Strength To Ce-TZP/Al2O3 Ceramics*
77	Ogawa, Takamasa	*FEA On Retention Forces Of Maxillary Complete Dentures In Patients*
78	Ogino, Yoichiro	*Specific Acid-Treated Surface Topography Alter Hydrophilicity And Osteogenic Cellular Responses*
79	Oh, Sang-Chun	*Combined Application Of Soft Tissue Augmentation Techniques For Emergence Profile*
80	Otomaru, Takafumi	*Prosthodontic Rehabilitation Of A Maxillectomy Patient With An Implant-Retained Overdenture*
81	Park, Ju-mi	*Stress Effect Of Second Molar Replacement With Partial Overdenture Prosthesis*
82	Park, Minseo	*Prosthodontic Restoration Of A Young Patient With Russell-Silver Syndrome*
83	Park, Sangwon	*Surface Characteristics Of Bioactive Glass Infiltrated Zirconia With Acid Etching*
84	Passia, Nicole	*The Single Mandibular Implant – Dentists´ Point Of View*
85	Persic, Sanja	*A Complex Implanto-Prosthodontic Rehabilitation Of A Patient With Cerebral Palsy*
86	Roulet, Jean-Francois	*Acrylic Reinforcement With Off The Shelf Perforated Metal Plates*
87	Ryu, Masahiro	*Smile Characters In Young Adults From Japan And Switzerland*
88	Sen, Deniz	*Influence Of Monolithic Zirconia Thickness On Polymerization Of Dual-Cure Cements*
89	Shimura, Yuta	*Verification Of Implant Placement In The Edentulous Posterior Mandible*

Poster #	**Last, First Name**	***Abstract Title***
90	Sim, Il-gwang	*Prosthetic Treatment On Large Sized Defects Of Anterior Mandible*
91	Sun, Yunhan	*Treatment Outcomes Of Mandibular Mini-Implants Supported Overdentures : Systematic Review*
92	Sunyoung, Choi	*Rehabilitation Of A Patient With Severe Ridge Resorption And Peri-Implantitis*
93	Tada, Sayaka	*Impact Of The Crown-Root Ratio On Survival Of Abutment Teeth*
94	Takaoka, Ryota	*Intentional Tooth Wear To Cope With Excessive Occlusal Force*
95	Takayama, Mari	*Effects Of Oral Moisturizers On Retention Forces Of Complete Dentures*
96	Tan, Ken	*Success And Survival Of 3-Unit Fixed Dental Prostheses*
97	Tey, Hwee Shinn Valerie	*Patients' Satisfaction With Implant Therapy After 5 Years In Function*
98	Tezvergil-Mutluay, Arzu	*Effect Of Self-Adhesive Cements On Endogenous Proteolytic Activity Of Dentin*
99	Thokoane, Meriting	*The Effect Of Too Much Caring*
100	Tu, Ching-Yu	*Satisfaction Of Mini-Implant Retained Mandibular Overdenture - A Prospective Study*
101	Uyar, Alper	*Effects Of Porcelain Firing On Alloys' Dimensional Stability And Characteristics*
102	Wang, Tong-Mei	*Effect Of A Commercial Fluorescence Liquid On 3Y-TZP Surface Microstructure*
103	Wong, Patrick	*Interfacial Fracture Toughness Of Resin Cements Bonded To Glazed Zirconia*
104	Xu, Chun	*Synthesis And Characterization Of A Polyimide-Epoxy Composite For Dental Application*
105	Yamaguchi, Kikue	*Influence Of Primer On Share Test Between Zirconia And Ceramics*
106	Yang, Hongso	*Overdentures In A Patient With Parkinson's Disease*
107	Yang, Jingwen	*Veneers For Dentinogenesis Imperfecta, A Case Report Of Rehabilitation*
108	Yang, Seungwon	*Transitional-Restoration Of Missing Anterior Teeth In Growing-Patient Using Mini-Implants*
109	Yeo, In-Sung	*Measures Strengthening Bond At Zirconia Core-Feldspathic Veneer Interface*
110	Yeon, Jae Woong	*Functional And Esthetical Full Mouth Rehabilitation With Implant Supported Prostheses*
111	Yoon, Hyung-In	*Effect Of Zirconia Surface Treatments On The Adhesion With Porcelain*
112	Yoon, Youngsuk	*Influence Of Microgroove Collar Design On Marginal Bone Resorption*

Poster #	**Last, First Name**	***Abstract Title***
113	Yoshizaki, Taro	*The Improvement Of Durability Of Coating Layer With Silica Nanoparticles*
114	Yozo, Fujinami	*Iincrease In Occlusal Vertical Dimension Affects On Retention Of Conditioning*
115	Yu, Weiqiang	*The Removal Torque Of Titania Nanotubes In Rabbit Tibia*
116	Yun, Kwidug	*Effect Of Zn On Corrosion Rate Of Surface-Treated Mg-Zn Alloy*
117	Zeng, Jianyu	*NGF'S Effect On Titanium-Implants Osseointegration In Type 2 Diabetic Rats*
118	Choi, Byung Kee	*CBK (Cranial Balancing Key) Splint & Anti-Aging Effect*
119	Pera, Francesco	*Accuracy of Different Dental Implant Impression Techniques Comparing Different Impression Materials and Digital Impression*

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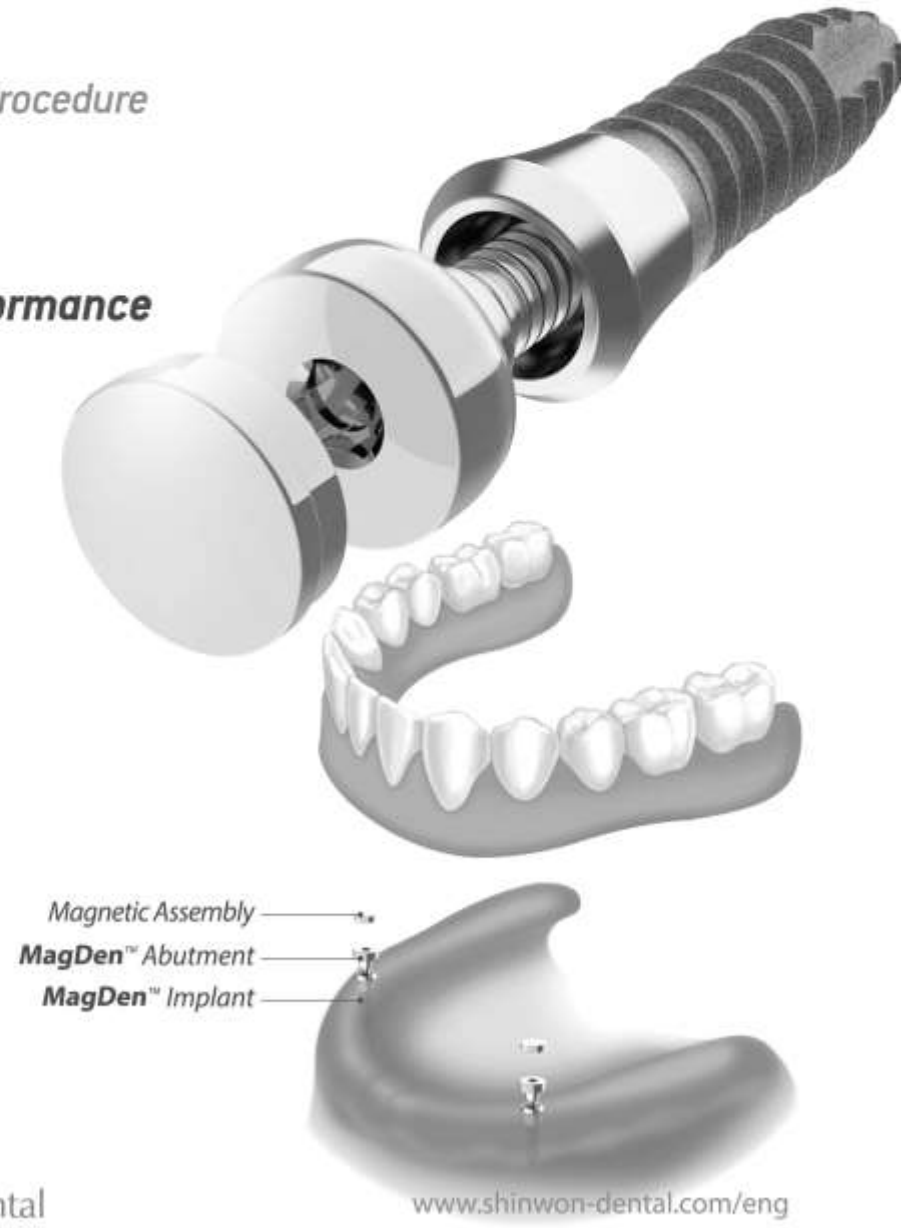

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Invited Speakers

Invited Speakers

(Listed in Alphabetical Order by Last Name)

Anas Aloum BDS, FACP
Medical Director and Prosthodontist
Abu Dhabi, UAE

Dr. Anas Aloum is a Consultant Prosthodontist running two multidisciplinary dental facilities in Abu Dhabi, UAE. He received his Degree in Advanced Prosthodontics and his Preceptorship in Periodontology and Implantology at the Herman Ostrow School of Dentistry, USC and is a member of the American Board of Prosthodontists. His passion for dental education drives him to be heavily involved in CME's by hosting and lecturing nationally and internationally in the field of Prosthodontics and Implantology.

Wael Att, DDS, Dr Med Dent, PhD
Director of Postgraduate Program
Department of Prosthodontics
School of Dentistry, University of Freiburg
Freiburg, Germany

Prof. Att is the Director of Postgraduate Program at the Department of Prosthodontics, School of Dentistry, University of Freiburg, Germany as well as the Chairman of the Department of Restorative Dentistry, Hamdan bin Mohammed College of Dental Medicine, Dubai, United Arab Emirates. He is a board-certified prosthodontist from the German Society of Prosthodontics and Biomaterials (DGPro) and serves as 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) and Vice President of the International Academy for Digital Dental Medicine (IADDM). Prof. Att obtained his DDS degree in 1997 from Tishreen University 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 a Visiting Assistant Professor from 2005 to 2007 at the Weintraub Center for Reconstructive Biotechnology, UCLA School of Dentistry. Prof. 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.

Limor Avivi-Arber
Assistant Professor
Department of Prosthodontics and Oral Physiology
Faculty of Dentistry, University of Toronto
Toronto, Canada

Limor Avivi-Arber is an Assistant Professor at the Departments of Prosthodontics and Oral Physiology, Faculty of Dentistry, University of Toronto. She received her double BSc degrees in medical sciences and pharmacy in 1986 and DMD degree in 1989 from the Hebrew University, Jerusalem; her Prosthodontic speciality in 1993, MSc in 1994 and PhD in 2009 from the University of Toronto. She teaches prosthodontics, oral physiology and occlusion at the graduate and undergraduate levels. Her current basic science research focuses on neurophysiological aspects of orofacial sensorimotor functions including orofacial pain, and the processes by which the CNS changes following intraoral interventions including tooth loss and their replacement with dental implants, and their clinical implications for oral rehabilitation. Several peer-reviewed papers have recently been published in dental and neuroscience journals. She is an active member in several national and international dental and neuroscience associations and serves as an Associate Editor of the International Journal of Prosthodontics.

Francesco Bassi, MD, DDS
Turin University
Department of Surgical Sciences
C.I.R. Dental School, Prosthodontic Section
Turin, Italy

He graduated in Medicine and specialized in Dentistry at Turin University. He is Full Professor at the Department of Surgical Sciences, C.I.R. Dental School, Prosthodontic Section. He is Dean of the Dental Hygienist School, and Director of the Master “Oral health in disadvantaged communities and in low-income countries” of the same University.

He teaches “Removable partial denture”, “Oral health global health” and “Oral care and dentistry for communities” at School of Dentistry and “Sciences of Dental Hygiene 3” at School of Dental Hygienist.

He is reviewer for: the "Regional Programme for the industrial research, the innovation and the technological transfer" of Emilia-Romagna, Italy; the Italian Ministry for Education, University and Research; and international journals. He is associate editor of the International Journal of Prosthodontics.

He is author of more than 100 papers on prosthodontics, oral implants, mandibular physiology, and co-authors of books in Spanish, English and Italian.

Invited Speakers

John Beumer, DDS, MS
Professor Emeritus
Advanced Prosthodontics, Prosthodontics
UCLA School of Dentistry
Los Angeles, California USA

Dr. Beumer received his dental degree from the University of California, San Francisco in 1967. He went on to complete postdoctoral training programs in Oral Medicine (UCSF, 1970) and Prosthodontics (UCLA, 1975). He has over 150 publications in the medical and dental literature including a book devoted to Maxillofacial Prosthetics and is the co-inventor of the UCLA abutment (with Wynn Hornberg CDT). Currently he is the Distinguished Professor and Chair, Division of Advanced Prosthodontics, Biomaterials and Hospital Dentistry, and director of the residency program of Maxillofacial Prosthetics, UCLA School of Dentistry. He has received lifetime achievement awards from the American Academy of Maxillofacial Prosthetics, the American College of Prosthodontists, and the Greater New York Academy of Prosthodontics and an honorary degree from the University of Turin.

Mario Bresciano
Private Practice, Prosthodontics
Turin, Italy

Diplomated as Certified Dental Technician in 1984. Graduated as DDS in 1990, at the University of Torino, Italy.

Specialty in Advanced Prosthodontics at USC, Los Angeles in 1993.

Diplomate of the American Board of Prosthodontics in 2002.

2005-2012 Co-Director of the Master Program in Advanced Prosthodontics at the University of Torino.

Fellow of the American College of Prosthodontists and Member of the American Academy of Fixed Prosthodontics.

Constituent Member of the ICP since 1994 (Student member 1991-93)

Private Practice limited to Prosthodontics in Torino since 1994.

Najla Chebib
Assistant Professor and Program Director
Advanced Education in Esthetic and Operative Dentistry Program
Tufts University School of Dental Medicine
Boston, Massachusetts USA

Najla Chebib, D.D.S., M.S., CAGS is an Assistant Professor and Program Director of the Advanced Education in Esthetic and Operative Dentistry program at Tufts University School of dental medicine.

She holds a dental degree from Saint Joseph University, Lebanon (1999), a Certificate in Advanced Education in General Dentistry from Boston University as well as a master's degree in prosthodontics and biomaterials from Saint Joseph University, Lebanon (2007).

She lectures about prosthetic and esthetic dentistry and assists students in the clinic with complex esthetic rehabilitations.

Dr. Chebib's current research interests include color; shade matching, ceramics and bonding.

Don Curtis
Professor at UCSF
Berkeley, California USA

Don Curtis is a professor at UCSF. He received his BS (1977) and DMD (1981) from the University of Oregon. Dr. Curtis received certificates in prosthodontics from USC (1983) and maxillofacial prosthodontics from UCLA (1985). Dr. Curtis has been full time at UCSF since 1986 and has maintained a part-time private practice limited to prosthodontics in Berkeley California since 1988. Dr. Curtis has over 80 publications in peer reviewed journals including Head and Neck, Bone, Medical Education, and numerous other basic science, medical, and prosthodontic journals. Dr. Curtis has been president of the Pacific Coast Society for Prosthodontics and is currently president of the American Board of Prosthodontics. Research interests include dental implants, microcirculation within muscles and dental education.

Invited Speakers

Stefano Del Monte
Private Practice
London, United Kingdom

Dr. Del Monte graduated in dentistry from the university of Rome Tor Vergata (Italy) with first class degree in 2013. Within the Erasmum program he attended the University Paris Descartes (France) and Louis Mourier Hospital for one year.

Dr. Del Monte spent one year as a visiting student at McGill University (Canada), where he started his research regarding the esthetic of the smile in collaboration with the University of Montreal. He won the SCAD VITA award for excellence in research at 6th SCAD meeting in Chicago and the first prize for the best table clinic presentation at CARDP annual meeting in Montreal. Currently he is living in London (UK) where he works in a private practice.

Jin-Keun Dong, DDS, MSD, PhD
Professor Emeritus, Dept. of Prosthodontics
School of Dentistry, Wonkwang University
Iksan, Republic of Korea

Dr. Jin-Keun Dong is a Professor Emeritus of the Department of Prosthodontics, School of Dentistry, Wonkwang University, Iksan, South Korea. He received DDS, MSD and PhD degrees from Kyunghee University, Seoul, South Korea.

He worked as a Clinical Assistant at the Nihon University School of Dentistry in Tokyo, Japan (1985-1986). He was a Visiting Professor of the Zurich University Dental School in Zurich, Switzerland (1990-1991) and the Ohio State University College of Dentistry in Ohio, USA (2006-2007). He served as a Dean and Director of Dental Hospital at the School of Dentistry, Wonkwang University.

He is interested in the field of Esthetic Dentistry, especially on the Smile and Dental Ceramics.

Steven Eckert
Professor Emeritus in Dentistry
Mayo Clinic College of Medicine
Edina, Minnesota USA

Steven Eckert attended the Ohio State University College of Dentistry and completed a General Practice Residency at Mt. Sinai Hospital in Chicago. This was followed by a private practice with teaching responsibilities at Loyola University School of Dentistry. In 1985 he elected to pursue graduate training at the Mayo Clinic in the Specialty of Prosthodontics. He completed this program along with a Master of Science degree and was invited to remain on staff at the Mayo Clinic where he served as Graduate Program Director for Prosthodontics. He remains Professor Emeritus in Dentistry at the Mayo Clinic College of Medicine. In 2010 retired from the Mayo Clinic only to begin a full time private practice devoted to implant dentistry.

His professional career has allowed him the opportunity to be involved in many organizations within dentistry. He has been president of the Academy of Osseointegration, American Academy of Maxillofacial Prosthetics, Academy of Prosthodontics and the American Board of Prosthodontics.

Dr. Eckert has written extensively about implant dentistry and other prosthodontic topics. He has been an editor for three scientific journals and is currently Editor-in-Chief for the International Journal of Oral and Maxillofacial Implants.

Hiroshi Egusa, D.D.S., Ph.D.
Professor and Chair
Division of Molecular and Regenerative Prosthodontics
Tohoku University Graduate School of Dentistry
Japan

Dr. Hiroshi Egusa is Professor and Chair of Division of Molecular and Regenerative Prosthodontics at Tohoku University Graduate School of Dentistry (Since 2014). He was educated at Hiroshima University in Japan, where he received DDS (1998) and PhD (2002) degrees. He 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 and engaged in stem cell research at UCLA from 2002-2004. He obtained an assistant professor position in 2004 in the Department of Fixed Prosthodontics (Chief of the Biology-Driven Prosthodontics Research Laboratory) at Osaka University. He received several research awards from the International Association for Dental Research (2012 Distinguished Scientist Award, First Place Winner of the 2002 Edward H. Hatton Award, First Place Winner of the 2004 Arthur R. Frechette Research Award), the Asian Academy of Prosthodontics (2009), the Asian Academy of Osseointegration (2010).

Invited Speakers

David Felton
President of the Academy of Prosthodontics
Morgantown, West Virginia USA

Dr. David Felton completed his DDS (’77) and MS (’84) degrees at the University of North Carolina at Chapel Hill. He joined the UNC School of Dentistry faculty in 1984, where he served until 2011. He was Graduate Prosthodontics Program Director (1990-’93, 2001), and Chair of Prosthodontics (1992-2002), at UNC. He became a Diplomate of the American Board of Prosthodontics in 1996, and served as President of the American College of Prosthodontists (2001-02). Professor Felton has served as Editor-in-Chief of the ***Journal of Prosthodontics*** since 2003. In August, 2011, he became Dean of the West Virginia University School of Dentistry, a position he held until 2014. He was elected as an examiner to the American Board of Prosthodontics in 2012, and now serves as Secretary-treasurer. Dr. Felton is the current President of the Academy of Prosthodontics, and has lectured nationally and internationally. He has authored nearly 50 peer-reviewed journal articles, and holds memberships in multiple dental organizations, including the International College of Prosthodontists.

Brian Fitzpatrick
Full-Time Specialist Practice
Brisbane, Australia

Dr. Brian Fitzpatrick is in full time specialist practice in Brisbane, Australia. He completed his prosthodontic training at the University of Queensland in 1983. He then undertook initial training in implant Prosthodontics at the University of Washington, Seattle in 1983 and advanced training at the University of Goteborg, Sweden in 1987. For many years he maintained part-time teaching and continuing professional education responsibilities at the University of Queensland. He has delivered a considerable number of invited scholarly presentations in Australia and internationally on various subjects and published on various topics including long term implant outcomes. He reviews for several international journals and has served in leadership positions on numerous National and International Prosthodontic organizations. Dr Fitzpatrick is a past Federal President and Honorary Life Fellow of the Australian Prosthodontic Society. He was elected Vice-President of the International College of Prosthodontists in 2013.

Petra C. Guess, DDS, Dr Med Dent, PhD Associate Professor, Department of Prosthodontics College of Dentistry Albert-Ludwigs University Freiburg, Germany

Dr. Guess, graduated and received her DDS from Albert-Ludwigs University, Freiburg, Germany in 2001. She was an Assistant Professor (2001-2006) at the Department of Prosthodontics (Chair Prof. Dr Dr. h.c. J.R. Strub), College of Dentistry, Albert-Ludwigs University, Freiburg, Germany and is a Board certified Prosthodontist (2005) of the German Society of Prosthodontics and Dental Materials (DGPro). From 2006-2009 she was a Visiting Scientist at the Department of Biomaterials & Biomimetics (Chair Prof. Dr. V.P. Thompson), NYU College of Dentistry, New York, USA. In 2009 Dr. Guess was appointed Associate Professor at the Department of Prosthodontics (Chair Prof. Dr. Dr. h.c. J.R. Strub) College of Dentistry, Albert-Ludwigs University, Freiburg, where she accomplished the Habilitation (Dr. med. dent. habil.) in 2011.

Seong Joo Heo, DDS,MS, PhD Department of Prosthodontics School of Dentistry Seoul National University Seoul, Korea

Dr. Heo graduated the Seoul National University, School of Dentistry in 1983. He finished an advanced training in Prosthodontics and a graduate program in Oral Science at the State University of New York at Buffalo from 1987 to 1989. He is currently the Professor at the Department of Prosthodontics, School of Dentistry, Seoul National University.

Also he is currently the President Elect, the Korean Academy of Prosthodontics and the President, the Korean Academy of Oral and Maxillofacial Implantology.

Invited Speakers

Hiroshi Hirayama, D.D.S., D.M.D., M.S., F.A.C.P.
Former Professor, Division Head of the Postgraduate Prosthodontics Division in Dept. of Prosthodontics and Operative Dentistry
Tufts University School of Dental Medicine
Boston, Massachusetts USA

Dr. Hiroshi Hirayama is a former Professor, the division head of the Postgraduate Prosthodontics division in Department of Prosthodontics and Operative dentistry, former Director of the Graduate and Postgraduate Prosthodontics program, former Director of Advanced Education in Esthetic Dentistry program and former Director of Advanced dental Technology and Research program at Tufts University School of Dental Medicine until December 2014. He is the recipient of 2014 American College of Prosthodontists the Educator of the year award. He received his Master's degree and a certificate in Prosthodontics from Tufts University School of Dental Medicine. He is a Diplomate of the American Board of Prosthodontics, and a Fellow of the American College of Prosthodontics. He lectures nationally and internationally and published extensively on peer review journals. He practices in Boston Massachusetts.

Stefan Holst
Global Head of Research
Science & Regulatory Affairs
Nobel Biocare
Switzerland

Dr. Stefan Holst graduated from the Medical University of Hanover, Dental School in 1999 followed by a postgraduate education at the Louisiana State University, Dept. of Prosthodontics, New Orleans, USA before becoming full time Professor at the University of Erlangen, Dept. of Prosthodontics where he headed - amongst other responsibilities - the CAD/CAM research laboratories for 11-years prior to joining Nobel Biocare in 2013. In his current position as the Global Head of Research, Science and Regulatory Affairs Dr. Holst is responsible for developing and executing the research and science strategy to further develop and support the company's portfolio of implants, prosthodontics and regenerative products. His background as a researcher, clinician and manager in the medical device arena make him a highly sought after public speaker and contributor to scientific meetings. He is also currently appointed as Adjunct Professor for Restorative Dentistry at the University of Pennsylvania.

Ryuji Hosokawa, DDS, PhD
Dean, Faculty of Dentistry
Professor and Head, Division of Oral Reconstruction and Rehabilitation
Director, Implant Dentistry Clinic of the College Hospital
Kyushu Dental University
Kitakyushu, Fukuoka, Japan

Graduated from the Kyushu Dental University (KDU) in 1986. Postgraduate training (1986-1990) in Fixed Prosthodontics, Occlusion and Implant Dentistry at the Department of Fixed Prosthodontics and Implants of the KDU. At the same time, post-graduate researcher (1986-1990) at the Department of Biochemistry and given PhD degree. Research Associate (1990-1991) at the Harvard University School of Dental Medicine (Boston, MA, USA), Department of Prosthetic Dentistry. Assistant Professor and then, Senior Lecturer at the Department of Advanced Prosthodontics of the Hiroshima University (Prof. Dr. Y. Akagawa) from 1995 to 2003. Since May 2003, Professor and Head of the Department of Oral Reconstruction and Rehabilitation of the Kyushu Dental University. Director of Implant Dentistry Clinic of the Univ. Hospital (2005-). Dean of the Faculty of Dentistry (2012-). Member of American Academy of Fixed Prosthodontics. Former Director of Implant Research Group (2009-2010) of IADR (International Association for Dental Research).

Invited Speakers

Dale Geoffrey Howes, B.Sc. (Dent); BDS; M.Dent (Wits); FCD (SA) Pros
Professor, Dept. of Oral Rehabilitation
University of the Witwatersrand
Johannesburg, South Africa

Dale Howes is in full time private prosthodontic practice at Morningside MediClinic, Johannesburg and Professor in the Department of Oral Rehabilitation at the University of the Witwatersrand.

He is the current Vice President of the ISMR (International Society for Maxillfacial Rehabilitation), board member of the ICP (International College of Prosthodontists), invited fellow of the International academy for Oral and Facial Rehabilitation (IAOFR) and serves on the North American working group for Advanced Digital Technology in Craniofacial Reconstruction.
He serves on the College of Dentistry of South Africa and is the past president of the Academy of Prosthodontics of South Africa, and founder member of the P-I Brånemark Institute of South Africa. He has served as a councilor of the South African Dental Association.

He has published research and book chapters in fields including dental implantology, head and neck cancer rehabilitation, occlusion and biomechanics.

He has delivered keynote presentations to:

- The Australasian Osseointegration Society (2009, 2011),
- The British Society for the Study of Prosthetic Dentistry (BSSPD)
- Latin American and Cuban Associations of Face Rehabilitation and Maxillofacial Prostheses in 2012 and 2013.
- The Russian Implant Society (2010)
- The International Society for Maxillofacial Rehabilitation (2013)
- Russian Society for Craniofacial Cancer (2014).
- 40th anniversary World Celebration of Osseointegration, Sao Paulo (2005)
- The International College of Prosthodontics (2009),
- The American Academy for Maxillofacial Prosthetics (2009)

Best Presentation awarded Nobel Biocare World Congress 2005 and Academy of Osseointegration Boston 2008

Jung-Bo Huh, DDS, MSD, PhD
Associate Professor of Prosthodontics
School of Dentistry, Pusan National University
Republic of Korea

Dr. Jung-Bo Huh is Associate Professor of Prosthodontics at School of Dentistry, Pusan National University in Korea. He has published about 60 scientific papers and three book chapters in the scientific literature for recent 4 years. He has lectured extensively on the subjects of dental implant, prosthodontics, tissue engineering and regenerative medicine. Huh is also the Head of Dental Research Institute of Pusan National University and the Head in department of prosthodontics, Pusan National University Dental Hospital. Huh has been honored with Student Research Fellowship Award in IADR Implantology Research Group, IADR Hatton Award in Korea Division, and Young Scientist Award in the Korean Academy of Prosthodontics.

Shin Jun Hyouk DDS, MS
Chief of Moonjoong Dental Clinic
Busan, Republic of Korea

Dr. Shin graduated from Busan National University of Dental College & post graduate school in 1998 and was an adjunct professor. He is currently a director of Korea Academy of Esthetic Association, Korean Academy of Digitalized Dentistry and publisher serially the Korean Journal of Clinical Dentistry in 2014. He is a world advisor of 3shape in the Denmark Copenhagen. He is also an Art Oral Korea member. Dr. Shin is Chief of Moonjoong Dental Clinic in Busan from 2001 to present day.

Rhonda Jacob
Co-President of the ICP
Houston, Texas USA

Rhonda Jacob is the current co-president of the ICP. She has been involved with maxillofacial rehabilitation and reconstruction while a faculty member of MD Anderson Cancer Center for 30 years. This has included being actively involved with the evolution of microvascular surgery and endosteal implant placement in this patient population.

Invited Speakers

Xinquan Jiang
Director of Department of Prosthodontics
Director of Oral Bioengineering/Regenerative Medicine Lab
Ninth People's Hospital. China

Xinquan Jiang, D.D.S, Ph.D. Professor. He serves now as the director of the department of Prosthodontics, and the director of Oral Bioengineering/Regenerative Medicine Lab, Ninth Peoples Hospital, School of Stomatology, affiliated to Shanghai JiaoTong University. Xinquan Jiang received his Ph.D in 2003 from Shanghai Second Medical University. He got his further training in University of Alberta during 2002~2003 in Canada and University of California, Los Angeles (UCLA) in USA during 2004~2006, and awarded an honorary professorship in Sydney University, Australia (2012~). His research interest focuses on the bone regeneration and dental implantation, and serves in the editorial board of Tissue Eng, Bone Res, IJOS, IJP, et al.. In 2005, he won the prestigious IADR/Unilever Hatton Award from the international association for dental research. Currently, he serves as the regional representative of Asian Academy of Prosthodontics (AAP) and vice president of Chinese Prosthodontic Society (CPS).

James Kelly
Director of Maxillofacial Prosthetics, Mayo Clinic Rochester, Minnesota USA

James Kelly is currently the director of Maxillofacial Prosthetics at Mayo Clinic in Rochester, MN. After graduating from dental school at Creighton University, he studied advanced prosthodontics and oral biology at UCLA. Thereafter, he completed his fellowship at the University of Texas, MD Anderson Cancer Center. Prior to arriving at Mayo Clinic, James directed the Maxillofacial Prosthetics program at UCLA. He enjoys active involvement in patient care, education, research, and many different prosthodontic and maxillofacial prosthodontic organizations.

Matthias Kern, Prof. Dr. FADM
Department of Prosthodontics, Propaedeutics and Dental Materials
School of Dentistry
Christian-Albrechts University at Kiel
Kiel, Germany

Dr. Kern graduated from Dental School in Freiburg, Germany in 1985. He was then assistant Professor in the Department of Prosthodontics, University of Freiburg from 1985-1991 and 1994-1997. From 1991-1993 he was visiting Research Associate Professor, University of Maryland at Baltimore, USA (Grant of the German Society of Research). Since 1997 he is Professor and Chairman of the Department of Prosthodontics, Propaedeutics and Dental Materials, 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). In June 2012 Dr. Kern became President of the German Society for Prosthetic Dentistry and Biomaterials (DGPro). He was reelected for a second term as President of the DGPro in May 2014.

Jong Cheol Kim
Republic of Korea

In 1997, graduated from Cheon Nam National University. Acquired PhD degree from same university. From 2006 to 2008, worked as adjunctive professor at the same university. Currently working at Daegu Mir Dental Hospital. Supporting MINEC eduction center as Director and member of Korean Academy of Periodontology. From 2011, in charge of developing the R2Gate software.

Seong-Kyun Kim
Tenured Professor, Dept. of Prosthodontics, School of Dentistry
Seoul National University
Seoul, Republic of Korea

He is a tenured Professor at the Department of Prosthodontics, School of Dentistry, Seoul National University and currently the Director of Academic Affairs at Korean Academy of Prosthodontics.

Invited Speakers

Iven Klineberg AM, RFD, BDS, BSc, MDS, PhD(Lond), FDSRCS(Lond, Edin), FRACDS, FICD

Dr Iven Klineberg graduated from the University of Sydney in dentistry and science (BDS, BSc), and prosthodontics (MDS).

PhD in the University of London (1971) at the Royal College of Surgeons of England, and Fellowship in Dental Surgery (FDSRCS); was awarded an Honorary Fellowship from the Royal College of Surgeons Edinburgh (2002).
Visiting Associate Professor in the Department of Occlusion, University of Michigan (1977-8); appointed Professor and Head of Prosthodontics, University of Sydney (1978-2006), and Nobel Biocare Chair of Oral Rehabilitation (from 2007).
Was appointed Dean, Faculty of Dentistry, University of Sydney 1991-8 and 2003-4.
Awarded Membership in the Order of Australia (1996).

Sreenivas Koka, DDS, MS, PhD
Clinical Professor
Loma Linda University School of Dentistry
Lecturer, UCLA School of Dentistry
San Diego, California USA

Sreenivas Koka received DDS and MS (Prosthodontics) degrees from the University of Michigan, a PhD (Medical Sciences) from the University of Nebraska and an MBA from the Massachusetts Institute of Technology (MIT). He currently owner of Koka Dental Clinic, a private practice focusing on implant and removable prosthodontics and also owner of Premium Dental Editing, an English editing service for dental manuscripts and publication materials. Dr. Koka currently holds the rank of clinical Professor at Loma Linda University School of Dentistry and of Lecturer at UCLA School of Dentistry and is co-Director of the Future Leaders in Prosthodontics workshop program series. Dr. Koka is a member of the Board of the International College of Prosthodontists, immediate past-President of the Academy of Prosthodontics, Fellow of the American College of Prosthodontists, former Professor and Chair of Dental Specialties at the Mayo Clinic and former Merritt C. Pedersen Professor of Dentistry at the University of Nebraska College of Dentistry. Dr. Koka has published over 80 journal articles and authored or co-authored numerous textbook chapters and is a member of the Editorial Advisory Board of the International Journal of Prosthodontics.

Ho-Beom Kwon
Associate Professor, Department of Prosthodontics
School of Dentistry, Seoul National University
Seoul, Republic of Korea

Prof. Ho Beom Kwon is Associate professor in the Department of Prosthodontics of School of Dentistry at Seoul National University in Seoul, Korea. He completed his dental degree and specialized in Prosthodontics at Seoul National University. He was Associate Professor at Sunkyunkwan University Samsung Medical Center. He visited the Department of Electrical and Computer Engineering at the University of British Columbia in Vancouver, Canada for 2 years as a Visiting Associate Professor. He is interested in the output of prosthodontic treatments including maxillofacial prosthodontics as well as occlusion and pronunciation. These days his research has been directed to the application of computer engineering to the study of the principles in prosthodontics. He is being involved with the research activities including computer simulations of the oral and maxillofacial functions with maxillofacial prostheses.

Danielle Layton, BDSc(Hons)(Qld), MSc Oxon, MDSc (Hons)(Syd)
Private Practice, Prosthodontics
Brisbane, Australia

Dr. Danielle Layton graduated with a BDSc with honours and The University Medal at the University of Queensland, Australia; an MDSc with honours in prosthodontics at the University of Sydney, Australia; and an MSc in Evidence Based Health Care at Oxford University, United Kingdom. She is in private prosthodontic practice in Brisbane, and is completing a Doctor of Philosophy at Oxford University. Dr. Danielle Layton contributes to numerous dental societies and academies through committee and scientific roles. She continues to publish and lecture widely, and explores research interests in survival outcomes, statistics, medical indexing and the influence of withdrawn data.

Invited Speakers

Jae-Hoon Lee, DDS, MS, Ph.D
Associate Professor, Department of Prosthodontics
Yonsei University
Seoul, Republic of Korea

Jae-Hoon Lee is an Associate Professor in the Department of Prosthodontics at Yonsei University.

Education / Training:
1999 DDS School of Oral and Dental Surgery at Columbia University
2000 GPR residency Montefiore Hospital, at Bronx, New York
2003 MS Post Graduate Prosthodontics at Columbia University
2008 Ph.D Graduate School of Dentistry at Yonsei University
2010 Visiting scholar Weintraub laboratory at University of California at Los Angeles

Richard Leesungbok, DMD, MSD, PhD
Head Professor & Chair, Department of Biomaterials & Prosthodontics
President, Kyung Hee University Dental Hopsital at Gangdong
Seoul, Republic of Korea

Richard is an ITI fellow and Head Professor and Chair in the Department of Biomaterials & Prosthodontics.
He is also the President of Kyung Hee University Dental Hospital at Gangdong,

Yoshinobu Maeda
Chairman and Professor
Department of Prosthodontics, Gerodontology and Oral Rehabilitation
Osaka University Graduate School of Dentistry
Japan

Yoshinobu Maeda was a graduate from Osaka University Dental School at 1977 and received the Ph.D. degree at 1981 along with the prosthodontic specialist training.

He is currently the chairman and Professor for the Department of Prosthodontics, Gerodontology and Oral Rehabilitation at Osaka University Graduate School of Dentistry. He is also the director of Dental Hospital. He was visiting Professor at the University of British Columbia from 1988-1989. He has been the member of ICP as well as Japanese Prosthodontic Society (JPS) and served as President with Dr.Martin Gross from 2012-2013 and hosted Torino meeting.

He has been involved with the clinical and basic biomechanical analysis on overdentures as well as implant overdentures.

Kenneth Malament
Clinical Professor at Tufts University
Course Director in Postgraduate Department of Prosthodontics
Boston, Massachusetts USA

Dr. Malament received his D.D.S. from N.Y.U. College of Dentistry and a specialty certificate and Master's degree from Boston University School of Graduate Dentistry. Dr. Malament has a full time practice limited to prosthodontics in Boston that includes a dental laboratory with master dental technologists. A Past-President of the American Board of Prosthodontics, he is a Clinical Professor at Tufts University and a Course Director in postgraduate department of Prosthodontics. Dr. Malament is a Fellow of the American College of Prosthodontists, Academy of Prosthodontics, Greater New York Academy of Prosthodontics, and Northeastern Gnathological Society. He is an active member of the International College of Prosthodontists, American Academy of Fixed Prosthodontics, American Academy of Esthetic Dentistry, Academy of Osseointegration, Northeastern Prosthodontic Society and American Equilibration Society. He is a Past President of the Greater New York Academy of Prosthodontics, Northeastern Gnathological Society and the Northeastern Prosthodontic Society.

Invited Speakers

Carlo P. Marinello
Professor and Chairman
Clinic for Fixed and Removable Prosthodontics and Temporomandibular Disorders
Dental School, University of Basel
Basel, Switzerland

He was an Assistant Professor, Department of Fixed and Removable Prosthodontics and Dental Material Sciences, University of Zurich. In 1989 he fulfilled his Habilitation Thesis and became Associate Professor. In 1989-1990 he served as a Visiting Research Professor, Department of Periodontology at the University of Gothenburg where he received his Master of Science degree in 1995. From 1991-1995 he was Associate Professor and Head of Periodontology, Department of Preventive Dentistry, Periodontology and Cariology at the University of Zurich. Since 1995 he is full-time Professor and Chairman of the Department of Reconstructive Dentistry and Temporomandibular Disorders at the Dental School of the University of Basel. In 2003 he received the Distinguished Lecturer Award from the American College of Prosthodontics (ACP) and in 2012 from the Greater New York Academy of Prosthodontics. In 2008 he received by the Pierre Fauchard Academy the Elmer S. Best Memorial Award. In 2011 he was the president of the American Prosthodontic Society.

Radi Masri
Tenured Associate Professor, Assistant Director of the Prosthodontics Program
University of Maryland Baltimore
Baltimore, Maryland USA

Dr. Masri is a tenured Associate Professor, and Assistant Director of the Prosthodontics Program at the University of Maryland Baltimore. He completed his prosthodontic residency training and received a master's degree in oral biology in 2001. He also received a PhD in biomedical sciences in 2005. Dr. Masri is a Director Elect of the American Board of Prosthodontics, the Associate Editor in Chief of the Journal of Prosthodontics, and a Director of the American Academy of Fixed Prosthodontics.

He is a Diplomate of the American Board of Prosthodontics, a fellow of the American College of Prosthodontists, a member of the American Academy of Fixed Prosthodontics and a member of the Academy of Prosthodontics.. He lectures nationally and internationally and serves as an external examiner for international dental schools in the field of prosthodontics. He is the chair of the American College of Prosthodontics Research Committee and has authored numerous scientific papers. Dr. Masri currently supervises a federally funded research laboratory that studies the innovative treatment for pulpitis and investigates the etiology and treatment of chronic pain. He is a past recipient of the American College of Prosthodontics Clinician Researcher Award, and the BioMaryland LIFE Prize Award.

Konstantinos Michalakis
Adjunct Associate Professor Division of Postgraduate Prosthodontics
Tufts University, School of Dental Medicine
Associate Professor Dept. of Prosthodontics, Aristotle University
Greece

Konstantinos Michalakis graduated from the Aristotle University of Thessaloniki School of Dentistry in 1989. From 1990 to 1993 he attended the postgraduate Prosthodontics residency program at Tufts University School of Dental Medicine, Boston, USA. In 1994 he started working in his private dental practice, focusing in prosthodontic procedures. In 2001, he was awarded a Ph.D. degree from the Aristotle University of Thessaloniki School of Dentistry. In 2004 he completed successfully the American Board of Prosthodontics written and oral examinations and he was awarded the Board Certification in Prosthodontics. In 2008, he was awarded the Masters of Science degree from the Department of Bioengineering of the University of Strathclyde, Glasgow, United Kingdom.

He has lectured extensively both in Greece and internationally, and he has authored many articles in peer-reviewed journals. Today, he is an Adjunct Associate Professor in the division of Postgraduate Prosthodontics at Tufts University School of Dental Medicine, and an Associate Professor in the Department of Prosthodontics of the Aristotle University of Thessaloniki School of Dentistry. He is also the Clinical Director of Graduate Prosthodontics at the Aristotle University.

He regularly reviews articles for the International Journal of Oral and Maxillofacial Implants and he is a member of the editorial board of the International Journal of Dentistry, Case Reports in Dentistry, BioMed Research International and Conference Papers in Medicine. He has held positions in the membership and the education and research committees of the International College of Prosthodontists and he is a fellow of the American College of Prosthodontists, a member of the American Academy of Fixed Prosthodontics, the European Academy for Osseointegration, the International Association for Dental Research, the International College of Dentists and the European Society of Biomechanics. He is the president of the Greek Chapter of Tufts Prosthodontic Alumni Association.

Invited Speakers

Dean Morton, BDS, MS, FACP
Professor and Chair of the Department of Oral Health and Rehabilitation
University of Louisville
Louisville, Kentucky USA

Dr. Dean Morton completed his dental training at the University of Sydney, and advanced education in Prosthodontics at the University of Iowa. He serves as Professor and Chair of the Department of Oral Health and Rehabilitation at the University of Louisville, concurrently directing the Graduate Prosthodontics Program.

He is a Diplomate of the American Board of Prosthodontics and a fellow of the American College of Prosthodontists, the Academy of Prosthodontics, the International College of Dentists, and the International Team for Implantology (ITI). He serves the Board of Directors of the ITI.

Dr. Morton is an Associate Editor of the International Journal of Oral and Maxillofacial Implants. He has authored numerous peer-reviewed scientific articles and abstracts. He lectures nationally and internationally on implants and esthetic dentistry and has a part-time practice within School of Dentistry devoted to Prosthodontics.

Matshediso 'Kuki' Mothopi-Peri
Head of Maxillofacial Prosthetics Unit,
Department of Oral Rehabilitation
School of Oral Health Sciences
University of the Witwatersrand
Johannesburg, South Africa

Dr Matshediso Mothopi-Peri also known as ‘Kuki’ completed both her Bachelor of Dental Science (BDS) and Masters in Dentistry (Prosthodontics) (MDent Pros) at the University of the Witwatersrand in South Africa. She also holds a National Diploma in Radiography.

Dr Matshediso Mothopi-Peri is a Prosthodontist and Lecturer in the Department of Oral Rehabilitation in the School of Oral Health Sciences at the University of the Witwatersrand, where she is also Head of the Division of Maxillofacial Prosthodontics. She is involved in the Prosthodontic teaching and clinical supervision for both undergraduate and postgraduate students. Dr Mothopi-Peri is also part of the multi-disciplinary Craniofacial and Head & Neck Teams at Johannesburg Academic Hospital.

Her research interests are in maxillofacial prosthodontics, treatment planning in Prosthodontics, the orofacial effects of radiation therapy and their management, removable prosthodontics, Geriatric Dentistry, and all these in relation to the philosophy of Appropriatech. She is passionate about advancing Prosthodontics in developing countries.

Radek Mounajjed., MUDr. DDS, Ph.D
D.C.M Clinic
Olomouc University
Hradec Králové, Czech Republic

MUDr. Radek Mounajjed DDS, Ph.D graduated from Damascus University School of Dentistry in 1994. He then completed his residency in general dentistry 1997, prosthodontics dentistry in 2000, and received his Ph.D in 2004 all from Charles university medical School Hradec Králové.

Since 2001 he has been working at the multi-disciplinary D.C.M clinic in Hradec Králové as full time prosthodontist. Since 2012 he has been external teacher at Olomouc University.

Dr. Mounajjed is the author of many publications and book chapters. He presented more than 150 talks, both nationally and internationally (USA, UK, Netherland, Italy, Greece, South Africa, Poland, Slovakia and Syria)

Dr. Mounajjed is the cofounder of HDVI, one of the accredited dental continuing education centers in the Czech republic. He is also a fellow of the Academy of Prosthodontics in USA and fellow of ITI and ICP.

Outside dentistry he enjoys building and flying RC model airplanes.

Frauke Müller
Professor and Chair, Gerodontology and Removable Prosthodontics
University of Geneva
Geneva, Switzerland

Frauke Müller is professor and chair for gerodontology and removable prosthodontics at the University of Geneva.

She was born in Kiel, Germany and studied dentistry in Bonn, where she received her Dental and Doctorate Degree. Until 2003, she worked at the Department of Prosthetic Dentistry of the University of Mainz, Germany where she received her habilitation (PD) in 1996. Thanks to fellowships, she had the opportunity to spend several years at the London Hospital Medical College, England (1988 and 1993/94). Professor Müller served on the board of the SSRD *(Swiss Society for Reconstructive Dentistry) and is Past-President of* the ECG (*European College of Gerodontology*) and GORG of IADR (*Geriatric Oral Research Group).* She is member of the ITI Board of Directors (*International Team for Implantology*). Since 2010 she is President of the *Swiss Society for Dentistry for elderly and handicapped persons* (SGZBB). Associate Editor of *Gerodontology* and the textbook "Oral Healthcare and The Frail Elder". In 2013 she was awarded the IADR Distinguished Scientist Award in Geriatric Oral Research. Her research activity is mainly related to gerodontology, oral function as well as complete and implant prosthodontics.

Invited Speakers

Caroline Nguyen
Vice-President of the Association of Prosthodontics of Canada
Vancouver, BC, Canada

Dr. Nguyen completed her Doctor of Dental Medicine from the University of Montreal in 2006, graduated Phi Kappa Phi for her Master of Sciences and Certificate in Advanced Education in Prosthodontics at the University of Maryland in 2009, and continued with a Fellowship in Maxillofacial Prosthodontics and Oral Oncology at the University of Texas MD Anderson Cancer Centre in 2010. Dr. Nguyen currently serves as an Assistant Professor at the University of British Columbia, and is the Provincial Practice Leader in prosthodontics for the British Columbia Cancer Agency. She is involved in clinical researches on the side effects of medications and radiation therapy on oral health. Dr. Nguyen is a Fellow in Prosthodontics of the Royal College of Dentists of Canada and a Diplomate of the American Board of Prosthodontics. She is the current Vice-President for the Association of Prosthodontists of Canada, Table Clinics Chair for the American College of Prosthodontics, and a prosthodontics board examiner for the Royal College of Dentists of Canada.

Takahiro Ono, DDS, PhD
Chief Professor
Division of Comprehensive Prosthodontics
Niigata University Graduate School of Medical and Dental Sciences
Japan

Chief Professor
Division of Comprehensive Prosthodontics, Niigata University Graduate School of Medical and Dental Sciences (since 2014)
Outside lecturer (2015): Osaka University, Tohoku University, Tokushima University, Tokyo Medical and Dental University
1995-2014: Associate Professor, Division of Removable Prosthodontics, Gerodontology and Oral Rehabilitation, Osaka University Graduate School of Dentistry
1988-1995: Assistant Professor, Department of Prosthodontics, Osaka University Faculty of Dentistry
1987: Graduation of Osaka University Graduate School of Dentistry (PhD)
1983: Graduation of Hiroshima University Faculty of Dentistry (DDS)
1957: born in Ashiya, Hyogo

C Peter Owen
Professor Emeritus
Department of Oral Rehabilitation
School of Oral Heath Science
Faculty of Health Sciences
University of the Witwatersrand
Johannesburg, South Africa

Peter Owen recently retired as Head of the Department of Oral Rehabilitation at the University of the Witwatersrand, Johannesburg, South Africa. Prior to the liberation of that country in 1994, he was actively involved in the anti-apartheid struggle, holding executive positions in a number of anti-apartheid organizations. He has pioneered the concept of "appropriatech": the use of cost-effective methods and materials in Prosthodontics whilst maintaining high quality. Allied to this is the development of Minimum Acceptable Protocols (MAPs) to serve as clinical guidelines, as a valid alternative to so-called standards of care in dentistry. He has served on the Board of the ICP since 2001. He has made over 140 presentations locally and internationally and has over 120 publications, including journal papers, books, chapters in books, manuals and other publications.

Gianluca Paniz
Adjunct Assistant Professor, Dept. of Prosthodontics and Operative Dentistry, Tufts University
Visiting Professor, Department of Implantology
University of Padova
Padova, Italy

Gianluca Paniz achieved his dental degree (DDS) at the University of Padova (Italy) in 2002. He attended TUFTS University (Boston, USA) from 2003 till 2007 and achieved the Certificate of Advanced Education in Prosthodontics, the Master of Science and the Certificate of Advanced Education in Esthetic Dentistry.

At the moment Gianluca Paniz is Adjunct Assistant Professor in the Department of Prosthodontics and Operative Dentistry at TUFTS University and Visiting Professor in the Department of Implantology at the University of Padova.

Gianluca is Diplomate of the American Board of Prosthodontics and International Fellow of the American College of Prosthodontics, Member of the Italian Academy of Prosthetic Dentistry (AIOP), Active Member of the of the Italian Academy of Aesthetic Dentistry (IAED) and President of the Scientific Committee of Italian Society of Osseointegration (SIO).

Gianluca Paniz limits his practice to prosthodontics in his offices in Padova Italy.

Invited Speakers

Stephen M. Parel, DDS
Private Practice
Dallas, Texas USA

Dr. Parel received his dental degree from The Medical College of Virginia in 1969. He spent one year as a general practice resident with the Veterans Administration Hospital in Richmond, which was followed by a two-year residency in Prosthodontics at the Wadsworth Veterans Administration Hospital in Los Angeles. He received his Maxillofacial Prosthetics training in Houston at the M.D. Anderson Hospital and Tumor Institute in 1973. He became a faculty member in the University of Texas System in 1975, rising to the rank of full professor in the San Antonio Medical and Dental Schools in 1978. He served as head of the Maxillofacial Prosthetics Division in the Department of Prosthodontics until 1991, which was followed by 7 years of private practice in prosthetic and implant dentistry.

Dr. Parel is a Diplomate of the American Board of Prosthodontics, the American and International College of Dentists, and is a member of many professional organizations, including the American Dental Association, the Academy of Prosthodontics, and the American College of Prosthodontics. He has been course director for osseointegration training at the University of Texas Health Science Center School of Dentistry in San Antonio, one of the four original Brånemark training centers in the United States. His literature contributions include over 45 scientific articles as principal author, and multiple textbook contributions. He was editor and co-author of *Esthetics and Osseointegration*, a landmark reference source for implant dentistry. He authored his second book, *The SmiLine System* in 1991, and completed a third book, *Esthetic Implant Restorations* several years later. He was co-founder of Osseointegration Seminars, Incorporated, and has been president of The American Academy of Maxillofacial Prosthetics, The Academy of Osseointegration, and The Osseointegration Foundation. He has received the Andrew J. Ackerman Award for meritorious lifetime service in the field of Maxillofacial Prosthetics, the Distinguished Lecturer and Dan Gordon Awards from the American College of Prosthodontics, and has served as an examiner and President of The American Board of Prosthodontists. He recently received the Branemark Award for lifetime achievement in the field of Implant dentistry, the highest honor bestowed by the Academy of Osseointegration's Foundation and The Titanium Society.

Dr. Parel has served as a professor at Baylor College of Dentistry—Texas A&M University System Health Science Center and director of the Center of Oral Maxillofacial Prosthodontics in the Department of Oral and Maxillofacial Surgery/Pharmacology from 1998 until 2008. Since that time until 2013, he served as the founder and director of Prosthodontics at a private Implant Specialty Clinic in Dallas, Texas. He is presently in private practice, and serves as a consultant to several companies in the implant industry.

Harold Preiskel
Specialty Private Practice & Emeritus Professor of Prosthodontics
King's College Dental Institute
London, United Kingdom

Harold Preiskel is in speciality private practice and Emeritus Professor of Prosthodontics at King's College Dental Institute where he founded the dental implant program.

He was the first President of The International College of Prosthodontists and the first non-American President of the American Prosthodontic Society, a founding editor of the International Journal of Prosthodontics and subsequently Chairman of the Board.

He is Past President of the American Dental Society of London, the British Dental Association (Metropolitan Branch), the London Dental Study Club and Chairman the International Prosthodontic Symposium 1982. He is a Fellow of the Academy of Prosthodontics and of the Royal College of Surgeons of England.

He is author of numerous textbooks, scientific articles, the recipient of prestigious Prosthodontic awards the world over and is active in teaching and private practice.

Alon Preiskel
Clinical Professor in Prosthodontics
King's College Dental Institute
London, United Kingdom

Dr Alon Preiskel is a Consultant (Clinical Professor) in Prosthodontics at King's College Dental Institute and partner in Preiskel Prosthodontics in London UK. He has served as Program Coordinator of the Implant Diploma at the Eastman Dental Institute (London) for five years and has taught at King's College Dental Institute (formally Guy's Hospital) where he completed his specialist Prosthodontic training program.

Dr Preiskel is member of numerous dental societies and lectures frequently at national and international meetings, including the Academy of Prosthodontics, American Prosthodontic Society, International College of Prosthodontics, and the London Nobel Biocare Symposium. He serves on the Executive Council of the American Prosthodontic Society and is a committee member of the International College of Prosthodontics. He is an Editor of the International Journal of Implant Dentistry. Dr Preiskel has recently gained an Executive MBA from the London Business School.

Invited Speakers

Tony Rotondo
Private Practice, Prosthodontics
Brisbane, Australia

Tony Rotondo is a registered specialist in Prosthodontics, he completed his undergraduate degree at the University of Queensland in 1984 and a postgraduate residency in Prosthodontics in 1996 at the University of California, Los Angles (UCLA). He currently practices in Brisbane. Tony has specific interests in dental aesthetics, dental implants and ceramic materials. He has and continues to teach undergraduates and postgraduates at the University of Queensland. He is a visiting lecturer to the postgraduate program in prosthodontics at the University of Sydney and a visiting lecturer to Griffith University, School of Dentistry in Southport.

In the past Tony has been the president of the Australian Society of Aesthetic Dentistry (QLD Branch), secretary of ANZAP (Australian and New Zealand Academy of Prosthodontists), treasurer and founding member of AOS (Australasian Osseointegration Society, QLD branch), he is a member of many other professional associations. Tony is a product evaluator for many dental companies. Tony presents numerous continuing educational programs nationally and internationally.

Jean-Francois Roulet
Director of the Center of Dental Biomaterials
University of Florida
Gainesville, Florida USA

Jean-François Roulet has obtained his DDS in Bern Switzerland 1974 followed by the Dr. med. dent. in 1977. After enrolling in university career and several stays abroad he obtained 1986his Habilitation (PhD) from the University of Zurich (Switzerland). From 1984 – 2002 he has served as Chairman and Dean (1991-1994) at the Free University and the Charité in Berlin, interrupted by a sabbatical at the University of Florida. After having served as Director R&D clinical for Ivoclar Vivadent for 9 years, he joined the University of Florida working in the Department of Restorative Dental Sciences, where he is actually serving as Director of the Center of Dental Biomatetrials. He has extensively published on multiple aspects of research and clinical dentistry. Lecturing and teaching are a very important part of his scientific work, which is documented with more than 880 worldwide lectures and courses given in the last 40 years.

Irena Sailer
Prof. Dr. med. dent., Head
Division of Fixed Prosthodontics and Biomaterials
University of Geneva
Geneva, Switzerland

Irena Sailer received her dental education and Dr. med. dent. degree from the Faculty of Medicine, University of Tübingen, Germany in 1997/ 1998. In 2003 Dr. Sailer received an Assistant Professorship at the Clinic of Fixed and Removable Prosthodontics and Dental Material Sciences in Zurich. From 2010 on she was an Associate Professor at the same clinic. In 2007 Dr. Sailer was a Visiting Scholar at the Department of Biomaterials and Biomimetics, Dental College, New York University, USA. Additionally, since 2009 she holds an Adjunct Associate Professorship at the Department of Preventive and Restorative Sciences, Robert Schattner Center, School of Dental Medicine, University of Pennsylvania. Philadelphia, USA.

Irena Sailer is a Specialist for Prosthodontics (Swiss Society for Reconstructive Dentistry), and holds a specialization degree for Dental Implantology (WBA) of the Swiss Society for Dentistry.

Since September 2013 she is the Head of the Division of Fixed Prosthodontics and Biomaterials at the University of Geneva.

June-Sung Shim
Professor, Yonsei University Dental School
Chairperson in the Dept. of Prosthodontics
Seoul, Republic of Korea

Prof. Shim has been working at Yonsei University Dental School in Seoul since 2000. In 2013, he was appointed as a chairperson in the department of Prosthodontics and has been serving as a clinician and educator. After he obtained D.D.S at YUCD (Yonsei University College of Dentistry), he completed Prosthodontic residency at Yonsei University Dental Hospital (YUDH). He is a certified prosthodontist of KAP (Korean Academy of Prosthodontics). He acquired PhD degree in Dental Biomaterials at University of Manchester under supervision of Prof. David Watts. He is a board member of KAP and served as a director of academic committee and secretary. Currently, he is serving in board examination committee. He was an academic director in KADD (Digital Dentistry) and KAOMI (Oral & Maxillo-Facial Implantology). YUDH started to provide Prosthodontic treatment using CAD CAM from 2002. Since 2013, YUDH has been using a wide range of various devices in research and clinical practice. Prof. Shim guided this progress as a leader of task force team and he is working hard to achieve extension and collaboration of restorative dentistry, implant dentistry and orthodontics. Also, he is serving as a member of Dental Advisory committee of NHPLEB (National Health Personnel Licensual Examination Board), which oversees license work of ROK.

Invited Speakers

Balendra Pratap Singh
Assistant Professor
King George's Medical University
Lucknow, Uttar Pradesh
India

Dr Balendra Pratap Singh is working as assistant professor in King Georges Medical University, Lucknow, India. He has completed his graduation and post-graduation from King Georges Medical college, Lucknow in the year 2003 and 2006 respectively. He is also 12th rank holder in All India PG in first attempt. He is handling eight research projects and has 41 publications (19 international). He is international fellow of ICMR, Fellow of American Academy of Maxillofacial Prosthodontics (FAAMP), Fellow of Pierre Fauchard Academy (FPFA), Fellow Indian Society of Dental Research (FISDR), member National Academy of Medical Sciences (MAMS). He is visiting faculty in Fukuoka, Japan; Kings College, London; John Hopkins University, Baltimore, USA, and University of Montreal, Canada. He also got special recognition award in establishing the Bio-medical waste management system in King George's Medical University by United Nation Development Project.

He is reviewer of 43 international journals and reviewed 178 manuscripts. He is editorial board of Journal of Prosthodontics. He is member of 11 scientific societies.

Ami Smidt, DMD, M.Sc.
Head, Ctr. for Graduate Studies in Prosthodontics
Hebrew University- Department of Prosthodontics
Hdassah School of Dental Medicine
Jerusalem, Israel

Prof. Smidt is Head, Center for Graduate Studies in Prosthodontics, Department of Prosthodontics Hebrew University-Hdassah School of Dental Medicine, Jerusalem, Israel.

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.

Prof. Smidt has published extensively and serves as a member on the editorial review boards of several international publications. He lectures frequently in international forums on topics related to orthodontics for better prosthodontics and esthetic and implant dentistry. His current research focuses on bleaching materials and their effect on tooth structure and the effect of a newly developed disinfecting temporary cement on crown marginal leakage.

Prof. Smidt served as President and Editor of the Israel Society of Prosthodontics, is a member of several professional organizations, and maintains a private practice dedicated to prosthodontics and esthetic dentistry in Tel Aviv, Israel.

Joerg Strub
Professor and Chair of the Department of Prosthodontics
Albert-Ludwigs University
Freiburg, Germany

Prof. Dr. J. R. Strub, born in 1948, received his D.D.S., Dr. Med. Dent. and Dr. Med. Dent. Habil. (PhD equiv) degrees from the University of Zurich, Switzerland in 1975/1985 and the Dr. h.c. from the National and Kapodistrian University, Athens, Greece, in 2008.

He was a Visiting Assistant Professor of Biomaterials at Tulane University and Louisiana State University, New Orleans, USA, 1982-1983. From 1982-1988 he was Associate Professor and co-director of the Graduate Programme in Periodontal Prosthetics at the University of Zurich.

Since 1988 Dr. Strub has been Professor and Chair of the Department of Prosthodontics at the Albert-Ludwigs University in Freiburg, Germany.

From 1997 – 2001 he was Dean and since 2002 he is Associate Dean for Clinical Affairs at the School of Dentistry of the Albert-Ludwigs University in Freiburg, Germany.

He was a Visiting Clinical Professor of Fixed Prosthodontics at the Osaka University in Osaka, Japan in 1996. Since 2009 he is Visiting Professor at the University of Pennsylvania (Dept. Preventive and Restorative Sciences), Philadelphia, USA.

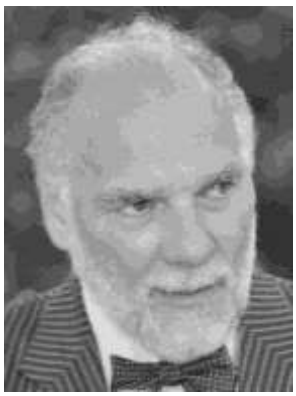
Thomas D. Taylor, DDS, MSD, FACP
Professor and Head,
Department of Reconstructive Sciences
Chairman, Division of Prosthodontics
University of Connecticut School of Dental Medicine
Farmington, Connecticut USA

Dr. Taylor is professor and head, Department of Reconstructive Sciences and chairman, Division of Prosthodontics at the University of Connecticut School of Dental Medicine. He is involved in both clinical and laboratory research and has published extensively in the prosthodontic literature. He is a past editor of the International Journal of Oral and Maxillofacial Implants. Dr. Taylor currently serves as executive director of as well as being past president of the American Board of Prosthodontics. He is also past president of the American College of Prosthodontists, the International College of Prosthodontists and the International Team for Implantology (ITI). He is past president of the Academy of Prosthodontics and currently serves as president of the Greater New York Academy of Prosthodontics.

Invited Speakers

Van P. Thompson, DDS, PhD
Professor, Tissue Engineering and Biophotonics
King's College London Dental Institute
London, UK

Known for his work on adhesion and bonded bridges at the University of Maryland and later for work on ceramic fatigue at New York University, he has published many articles and made numerous presentations on dental biomaterials in the U.S. and internationally. His current research areas include dentin caries activity, all-ceramic crown fatigue and fracture, dentin modification for bonding, engineering tissue response via scaffold architecture and practice based research (PEARL Network).



Aris Tripodakis
Athens, Greece

Dr. Tripodakis received his Dental Degree (1973) and his doctorate (1994) from the National and Kapodistrian University of Athens, Greece, and a Certificate of Prosthodontics (1979) and a Master of Science (1981) from Tufts University, Boston, USA. He is currently an Associate professor at the University of Athens, and a visiting Associate professor at Tufts University. Dr. Tripodakis has received two research awards from the Academy of Osseointegration (1995, 1998). He is an international lecturer, a published author, and an associate editor of the Journal of Japan Prosthodontic Research & Practice, and the Journal of Osseointegration. He has served as President for several prestigious dental organizations including the American Dental Society of Europe (2002-2003), the International College of Prosthodontists (2003-2005), the International College of Dentists-Eu (2007-2008) and the European Academy of Esthetic Dentistry (2012-2014).

Yoshihiro Tsukiyama, DDS, PhD
Section of Implant and Rehabilitative Dentistry
Division of Oral Rehabilitation
Faculty of Dental Science
Kyushu University
Maidashi, Higashi-ku, Fukuoka, Japan

Dr. Tsukiyama graduated Kyushu University School of Dentistry and proceeded to postgraduate school in 1987. He engaged in the research on stomatognathic function in the beginning of his career. He went to UCLA School of Dentistry between 1995 and 1997, and conducted researches on temporomandibular disorders (TMD) and orofacial pain. He is now engaging in researches on the clinical evaluation of prosthodontic treatment including dental implants, digital dentistry, sleep bruxism, occlusal dysesthesia, TMD and orofacial pain, and stomatognathic function.

He has been serving as officers of national and international academic societies, including Japan Prosthodontic Society, Japan Society of Orofacial Pain, Asian Acedemy of Craniomandibular Disorders, International Association for Dental Research, and has been contributing to the development of clinical guidelines. He is currently the Associate Professor at the Section of Implant and Rehabilitative Dentistry, Division of Oral Rehabilitation, Faculty of Dental Science, Kyushu University.

Frank Tuminelli, DMD
President of the American College of Prosthodontists
Program Director for Graduate Prosthodontics
New York Hospital Queens
(Presbyterian Health Care System)
Long Island, New York USA

Dr. Frank J Tuminelli received his DMD and Certificate in specialty training in Prosthodontics from Fairleigh Dickenson University School of Dental Medicine. Dr. Tuminelli is a Diplomate of the American Board of Prosthodontics. He is the Program Director for Graduate Prosthodontics at New York Hospital Queens (Presbyterian Health Care System). He served as the Program Director of Advanced Prosthodontics and Implantology, for the NSHLIJ Health System for ten years. Currently he is the President of the American College of Prosthodontists, and past president of The Greater New York Academy of Prosthodontics. Dr. Tuminelli holds Fellowship in ACP, GNYAP, NGS, FACD in addition to membership in numerous organizations. Dr. Tuminelli served as the Team Dentist for the New York Islanders for ten years. He speaks nationally and internationally, and has authored / coauthored multiple scientific papers. He maintains a private practice limited to Prosthodontics on Long Island.

Invited Speakers

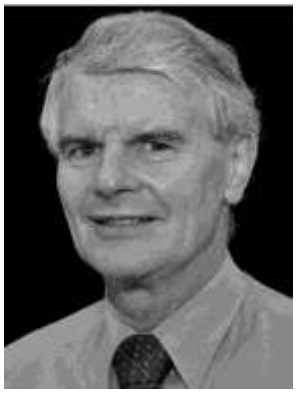
Paolo Vigolo
Vicenza, Italy

He gained a first class honours degree *cum laude* in Dentistry in 1986 from the University of Padova (Italy). In 1987 he won the "G.F.Cattozzo" scholarship, which allowed him to spend six months in the Department of Restorative Dentistry of Tufts University, Boston.

From 1988 to 1991 he was once again in the United States, where he obtained a Certificate of Advanced Graduate Studies in Prosthodontics and became Master of Science in Dentistry (Prosthodontics), both from Boston University Goldman School of Dental Medicine.

Since 1991, on his return to Italy, he has run his own dental clinic in Vicenza, where he is principally concerned with dental prostheses, implantology and gnatology. Since 1996 he has been Professor of Occlusion and Periodontal-Prosthetics in the Specialisation Course of Periodontology at the University of Padova; since 2000 part-time Assistant Professor of Periodontal-Prosthetics at the Department of Clinical Odontostomatology for the degree course in Dentistry at the University of Padova and since 2004 Professor in the Master Course of Osseointegration at the University of Padova. In 1992 he was assigned second place in the Annual Research Award of the American Academy of Maxillofacial Prosthetics. In 2001 he won the Judson C. Hickey Award in the Clinical Science and Research Category organised by the Editorial Council of The Journal of Prosthetic Dentistry.

Dr. Vigolo is the author of numerous publications in the field of prosthetics and implants.



Terry Walton AM, BDS (Syd), MDSc,(Syd) MS (Mich), FRACDS, FICD
Professor Affiliate in Clinical Dentistry
University of Sydney
Sydney, Australia

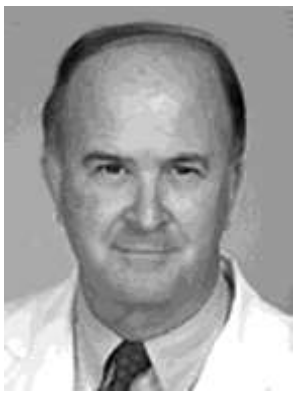
Dr Terry Walton graduated with Bachelor of Dental Surgery and Master of Dental Science degrees from the University of Sydney in 1974 and 1979 respectively; a Master of Science (Prosthodontics) degree from the University of Michigan in 1981and a Doctor of Dental Science degree from the University of Sydney 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.

Hans-Peter Weber
Professor and Chair of the Dept. of Prosthodontics
Tufts University School of Dental Medicine
Boston, Massachusetts USA

Dr. Weber is Professor and Chair of the Department of Prosthodontics at Tufts University, School of Dental Medicine. He holds dental degrees from the University of Berne, Switzerland (Dr. med. dent., 1976) and the Harvard School of Dental Medicine (DMD, 1990), as well as Certificates in Prosthodontics (1979) and Periodontology (1984) from the University of Berne. Dr. Weber's professional activities include teaching, patient care and clinical research in prosthodontics and implant dentistry. He has made numerous contributions to the scientific literature and is a regularly invited panelist at national and international meetings. Dr. Weber is an active member in several professional organizations. He is a Past President of the Academy of Prosthodontics and an Honorary Fellow of the American College of Prosthodontists. He serves as Co-Editior of "Clinical Oral Implants Research" and reviewer for several other peer-reviewed journals.

Glenn J. Wolfinger, DMD, FACP
Prosthodontist, Pi Dental Center
Fort Washington, Pennsylvania USA

Dr. Glenn Wolfinger is a Board Certified Prosthodontist practicing at Pi Dental Center in Fort Washington, Pennsylvania. Dr. Wolfinger is a Diplomate of the American Board of Prosthodontics, a Fellow and Diplomate in the International Congress of Oral Implantologists, a Fellow in the Academy of Osseointegration, and a Fellow in the American College of Prosthodontists. He has served on committees within the Academy of Osseointegration and has served as a member of the Board of Directors of the American College of Prosthodontists. Dr. Wolfinger graduated from Tufts University School of Dental Medicine, completed a general practice residency program at Albert Einstein Medical Center in Philadelphia, and then completed a residency in combined Prosthodontics through the VA and Harvard University School of Dental Medicine in Boston. He is Co-Director of the Institute For Facial Esthetics. Dr. Wolfinger is a Past-President of the Pennsylvania Prosthodontic Association, and a member of numerous other dental organizations. He has participated in numerous research projects, has lectured internationally, and has had many articles published in refereed journals.



George Zarb
Editor-in-Chief, International Journal of Prosthodontics
Emeritus Professor, University of Toronto
Past Co-President of the ICP
Toronto, Canada

George Zarb is the Editor-in-Chief of the International Journal of Prosthodontics. He is an Emeritus Professor at the University of Toronto and a Past co-President of the ICP. His academic career sought to advance Prosthodontic scholarship in patient care, education and research.

Invited Speakers

Yongsheng Zhou
Professor and Chairman
Department of Prosthodontics
Associate Dean of Peking University
School of Stomatology, China

Dr. Yongsheng Zhou is the professor and chairman of Department of Prosthodontics, associate dean of Peking University School of Stomatology (PKUSS). He achieved his DDS degree in PKUSS in 1994 and PhD in the same school in 1998. He accepted postdoctoral training in University of North Carolina Dental Research Center, Department of Prosthodontics for one year. Dr. Zhou is currently a Diplomate of the Chinese Prosthodontic Society. He is the vice-president of Chinese Society for Oral Maxillofacial Rehabilitation, a standing Committee member of Chinese Prosthodontic Society, Council member of Asian Academy of Prosthodontics, vice president of Beijing Prosthodontic Soceity, and commissioners of Beijing Municipal Stomatological Association, and National Board of Dental Examiners, etc. He is also a member of Education and Research Committee of International College of Prosthodontists. He is an editor for 6 academic journals in Stomatology. His Researches focus on the usage of bone tissue engineering based on adult stem cells to restore oral bone loss, material surface modification for improving osteogenesis, and digital technology, etc.

Nicola Zitzmann
Professor, Clinic for Periodontology
Endodontology & Cariology
University of Basel
Basel, Switzerland

N. Zitzmann is Professor at the Clinic for Periodontology, Endodontology and Cariology at the University of Basel (representative of the head of the Department). She is an ITI fellow and education delegate for Switzerland, board member of the International College of Prosthodontics, and member of the SSP and the SSRD.

N. Zitzmann received her Dental Degree in 1991. From 1994 to 1997, she completed the postgraduate program at the Department of Fixed and Removable Prosthodontics and Dental Material Sciences in Zurich. From 1997, N. Zitzmann worked as Assistant Professor at the Department of Fixed and Removable Prosthodontics at the University of Basel and completed the specialist training in Reconstructive Dentistry in 2001. She finished her habilitation thesis in prosthodontics in 2004. N. Zitzmann has been a Visiting Assistant at the Department of Periodontology at the University of Göteborg, Sweden, and achieved her Ph.D. degree in the field of Periodontology in 2006.

Lecture Presentations

Thursday, September 17th

Focus Session I: Keynote Presentations

1

WHAT CONSTITUTES MEANINGFUL RESEARCH IN IMPLANT DENTISTRY?

Eckert, Steve*
Professor Emeritus in Dentistry
Mayo Clinic College of Medicine
Edina, Minnesota USA

Abstract: This presentation will provide the audience with examples of classic literature that provided the foundation for the acceptance of dental implants as reliable devices that are used to retain and support dental prostheses. The classic literature will be carefully analyzed to identify the strengths and weaknesses associated with this literature. Alternative study designs will be discussed while considering the merits and deficiencies associated with different designs. Specifically, the practicality of studies that are designed to minimize investigator bias will be considered. Discussion of alternative designs that address issues of directness, consistency and precision will be provided as these relate to the overall strength of evidence. Likewise strength of evidence will be considered relative to clinical decision-making in implant dentistry.

2

IMPLANT RESTORATIONS IN THE ESTHETIC ZONE: CHALLENGES AND SOLUTIONS

Weber, Hans-Peter*
Professor and Chair of the Dept. of Prosthodontics
Tufts University School of Dental Medicine
Boston, Massachusetts USA

Abstract: The successful use of dental implant supported prostheses for the replacement of missing teeth in the esthetic zone is well documented. Challenges, however, do exist, and unsatisfactory treatment outcomes are not uncommon.

For single tooth replacements, there is convincing evidence that implant-supported restorations will lead to successful treatment outcomes if hard and soft tissues at the adjacent natural teeth as well as the implant site are intact. This assumes that guidelines for correct 3-dimensional implant placement according to prosthodontic requirements are properly followed.

In contrast, achieving an esthetically optimal result with fixed implant restorations to replace multiple missing adjacent teeth, is not as predictable. This is mainly due to the fact that that hard and soft tissue deficiencies are more extended and, hence, more difficult to manage. While the predictability of sufficient horizontal augmentation is high, vertical ridge augmentation or the replacement of missing inter-implant papillae with biological means continues to have its limitations.

This presentation will address the importance of pre-operative diagnostics, assessment of risk factors, and detailed treatment planning including staging of procedural steps in these complex indications. The advantages offered by using digital tools for these purposes will be highlighted, and newly available restorative components, materials, and techniques assessed on the basis of current scientific evidence. Clinical cases will serve to illustrate various treatment approaches.

3

INTERACTIVE TREATMENT PLANNING

Strub, Joerg*
Professor and Chair of the Department of Prosthodontics
Albert-Ludwigs University
Freiburg, Germany

Abstract: In this interactive treatment planning lecture, special focus will be given to the analysis and treatment of esthetic cases. The audience will gain confidence in treatment planning and know how to manage candidate cases. The presentation is divided into 4 parts. Basic parameters for esthetic evaluation, such as frame and reference as well as proportions and idealism will be outlined in the first part. It will help the clinician efficiently analyze the appearance of the patient. The second part will cover topics related to dental esthetics, including symmetry, diversity, perspective and illusion. The importance of gingival esthetics and its relation and harmony with dental esthetics will be emphasized in the third part. Finally, an interactive treatment planning will take place in the fourth part where critical thinking and competitiveness of the clinicians are needed to outline the most favorable treatment plan.

4

CERAMIC AND CERAMIC-LIKE MATERIALS AND WHY ENAMEL IS HARD TO BEAT

Thompson, Van*
Professor, Tissue Engineering and Biophotonics
King's College, London Dental Insistute
London, United Kingdom

Abstract: This presentation will focus on the latest in ceramics, oxide and glass-ceramics, and their physical properties compared with those based upon resin-ceramic technology The most recent laboratory and clinical outcomes will be reviewed.
Enamel is uniquely designed and clinically outperforms CAD/CAM materials. Enamel micro- and meso-structure (decussation) promoting damage tolerance and longevity will be discussed along with the esthetic role of these structures.

Learning Objectives:

- Discuss the interactions between ceramic slow crack growth, strength, fracture toughness and fatigue
- Describe the structure property and esthetic relationships for oxide ceramics, glass-ceramics and resin matrix ceramics
- Describe the clinical evidence for applications of these materials
- Describe the micro- and meso-structure of enamel and how esthetics and damage resistance are enhanced by this single cell derived structure

Concurrent Session- Geriatrics

5

AGE AND FRAILTY IN PROSTHODONTICS

Zarb, George*, MacEntee, Michael
Editor-in-Chief, International Journal of Prosthodontics
Emeritus Professor, University of Toronto
Past Co-President of the ICP
Toronto, Canada

Abstract: The aging population is shaping the global economy like no other, and prosthodontists need to meet this challenge appropriately and urgently. It is a challenge the goes beyond the usual private practice clinic that is so well-equipped to accommodate older people who are reasonably mobile and affluent. It is a challenge that must reach-out to people who are frail physically or cognitively or both, and who typically are housebound or restricted to a long-term care facility. It relates to a population restrained by comorbidity, polypharmacy and all too frequently financial hardship. This is the new context in which the potential of the prosthodontist on the interprofessional healthcare team needs careful consideration. Although the potential is not widely recognized, we are well-equipped by our professional knowledge and skills to work alongside other groups who contribute currently to managing the inconvenient demands of chronic disease and disability. However, our full potential and responsibility as individual prosthodontists and as the ICP will emerge only when we recognize that tooth loss and associated disorders need simple and relatively inexpensive strategies to sustain a tolerable and dignified quality of life for people who are coping with the realities of frailty and the proximity of death.

6

HOW AGE-RELATED ORAL CHANGES INFLUENCES PROSTHODONTICS?

Heo, Seong Joo*
Department of Prosthodontics
School of Dentistry, Seoul National University
Seoul, Republic of Korea

Purpose: To evaluate the effects of oral changes on prosthodontic treatments in elderly patients.

Material and Methods: A non-systematic review current literature was performed on electronic databases.

Results: Aging affects oral changes in older populations, but there are few scientific studies demonstrating the clinical relations or implications of these changes. Some but not all studies found that the thickness of oral epithelium atrophies with age, with recent investigations indicating that the epithelial cells flatten to reduce overall thickness. Furthermore, there is evidence that a drop in nutritional intake reduces the resistance of mucosa to denture irritation. The oral mucosa is protected by saliva, which is reduced by numerous medications, radiotherapy, Sjögren's syndrome and other disorders, and the subsequent xerostomia can disturb chewing, swallowing, speaking and denture-use. The teeth of people with decreased salivary flow are also more prone to dental caries unless protected by fluoride and regular clinical vigilance. Residual ridge resorption of the mandible following tooth loss is influenced by both local and systemic factors, but associations between patient-satisfaction and the quality of the residual ridge and dentures is weak. However, measurements of genetic variations of single nucleotide polymorphisms (SNP genotyping) before tooth extraction might help to identify people who are prone to extreme ridge resorption and increase the likelihood of successful prosthodontic treatment.

Conclusions: Oral changes in elderly patients should be carefully evaluated before prosthodontic treatments to achieve the successful results.

7

HOW FRAILTY INFLUENCES ORAL HEALTHCARE BEHAVIOR AND PERSPECTIVES OF ELDERS

Niesten, Dominique*
Radboud University Medical Center
Dentistry
Nijmegen, Netherlands

Keywords: frailty, oral health behavior

Purpose/Aim: Oral care and treatment should be adapted to the demands of the growing group of frail older people. Therefore, older people's perspectives on oral health and oral care were investigated, as was the way frailty influences these perpectives and their oral care behavior.

Materials and Methods: A qualitative research design was used. Fifty-one in-depth semi-structured interviews with Dutch frail older people were conducted. Interview topics were oral health related quality of life, oral and general health, oral health views and oral health care practices. Additional information was collected on age, gender, living situation, prosthetic status, self reported health and oral health, and an index for frailty. Thematic analysis was used to identify patterns in the data.

Results: Thematic analysis revealed that frail older people: 1) experience improved oral health related quality of life through a sense of pride and achievement, intactness and control, as an effect of having and having preserved their natural teeth. Especially the most severely frail with disabilities causing severe chronic pain or impaired fine-motor skills, value the good state of their teeth against the background of their declining health. 2) experience psychological and social barriers to oral health care when institutionalized. 3) favor long-established oral hygiene routines to sustain a sense of self-worth. 4) discontinue oral hygiene routines when burdened by severe health complaints, in particular chronic pain, low morale and low energy. Discontinuation of oral care is mostly explained by the elders accepting more oral pain or discomfort because they: a) lack belief in the results of dental visits and tooth cleaning; b) trivialize oral health and oral care in the general context of their impaired health and old age; and c) consciously use their sparse energy for priorities other than oral healthcare. Institutionalized elderly often discontinue oral care because of disorientation or inconveniencing social supports.

Conclusions: The level and type of frailty influences people’s perspectives on oral health and related behaviors. Frail elders associate oral hygiene and having a natural dentition with self-worth, but readily abandon dental visits with increasing frailty unless they feel that a dentist can relieve specific problems.

8

PROSTHODONTIC STATUS OF A CHINESE INSTITUTIONALIZED DENTATE ELDERLY POPULATION

Zhang, Qian*, Li, Tingting; Gerritsen, Anneloes; Witter, Dick; Bronkhorst, Ewald; Creugers, Nico.
Radboud University Nijmegen Medical Centre
Department of Oral Function and Prosthetic Dentistry, College of Dental Science
Nijmegen, Netherlands

Keywords: Dental functionality, tooth replacement, Institutionalized older people

Purpose/Aim: To investigate the prevalence of missing teeth and prosthodontic replacements in a Chinese institutionalized elderly population using a hierarchical dental functional classification (HDFC).

Materials and Methods: 512 elders (9% age 60-69 yrs, 29% 70-79 yrs, and 62% = 80 yrs) living in 8 nursing homes in Qingdao were included and categorized in the HDFC without and with tooth replacements. Location of present teeth, tooth replacements and posterior occluding pairs (POPs) were analyzed. In this classification system, the level of functionality is considered to be sufficient if the following criteria are met: at least 10 natural teeth in each jaw, a complete anterior region, premolar regions comprising 3 or 4 POPs, and in the molar region at least 1 POP bilaterally. Depending on tooth replacements, subjects were reclassified ('promoted') to categories reflecting higher level of functionality. 'Promotions' were considered indicators for prosthodontic effectiveness: 10 ‘points’ when achieving at least 10 teeth (including artificial teeth) in each jaw; 3 ‘points’ when achieving a complete anterior region; 2 ‘points’ when achieving 3 or 4 POPs in the premolar regions, and 1 ‘point’ when achieving at least 1 molar POP bilaterally.

Results: In the HDFC, based on presence of natural teeth, only 15,4% of the total sample met all criteria for a sufficient functional dentition, while 45,1% met none of the criteria. In the branch of 'at least 10 teeth in each jaw' the mean number of teeth present was 26.3 ± 2.9, and mean number of POPs was 6.2 ± 2.0. In the branch of 'less than 10 teeth in each jaw', these figures were 13.4 ± 5.5 and 1.1 ± 1.5 respectively. Of the 384 elders dentate in each jaw, 170 (44%) had no tooth replacement, whilst 214 (56%) had a fixed dental prosthesis (FDP) or a partial removable dental prosthesis (RDP) or both. FDPs replaced predominantly 1 or 2 teeth, RDPs 3 or more teeth. Based on the presence of natural plus artificial teeth, 46,1% of the sample met all criteria for a sufficient functional dentition, while 18,2% met none of the criteria. In the 'promoted' subjects, mean number of 'teeth' added by an FDP was 3.3 ± 2.4; for 'teeth' added by an RDP this was 11.6 ± 6.6. Per artificial tooth added, FDP had a significant higher promotion value than RDP (1.5 ± 1.1 vs. 0.8 ± 0.7; P < .001).

Conclusions: Approximately one-third of subjects (30,7%) met the criteria of DHFC for a functional dentition as a result of tooth replacement(s). RDPs were more effective for 'promotion' because they replaced a higher number of teeth, whilst FDPs were more effective per artificial tooth added.

9

DENTAL STATUS AND CHEWING ABILITY IN ELDERLY SUBJECTS IN SWEDEN

Carlsson, Gunnar*, Ekbäck, Gunnar; Johansson, Anders; Ordell, Sven; Unell, Lennart
Universities of Gothenburg, Örebro, Malmö In Sweden, and Bergen In Norway
Prosthetic Dentistry/Dental Materials Science
Goteborg, Sweden

Keywords: edentulism, general health, mastication

Purpose/Aim: To compare two cohorts of elderly people, 70 and 80 years old, with respect to dental status and self-assessed chewing ability. The hypotheses were: 1) dental status is associated with self-assessed chewing ability; 2) chewing ability is poorer among the 80- than the 70-year-old subjects.

Materials and Methods: Identical questionnaires containing 53 questions were in 2012 sent to all subjects born in 1942 and 1932, living in two Swedish counties. The questions were divided into socio-economic conditions (e.g. age, gender, occupation), general health, and oral conditions (e.g. satisfaction with teeth, oral problems, chewing ability, number of teeth, presence of prostheses). The response rate was 72.2 % for the 70- and 66.4 % for the 80-year-old subjects, with an average of 70.1 % for both samples, resulting in samples of 5697 70- and 2922 80-year-old subjects. Answers to questions on self-assessed chewing ability, dental status and some related factors have been analyzed.

Results: The dental status varied but was in general good; 72 % of the 70-and 60 % of the 80-year-old subjects reported that they had all or only single missing teeth. The rate of edentulism was 3 % and 7 %, respectively. Removable partial dentures were reported by 6 % and 10 % in the two age groups, implant treatment by 13 % in both age groups. The self-assessed chewing ability was mostly good and correlated with the number of teeth (Spearman rho = 0.46). A majority of the edentulous subjects assessed their chewing ability as very or rather good. Logistic regression showed that self-assessed chewing ability was significantly associated with a number of dental variables but also with dry mouth at daytime and general health.

Conclusions: Dental status was relatively good at both ages but somewhat poorer in the older cohort. A majority reported that they had all or only few missing teeth. The rate of edentulism was 3 % and 7 % in the two age groups. Several dental variables, dry mouth at daytime and being healthy were in both age groups significantly associated with self-assessed chewing ability, number of teeth showing the strongest association.

10

PROSTHODONTIC CHALLENGES IN AN AGING GLOBAL POPULATION

Owen, C Peter*
Professor Emeritus
Department of Oral Rehabilitation
School of Oral Health Science
Faculty of Health Sciences
University of the Witwatersrand
Johannesburg, South Africa

Abstract: To assess the possibility of providing a simpler but prosthodontically sound treatment philosophy for the majority of partially and completely edentate elderly who cannot afford anything other than acrylic-resin prostheses.

Methods: A critical review of the demand for dental prostheses and current techniques for replacing missing teeth was conducted in the epidemiological and prosthodontic literature.

Results: Tooth loss is not an inevitable consequence of age, but for the majority of the global population it remains a fact of life that accompanies old age. Even in highly developed communities there are those who, despite meticulous oral healthcare, succumb to oral pathogens and lose some if not all of their teeth. Oral implants have eased the burden of adapting to removable prostheses for many people with missing teeth; however, inequalities in income and healthcare deny this benefit to the vast majority of the globally population.

Conclusions: Rates of edentulism vary widely between countries and in different communities within the same country, but it is abundantly clear that there is an urgent need to address the burden of tooth loss in regions and communities where oral implants are currently unavailable.

11

PROSTHODONTIC MATERIALS FOR ELDERCARE

Maeda, Yoshinobu*
Chairman and Professor
Dept. of Prosthodontics, Gerodontology and Oral Rehabilitation
Osaka University Graduate School of Dentistry
Japan

Abstract: Prosthodontic materials for eldercare also should be simple and sustainable to work with. In other words, they should be easy to clean, easy to maintain, easy to modify or replace as well as easy to work even in restricted treatment or oral environments. Also these materials should be chosen and applied, not based on the age but on patient manual dexterity and cognitive functions. In this presentation, I will review current available materials for following prosthodontic interventions which will satisfy above mentioned requirements in relation to preventive and recovery measures for possible complications.

Materials for Impression: tray and impression and border molding. Possible complication is miss-swallowing.

Materials for Removable Partial Dentures: Denture base (resin or metal framework). Artificial teeth, retainers (clasp or attachment), rest seats and home care. Possible complications are plaque accumulation, denture stomatitis, fracture, water absorption, deformation.

Materials for Overdentures: Restoration for abutment and remaining teeth, root coping, reinforcement and home care. Possible complications are denture fracture, losing retention, caries and periodontal breakdown.

Materials for Implant Restorations: Implant bodies and abutments (two pieces, narrow or short) as well as home care. Possible complications are implantitis and losing implants.

12

PROSTHODONTICS FOR MULTIMORBID AND FRAIL ELDERS

Müller, Frauke*
Professor and Chair, Gerodontology and Removable Prosthodontics
University of Geneva
Geneva, Switzerland

Abstract: With three or more chronic diseases requiring drug intake a patient has to be considered multi-morbid. In addition geriatric patients often become fragile and show signs of fatigue, weight loss, weakness, anorexia and physical inactivity. The reduced mobility requires a special logistics for the dental practitioner but has to be also considered in the treatment planning. Polypharmacy often creates symptoms of a dry mouth as side effect, which impairs mastication, speech and denture wearing. Furthermore, cognitive impairment becomes more prevalent in geriatric patients. Especially when swallowing disorders are present, dental plaque may even present a risk for aspiration pneumonia. Dental care and treatment planning have to take into account the patient's compliance and physical resistance to long and invasive treatments. Treatment considerations may therefore have to deviate from an ideal academic treatment plan to a reasonable approach, thus taking into account the patients functional limitations and the cost-benefit ratio, and in palliative care even the life expectancy. In elderly and fragile patients it becomes often inevitable to further limit the treatment options to what is feasible, as they often have little motivation to enter long and invasive treatment procedures and their physical and mental condition may preclude both, undergoing the treatment procedures and handling sophisticated removable appliances. The decision to extract compromised teeth must always be taken in view of the possibility and necessity of tooth replacement, as functional, medical and financial issues may preclude denture insertion. Treatment considerations for the very old also include adapting the partial and full denture design to the features of the aged orofacial system. Prospective treatment planning should avoid comprehensive changes of dental prostheses in late life, when neuroplasticity is diminished and hinders adaptation.

13

ACCOMMODATING FRAIL PATIENTS IN A PROSTHODONTIC PRACTICE

Fitzpatrick, Brian*
Full-Time Specialist Practice
Brisbane, Australia

Abstract: The term "Frail" is variously defined as**:** easily led into evil, easily broken or destroyed (fragile) **or** physically weak. In addressing this topic in the overall context of Geriatrics, I would prefer to explore the notion that our Frail Patients are physically weak and fragile. The aging process is predictable in that if one survives long enough, life will inevitable deliver each of us into a state that can be defined as "Frail".

The state of "Frail" can be hurled upon an aging individual catastrophically through trauma or an acute disease process or otherwise be slow and pervasive. The destination remains unaltered and accompanying this state is frequently a degree of chronicity which demands health maintenance over a lengthy and unpredictable period.

If we agree with this notion of aging and the inevitable observation that an increasing number of our patients will find themselves in this frail situation, then logic and prudence suggest the preparation for this state must commence earlier in life. It would be difficult to argue other than simplicity in both the delivery and nature of prosthodontic services is essential for this cohort of Frail Patients.

All prosthodontic intervention and devices require maintenance and revision over time. Do we as a prosthodontic community pay enough attention to the design of our prosthodontic interventions such that flexibility and simplicity exists with the design of such devices to accommodate change when considering the aging process?

This presentation will explore the core principles of all prosthodontic services and discuss whether the prosthodontic community specifically and the dental community in general is adhering to conservative best prosthodontic principles when considering this notion of managing the "Frail Patient".

Concurrent Session- Practice

14

HANDLING IMPLANT COMPLICATIONS AND ALTERNATIVE TREATMENT OPTIONS FOR SINGLE TOOTH REPLACEMENT

Zitzmann, Nicola*
Professor, Clinic for Periodontology, Endodontology & Cariology
University of Basel
Basel, Switzerland

Abstract: Clinical problems with implant restorations comprise biological and technical complications and are often associated with esthetic and/or functional impairment. Implant malpositioning or infrapositioning following ongoing growth (when implants had been placed in young adults) are a clinical challenge particularly in single tooth implants in the maxillary anterior region. While technical advancement with mesostructures, adhesive techniques and the application of pink porcelain frequently facilitate esthetically acceptable implant restorations, implant repositioning or removal may be regarded as last resort in extreme situations.
Alternative treatment options for single tooth replacement comprise orthodontic space closure particularly in adolescence, and adhesive restorations either with a metal framework or full ceramics as a minimally invasive temporary or long-term treatment option.

Objectives of the Presentation:

1. consider technical options for restorative solutions in malpositioned implants
2. handle implant infrapositioning
3. know indications for treatment alternatives to avoid single tooth implants in young adults

15

DOES EDENTULISM LEAD TO SYSTEMIC CO-MORBID DISEASE?

Felton, David*
President of the Academy of Prosthodontics
Morgantown, West Virginia USA

Description: Globally, the rates of edentulism are declining, but this decline may be offset by an increase in life expectancy and population growth. Unfortunately, in economically depressed communities, it appears that tooth removal and immediate denture insertion still occur at high rates, even in patients in the 18=40 age cohort. Given the increases in life expectancy (currently 78.8 years in the US), what is the impact of edentulation in these patients over the course of their life? Tooth loss has been implicated in a number of systemic co-morbid conditions. This presentation will discuss the literature to determine if the denture wearing patient cohort is at an increased risk for malnutrition, obesity, cardiovascular disease, pulmonary diseases, cancer, dementia, and even death, when compared to patient with a remaining natural dentition. Recommendations for patient care in this debilitated population will be discussed.

Learning Objectives:

- understand the rate of complete edentulism on a global scale
- understand how tooth loss and denture wear can negatively impact a patient's general systemic health
- learn the relationship between edentulism and a multitude of systemic co-morbid diseases
- understand how edentulism can increase the risk of patients to all-cause mortality

16

MORPHOLOGY FIRST, A TECHNIQUE FOR SIMPLIFYING SPACE APPROPRIATION IN THE INTER-DISCIPLINARY CASE

Rotondo, Tony*
Private Practice, Prosthodontics
Brisbane, Australia

Abstract: Many dental conditions can create problems of space appropriation, these can include; microdontia and macrodontia; treatments involving canine substitution; patients where attrition, erosion and abrasion have altered tooth form and situations where teeth are not present or are in incorrect position. While space appropriation may be simple enough when managing a local problem, it becomes more complex as multiple teeth become involved. On the occasions where the entire dentition is affected visualizing appropriate tooth position is only part of the inter-disciplinary teams problem, anticipating inter-arch and inter-incisal relationships can make visualization and ultimately the orthodontic positioning of teeth in anticipation of restorative care, very difficult.

Determining the correct aesthetic position for the teeth as they relates to the face, has been discussed by many authors and for many, has become the first step in the development of an inter-disciplinary treatment plan.

While a simplification, the aesthetic composition typically begins with the establishment of an appropriate incisal edge position, followed the position of the incisal plane. This is usually determined by evaluating the relative position of the lips, both in repose and on smiling, to the visualized position of the anterior teeth, also considering horizontal reference planes. Conceptualisation of tooth size, shape and proportion is typically the next consideration. Once visualized this ideal can become the starting point of an interdisciplinary plan which may vary depending on each specialists thoughts regarding what is practically achievable.

This discussion will focus specifically on clinical situations where tooth morphology (shape, size, proportion) is required to be altered prosthetically to achieve an aesthetic and functional outcome.
A simple proposal to correct the morphological discrepancy first in an effort to facilitate orthodontic treatment will be described; this concept will be illustrated with case presentations.

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EVALUATION OF THERAPEUTICAL CHOICES IN IMPLANT PROSTHODONTICS

Vigolo, Paolo*
Italy

Abstract: In the past thirty years Implant Dentistry has been characterized by the development of new surgical and prosthetic protocols. The success of an implant is often due to its proper use as an abutment for the final restoration. All steps of the implant protocol, from the formulation of a proper treatment plan to the various clinical procedures (surgical and prosthetic techniques), are described by many studies published in the more recent international literature. This presentation will illustrate some of these results with particular emphasis placed on prosthetic aspects of an implant treatment.

18

THE PROSTHODONTIC DILEMMA – IS THE TAIL WAGGING THE DOG?

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Abstract: In the period since the period of the founding of the ICP there has been a quantum leap in prosthodontic treatment possibilities. The presentation will examine the lessons to be learned from previous generations while highlighting milestones of progress, together with pitfalls that await the unwary.
Osseointegration techniques have enhanced the quality of life for countless thousands while digital technology now extends from imaging through treatment planning to the actual production of the prosthesis-all within the lifetime of our organisation. Knowledge brings with it the burden of responsibility with challenges that accompany the ensuing potential benefits.

The siren call of mindless technique worship has always tempted our specialty, but the hazards are even greater nowadays with such powerful armamentaria at our disposal. These exciting therapeutic methods place the burden of responsibility on those who employ them.

Course Objectives:

1. To understand the significant developments within our speciality
2. To profit from the lessons of our prosthodontic pioneers
3. To devise maximum benefits from modern techniques

19

MARGINAL GAP. WHAT IS REALITY AND WHAT IS GOAL?

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External Teacher, Olomouc Univeristy
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Abstract: Marginal gap. What is reality, and what is the goal. Why we talk about it all the time?
Every dentist and technician would like to deliver their patients exact and beautiful restorations. All clinicians claim they do, but the reality is different. In his presentation the author will focus on Fixed Restorations marginal gap through the following points: reality, what the literature say, own expertise, and goals. By analyzing all the previous four points, will try to suggest a realistic range of acceptance of the marginal gap.

Lecture Objectives:
1- Suggest a realistic range of acceptance of the marginal gap.
2- What we mean by minimal marginal gap?

20

EVIDENCE-BASED RESTORATION OF ENDODONTICALLY TREATED TEETH

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Turin, Italy

Abstract: This presentation will assess the options for reconstructing endodontically treated teeth.
Necessity of post placement, choice of materials, need for coronal coverage, and choice of final restorations will be discussed using evidence based criteria.
Emphasis will be placed on treatments based on relevant clinical trials rather than bio-mechanical theories derived from in-vitro studies.

21

TREATING THE DISCOLORED TEETH

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Abstract: Any alteration to the enamel, dentine or pulp of the teeth, can cause an alteration of the appearance of the tooth. Treatments of discolored teeth comprise of a panoply of options that ranges from whitening to an artificial restoration or even extraction. Closely matching natural teeth with an artificial restoration can be one of the most challenging procedures in restorative dentistry.

Color may play a lesser role in determining the clinical success of dental restorations; however, the psychological esthetic impact may, in itself, play a crucial role in the overall acceptance by the patient. Shade selection and optical properties of each dental material determines it resemblance to the natural tooth. The relative translucency of the tooth to be matched as well as the material selected must coincide. A proper understanding of the optical properties of the material used can help clinicians in matching ceramic restorations to natural teeth.

Through a series of clinical case reviews we will aim at highlighting the key elements that determine material selection such as mechanical properties and optical properties, while providing clinical recommendations for ensuring a good shade match and a durable successful restoration for your patients.

22

UNCONVENTIONAL IMPLANT PLACEMENT THROUGH IMPACTED UPPER CANINES WITH THE USE OF COMPUTER GUIDANCE: A NOVEL TWO-STAGE APPROACH

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Abstract: Dental implants are building blocks in Prosthodontics and created a significant change in the treatment strategies. Replacing a missing tooth or an irrational tooth with an implant supported prosthesis is daily practice and first choice in most events. Cases where placing an implant is not possible due to anatomical limitations and deficiencies like impacted teeth, lacerated roots, the infra alveolar nerve or lack of bone, demand an alternative treatment or a preparative procedure. Upper maxillary impacted canines usually influence the pre maxillary area preventing the normal development and arrangement of the upper anterior six teeth. In the case presented, 2 impacted upper maxillary canines in a 19 years old female patient, impaired aesthetics and did not allow implant placement to replace the retained canine deciduous teeth. Eruption of the impacted canines was not an option and so an alternative way was sought. It was decided to use a CT scan and a computer planning software for drilling a wide way through the canines, preserve the osteotomy drill with a bone substitute and wait for healing. After proper healing time, a new CT scan was performed, and after confirming the results of the prepared sites, implant placement was planned at each of the sites. The implants were planned and placed through the prepared path created in the first drilling event, with no contact with the remnants of the impacted canines. The implants were restored after loading with an implant supported crown.

23

NORTH-ITALIAN ACCESS TO ORAL HEALTH AFTER THE ECONOMICAL GLOBAL CRISIS

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Aim: In Italy dentistry is mainly performed through private practice and only a little is supplied by the National Health System. Thus, oral health is often overlooked by those families with economic difficulty. Voluntary associations are born to provide free dental care to disadvantaged patients. Over the last years, not only immigrants, but also Italians with severe economic problems have started to avail themselves of these associations, where dental prosthesis is free. The aim of the study is to evaluate whether and how the type of patients turning to these structures in the city of Turin, as representative for North-Italy, had changed.

Materials and Methods: Data from 2009 ton2014 concerning therapies and the number of patients who have showed up for a first visit over the years have been collected. Many aspects are taken into account: schedules, number of dental chairs, number of volunteers, treatment access modalities, dental provided therapies, number of patients coming for a first visit over the years, percentage of Italian patients, update of computerized medical records.

Results: The relationship between resources and patients has remained unvaried, thanks to the remarkable medical staff increase. Interestingly, over the years the type of therapies has changed and extractions have shown a statistically significant increase. Patients mean age has remained basically unvaried. Female presence has increased in a statistically significant way. From 2009 to 2013 requests from Italians have increased: incidence has turned from 30,4% to 40,7%. The first data given by the associations reveal that in the first semester of 2014 incidence is way above, reaching 56%.

Conclusions: In the light of these data, institutions taken into account have shown a wide offer to the weakest groups of the population, increasing the number of volunteers and the quality of the services and the structures. However, the study also shows the dramatic consequences of global crisis, in particular the increasing number of disadvantaged Italians showing up to these associations, especially those belonging to categories once not considered at risk; this context is evident all over Italy and especially in the North where the economic crisis had a bigger impact.

24

THE CRITERIA OF ATTRACTIVE SMILE

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Abstract: The goal of esthetic dentistry is to make beautiful arrangement of maxillofacial structures when smiling because when people smile, dental structures are shown the most. A high proportion of individuals seek dental care because of esthetic reasons, that is, the desire to look more attractive by improving their smiles.

The evaluation of esthetics is somewhat difficult because that is very subjective in its nature. However, it is widely accepted in a variety of fields. For example, in the sports competition like figure skating, not only technical aspects but also esthetics is evaluated. We used evaluation method as to assess smile as objectively as possible, such as, the evaluation committee.

We have been trying to find out the criteria of the attractive smile since 1991. Studies include not only geometric analysis of the smile but also the relationship between the smile and the personality, and effect of the smile exercise. In an attractive smile, the full shape of the maxillary anterior teeth was shown between the upper and lower lip, the upper lip curved upward or straight, the maxillary anterior incisal curve was parallel to the lower lip, and teeth were displayed to the first molar. Personality traits such as Warmth, Calmness, Extroversion and Low Anxiety were positively related to an attractive smile. Dr. Gibson's smile exercise was an effective method to improve the esthetic level of the smile if patients exercise continuously.

Recently, we studied differences of the smile according to ethnicity and gender and the change of the smile with the passage of time. Caucasian females had a significantly greater tooth arc than Caucasian males, Korean females, or Korean males. And lip arcs of Caucasians were significantly greater than that of Koreans. The lip arcs were greater than the tooth arcs in both race and gender. The smile have become more elegant compared to 20 years ago, which is a significant change of smile.

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CERAMIC VENEERS - VISUALIZE BEFORE YOU ACTUALIZE..!

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Keywords: esthetics, veneers smile

Case Presentation: in this esthetic driven world, everyone is conscious as to how they look and if any corrections have to be incorporated, it is imperative to make the patient visualize the final outcome even before the work begins.

Even though mock ups and temporaries have solved the purpose of visualization, their judicious use alongwith a three dimensional aspect of visualization is of utmost importance. Therefore, digital smile designing concept was also incorporated to compare and contrast the case selection and treatment planning with / without this tool.

Patient acceptance was increased dramatically with the final look being modified and customized based on the patient desires - thereby making the patient an active participant in smile designing.

The bridge between expectations and reality was met with use of mock ups, temporaries and smile designing tool that helped patients accept, authenticate and give a go-ahead for the treatment with more confidence in the procedure and the dentist.

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AN INNOVATIVE APPROACH TO ZYGOMATIC IMPLANT PLACEMENT IN MAXILLECTOMY DEFECTS

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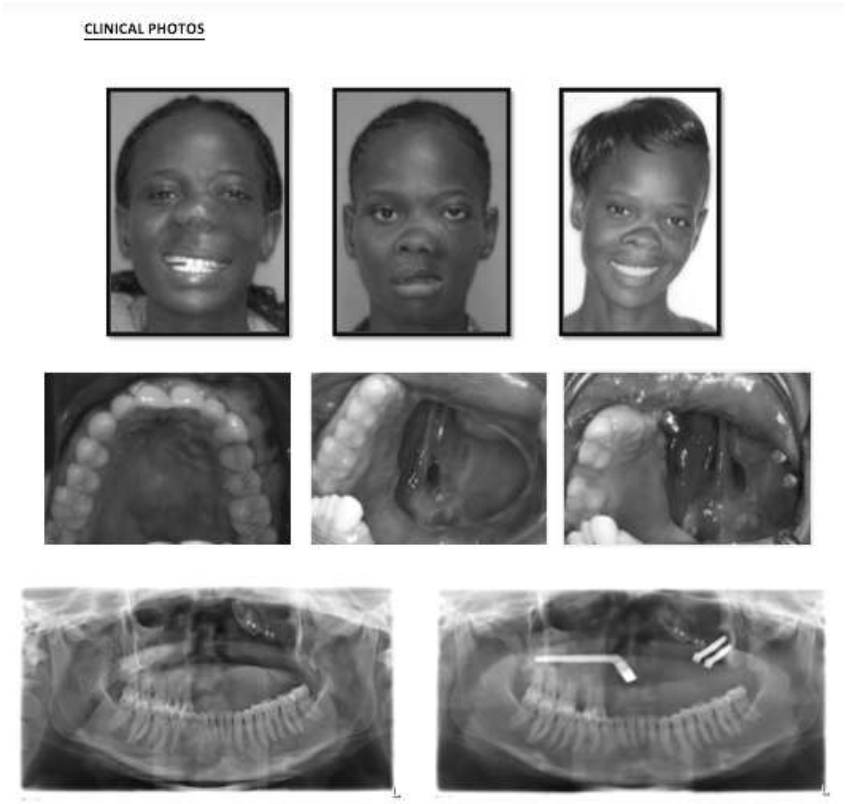
Case Presentation: This case demonstrates an innovative approach to the rehabilitation of an acquired maxillectomy defect following the resection of an ossifying fibroma. The management of this patient illustrates the communication that is required between the surgical and prosthodontic team and the multidisciplinary approach that must be adopted when treating these cases. The late presentation of this neoplasm resulted in an extensive mass that extended from the midline of the maxilla intra-orally to the pterygoid plates posteriorly and the inferior orbital rim margin superiorly. The extent of the resection created a defect with a severely compromised stability triangle, which carries a high morbidity for standard prosthodontic obturation techniques. The obturation of these defects has evolved over the years and the introduction of osseointegrated implants and has revolutionised the management of maxillectomy defects. It was therefore decided to provide this patient with an implant-supported prosthesis by placing oncology (modified zygomatic implants) implants into her zygomatic process on the side of the defect. The oncology implant is a modified design of Southern Implants' zygomatic implant that has been specifically manufactured for maxillectomy defects. However, these implants required cross arch splinting to prevent mechanical and biological complications. In hemi-maxillectomy cases such as the one being presented, this often means that perfectly healthy teeth would usually be sacrificed in order to place osseointegrated dental implants into the remaining alveolus to allow for the required cross arch splinting. The innovative approach employed in this case allowed for the preservation of the remaining healthy teeth by placing a zygomatic implant from the defect margin adjacent to the remaining alveolus, traversing the alveolus above the roots of the remaining dentition into the right zygomatic process. This case illustrates some of the challenges experienced in the treatment of these defects and highlights the continuum of treatment approach that is adopted in our department to optimise these patients' quality of life.



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DIGITAL TREATMENT PLANNING IN MAXILLOFACIAL PROSTHETICS: A CASE REPORT

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Case Presentation: Treatment planning of maxillofacial prosthetics has rapidly advanced by digital technology. This advancement has changed patients' expectations towards the functional and aesthetics outcome of maxillofacial prosthetic treatments. The purpose of this case report is to discuss the role of digital technology in the treatment planning and achievement for a patient with complex maxillofacial prosthetic needs.

A 75-year-old male patient was referred to the maxillofacial prosthetics clinic at Tokyo Medical and Dental University for maxillofacial prosthetic rehabilitation. He was diagnosed with squamous cell carcinoma in the left maxillary sinus. The tumor was surgically resected causing extensive tissue lose affecting his oral function and aesthetics. The patient expects prosthetic rehabilitation that fulfilling his function, aesthetics, and psychosocial activities. Therefore, four key elements were considered in digital treatment planning for this patient;

1. Visualization: The soft tissue and boney defected areas were three-dimensionally digitized using Computed Tomography (CT) that was taken post-surgery. Extra-oral soft tissue were also digitized by using three-dimensional (3D) digital photography. Maxillary and mandibular casts were digitized by using laser scanner. From these data, virtual and solid 3D models were created for treatment planning options.
2. Design: Based on the 3D virtual and solid models, various intra and extra oral prostheses were virtually designed using 3D designing software. These designs were discussed with the patient to find the most suitable prosthesis design that admire his function and aesthetics expectations. Consequently, an obturator prosthesis was planned intra orally to restore function and aesthetics, an orbital prosthesis was also planned to restore aesthetics for this patient.
3. Manufacturing: The ultimate design for both prostheses were molded in wax by stereolithography using 3D printer and then conventionally processed.
4. Evaluation: The definitive prostheses were evaluated regarding fitting, function, and aesthetics.

Digital treatment planning has improved the patient's expectations of treatment options by virtual visualization. It has successfully managed complex maxillofacial defects and accelerated the treatment delivery by 3D designing and manufacturing. Consequently, the patient's function and aesthetics were improved.

This case report confirms the applicability of digital treatment planning in managing patients with complex maxillofacial prosthetic needs.

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IMMEDIATELY-LOADED PROSTHESES IN THE EDENTULOUS PATIENT: NOVEL DIAGNOSTIC INFORMATION TRANSFER

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Keywords: Immediate-loading, edentulous, jaw-relation

Case Presentation: The final prosthodontic diagnosis for implant-supported prostheses in edentulous patients requires the use of diagnostic dentures. This not only affords patients the opportunity of an aesthetic preview of tooth shape and arrangement, but in addition, technical aspects such the maxillo-mandibular relationship can be determined and assessed over a period of time to determine a patient-specific treatment position. The vertical dimension of occlusion is of particular importance as it is directly related to speech and comfort. The difficulty arises when this information is to be transferred to the implant-supported prosthesis. Very little has been published describing methods of accurately transferring this prosthodontic diagnostic information. Intra-operatively, there is a lack of a reference points when using conventional tissue-borne jaw-relation guides. Surgically, preparation for implant sites requires raising of mucoperiosteal flaps and alveoplasty, and this prevents the accurate seating of such guides. These guides are further limited in providing information related to tooth position and the occlusal plane, and recording of the maxillo-mandibular treatment position is particularly unpredictable while the patient is in a supine position under general anaesthetic. The management of this patient shows a progression from presentation, a prosthodontically driven diagnosis for implant planning, and the rationale and fabrication of a novel device used to accurately transfer the prosthodontic diagnostic work-up to immediately loaded implant-supported prostheses.

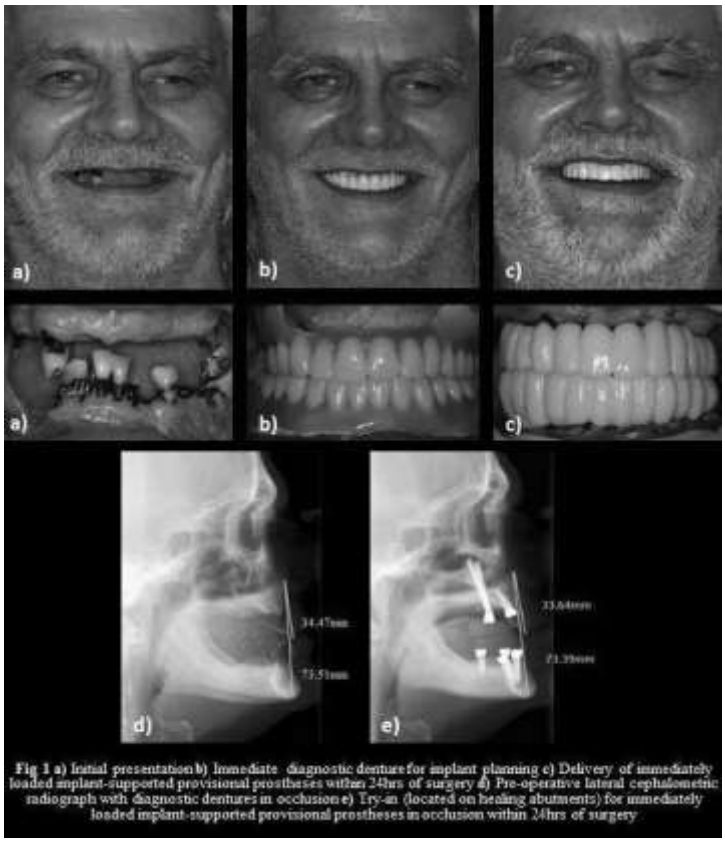

Fig 1 a) Initial presentation b) Immediate diagnostic denture for implant planning c) Delivery of immediately loaded implant-supported provisional prostheses within 24hrs of surgery d) Pre-operative lateral cephalometric radiograph with diagnostic dentures in occlusion e) Try-in (located on healing abutments) for immediately loaded implant-supported provisional prostheses in occlusion within 24hrs of surgery

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USING DENTAL IMPLANTS AS ORTHODONTIC ANCHORAGE

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Keywords: insufficient posterior support, orthodontic anchorage, dental implants

Purpose: To describe an optimized treatment plan and sequence for a patient who needs periodontic, orthodontic, and prosthodontic combined therapy. Our presentation will describe using definitive implants as orthodontic anchorage and posterior support during the rehabilitation.

Patient's Brief History: A 57 year-old male came to our hospital for treating gum problems and restoring chewing functions. He lost several posterior teeth due to severe mobility in the last 5 years. He also suffered from recurrent gingival bleeding for several months. His medical history was uneventful, and he had smoked for more than 30 years and quitted 3 years ago.

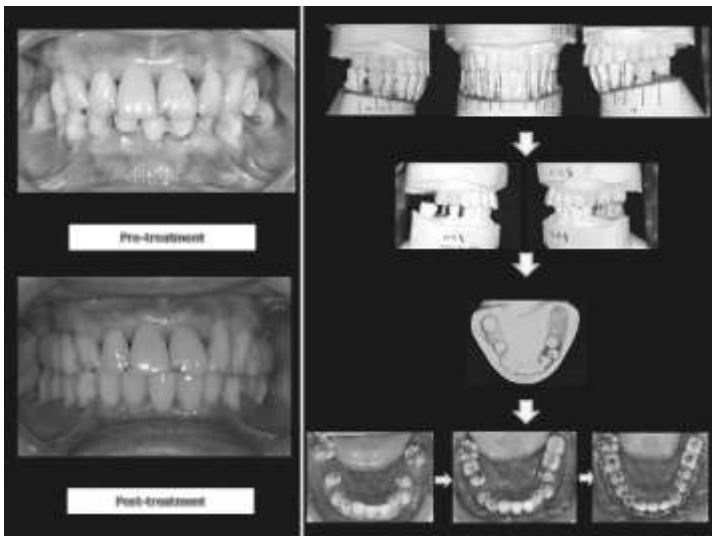
Local Findings and Diagnosis: He had poor oral hygiene, generalized periodontal destruction and multiple missing teeth, insufficient posterior support, and mal-positioned mandibular teeth. He also had excessive overjet and overbite. Besides, his maxillary anterior teeth were severely worn at palatal surfaces. His skeletal relationship was Angle's class I with low Frankfort-mandibular plane angle.

Goals of Treatment Were: (1) controlling the periodontal diseases, (2) creating proper tooth alignment to improve oral hygiene maintenance, and (3) restoring posterior support and chewing function.

Treatment Plan: After phase I and phase II periodontal treatments were finished, prosthodontic rehabilitation combined with orthodontic treatment was suggested for stable occlusion and easy oral hygiene maintenance in the future. The treatment option of single arch (mandible) orthodontic treatment was selected. As the positions of remaining maxillary teeth would not be changed and mandibular teeth would be moved accordingly, the ideal position of definitive implants could be planned on pre-treatment and orthodontic set-up models using cross-mounting technique. Implantation early was recommended because the residual teeth could not provide adequate anchorage and posterior support during orthodontic treatment. Thus, the definitive implants of both arches were placed according to planned positions before the orthodontic treatment. Then, provisional implant restorations were fabricated which provided the orthodontic anchorages and posterior support to accelerate the speed of orthodontic treatment.

Results: After mandibular teeth were well aligned, final prostheses were fabricated and an occlusal splint was delivered. He has been under regular follow-up every 3 months for 15 months and his condition was stable.

Conclusion: When there are not enough teeth as orthodontic anchorages in cases with loss of posterior support, orthodontic treatment can be inefficacy and time-consuming. Provisional implants may be used as anchorages if the precise implant positions for rehabilitation cannot be defined. However, through careful planning and using cross mounting technique to determine the implant position, the definitive implants could be placed first and used as orthodontic anchorages during rehabilitation.



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COMPLEX RESTORATIVE MANAGEMENT OF A PATIENT WITH HYPERSENSITIVE PHARYNGEAL REFLEX

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Keywords: Fixed, implants, pharyngeal

Introduction: Prosthodontic and implant management for a patient with a hypersensitive pharyngeal reflex can be complicated and may limit the patient's ability to accept dental care.

Case Presentation: Multidisciplinary management and prosthodontic oral rehabilitation was employed for management of a patient with a terminal maxillary dentition, who presented with a hypersensitive pharyngeal reflex. The patient had refused a removable maxillary prosthesis as a long term treatment option and a fixed-full arch implant supported prosthesis was considered.

Management Stages:
a) The hypersensitive pharyngeal reflex needed to be managed before tooth extraction. Desensitisation techniques, psychologist management and training prostheses were constructed and implemented to assist the alleviation of the hypersensitive pharyngeal reflex.
b) Once the training prosthesis was tolerated by the patient and the severity of the hypersensitive pharyngeal reflex was reduced to allow dental management to be undertaken, tooth extraction and an immediate complete maxillary denture was issued and the patient monitored for up to 12 months.
c) Planning of the full-arch fixed implant support prosthesis was then considered. Implant placement followed a 2 stage protocol and conventional loading of the implants was followed. Provisionalisation was undertaken and followed for 6 months.
d) The definitive titanium–acrylic prosthesis was issued once all clinical parameters were considered satisfactory, adequate oral hygiene practices demonstrated and patient satisfaction achieved.
e) Follow up over 2 years has indicated that the initial gains in overcoming the gag reflex was consolidated and optimum function was sustained.

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AN IMPLANT-SUPPORTED LOCATOR AND MAGNETIC OVERDENTURE CASE

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Keywords: overdenture, locator, magnetic attachment

Main Complaint: the patient's old denture is broken, she asks for a new one

Current History: She had her old denture for many years and currently extracted several teeth. She is unsatisfied with the old denture because it is loosen

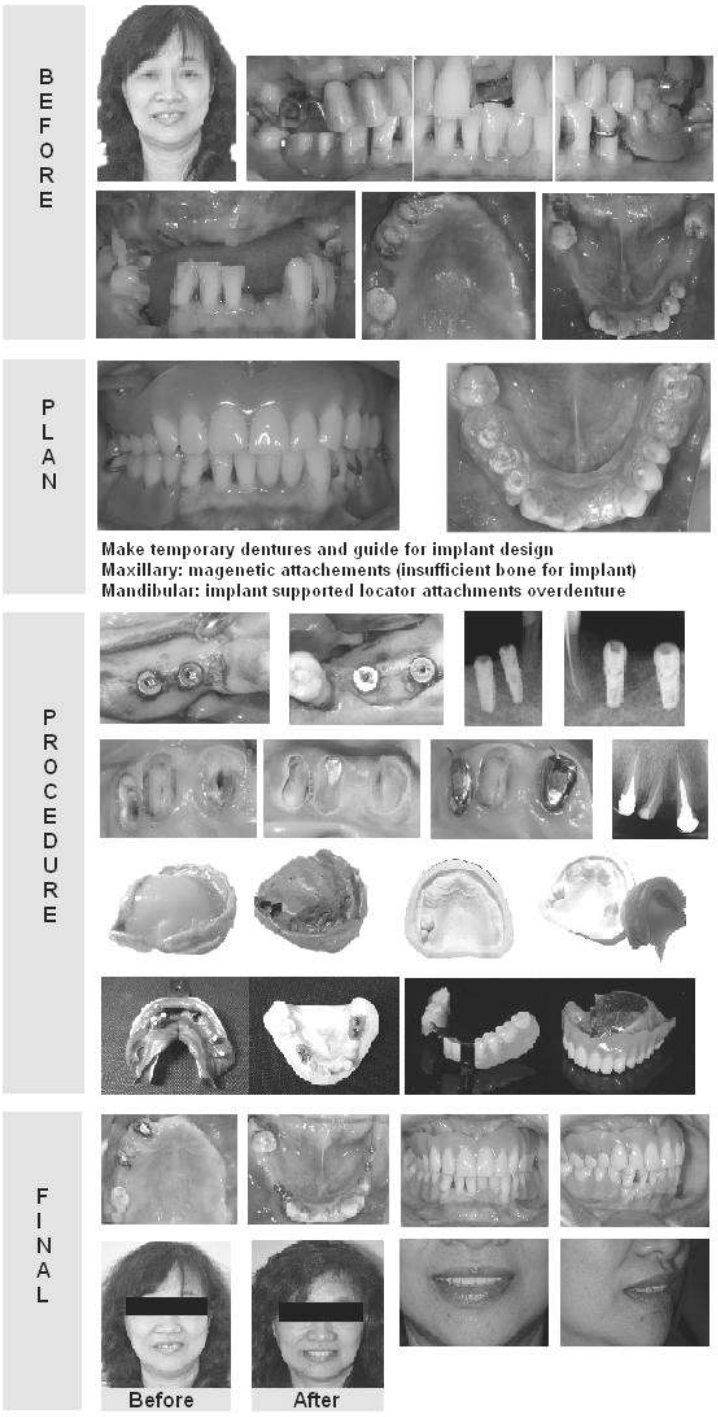
Past History: Periodontitis for decades and under regular periodontic treatment every half year. Denied of systematic disease and allergies

Clinical Examinations: 11,12,16,21-28,36,37,44-46 missing; 13-15,31,32 residual root, loose (-); 34,35 resin filling with secondary caries beneath gingiva 1mm, loose I degree; 17,18 loose II degree; 38.47 loose II degree, incline to mesial; General oral health is good, BOP (-), left maxillary bone astrophy X-ray

Examination: CT shows insufficient bone in left maxillary arch (bone height 3-4mm, width 5-6mm), sufficient bone in mandibular arch (bone height 12-14mm, width 5-6mm)

Diagnosis: 1. Maxillary and mandibular denture defect 2. 13,14,15,31,32 teeth defect 3. 34,35 secondary caries 4. chronic periodontitis

Treatment Plan: 1. Maxillary arch: Plan A: implant-supported overdenture. Need place implant+GBR on left arch, use implant supported locator or magnetic attachments on both side, and overdenture Plan B: place 2 magnetic attachments on right side and overdenture Due to insufficient bone (longer treatment time, fees and risks), patient choose plan B 2. Mandibular arch: Plan A: implant-supported fixed bridge extract residual root 31,41,34,35 place implants at 36,37,45,46,31, and make fixed bridge Plan B: implant-supported locator overdenture no need extract residual root. place implant at 36,37,45,46, use locator overdenture Our patient doesn't want teeth to be extracted, so she choose plan B All the treatment procedures are imformed shortly with the attached file.



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PROSTHODONTIC REHABILITATION FOR THE PATIENT SUFFERED FROM BRONJ

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Keywords: bisphosphonate, BRONJ

Case Presentation: Bisphosphonates (BPs) are non-metabolic synthetic analogs of pyrophosphates, and approved to treat osteoporosis and osteopenia. Bisphosphonate-related osteonecrosis of the jaw (BRONJ) has been characterized as a main side effect of BP treatment, showing marked suppression of bone remodeling with a break in the oral mucosa, and leads to bone death. BRONJ regions may remain silent until the occurrence of a triggering event, such as an invasive dental procedures, infection, or mechanical trauma to the jaw bone. The treatment strategies can be divided into conservative and surgical approaches, but there is currently no gold standard for the treatment of BRONJ. In this case presentation, we are going to report the brief review about the treatment of BRONJ and the cases of prosthodontic treatments after surgical intervention for the management of BRONJ.

Friday, September 18th

Concurrent Session- Implant Prosthodontics A

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BRAIN-GUIDED & COMPUTER-GUIDED IMPLANT DENTISTRY

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Abstract: Over the past 10 years, continuous improvements to Computer-Guided Surgery and CAD/CAM technology over this time, has started to challenge the technique of implant placement, fabricating implant prostheses, and abutments using conventional methods. As for the loading protocols, The scientific evidence for 'immediate loading' in implant dentistry except on partially edentulous maxilla is sufficient. But, in some of clinical reports, immediate loading even in posterior maxilla sometimes show good results under limited conditions as follows, 1) Utilize micro-rough surface treated implants, 2) Maintain around 30~55Ncm of insertion torque on implant surgery, and 3) Confirm the implant bed of at least 5mm remaining bone thickness vertically, when cortical bone fixation technique(bicortical fixation) with sinus floor elevation is applied, In only those cases that primary stability effect is expected, which depends on pure physical force and no micro-movement what so ever, during 1 week post-insertion and etc. immediate loading by connecting immediate functional restorations is possible.
The purpose of this presentation is to answer the focused question: "How do Computer-Guided Surgery and CAD/CAM implant prostheses in patients with missing teeth, who have one or more dental implants, perform compared to conventionally placed implant as well as conventionally fabricated implant prostheses, when assessing aesthetics, complications (biologic and mechanical), patient satisfaction and risk factors."

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MICRO-MECHANICAL PROPERTIES OF PERI-IMPLANT BONE IN RETRIEVED DENTAL IMPLANTS

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Keywords: implant, nanoindentation, mechanical properties

Purpose/Aim: Masticatory stress distribution at the peri-implant bone may continuously alter interfacial bone mineral density distribution even after osseointegration is completed. We hypothesized that the alteration of bone mineral density changes mechanical properties of bone tissue at the implant interface, which are responsible for determining mechanical stability of the implant system.

Materials and Methods: Failed implants due to fracture of fixtures were retrieved by trephine bur including interfacial bone. The specimens were embedded in resin block and prepared with Exact system for histologic and micro-mechanical property analysis. Histomorphometric analysis was perfomed by measuring BIC ratio at implant interface. Then modulus elasticity (E) and surface hardness (H) of peri-implant interfacial bone were measured by nanoindenter.

Results: Histomorphometric analysis showed intimate bone contact at thread in all retrieved implant specimens. There was a strong positive correlation between E and H of interfacial bone. No difference in mechanical properties according to the depth of thread. In the thread, the bone located upper flank has the highest mechanical properties however; overall mechanical properties inside of thread were same.

Conclusions: Titanium implants were well integrated over the long term period regardless of thread design and surface morphology. Peri-implant bone showed continuous remodeling and bone quality can be anayzed by nanoindentation method.

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SJÖGREN'S AND IMPLANTS: GOOD NEWS AND BAD NEWS

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Discipline of Prosthodontics
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Keywords: Sjögren's, implants, xerostomia/hyposalivation

Purpose/Aim: Sjögren's Syndrome (SS) is a chronic, slowly progressive, poorly understood, multi-system, inflammatory autoimmune disorder primarily affecting the lacrimal and salivary glands. As a result of hyposalivation, the oral environment is severely affected leading to difficulty swallowing, speaking, tasting, eating, and chewing as well as to increased dental caries, tooth breakage, and tooth loss. With the success of dental implants as a modality to replace missing teeth, the knee-jerk reaction of dentists has frequently been to place implants to restore the dentition of SS patients. The limited evidence in the literature suggests that this is a viable option. The purpose of the study was to determine whether the success rate of dental implant therapy in SS patients was comparable to those without xerostomia/hyposalivation.

Materials and Methods: 11 SS patients (45 implants in total) whose dentition had been restored with dental implants and whose prostheses had been in function for at least 2 years were recruited into the retrospective pilot study. Age, gender, and implant sites (45 implants in total) were matched with non-xerostomia patients. Radiographs of the implant sites were digitized and peri-implant bone level measurements were made using ImageJ software. Success of the implants was based solely on radiographic evidence as per previous criteria (bone loss <0.2 mm annually after the implant's first year of service; Albrektson et al., 1986). Satisfaction, Xerostomia Index, and Quality of Life questionnaires were completed by participants.

Results: While there was a 100% success rate of the 45 implants in non-xerostomia patients after 2 or more years in function, there was only a 59.4% success rate in the SS patients. All participants were satisfied with their implant therapy and felt that their quality of life had improved as a result. No participants reported any effect on salivary flow as a result of implant therapy.

Conclusions: SS patients experienced more rapid bone resorption around their implants than those without xerostomia and had a higher implant failure rate compared to non-SS patients. Although the peri-implant bone loss was significantly greater in the SS patients, they were generally reluctant to undergo any further surgical treatment. While implant therapy is a viable option for SS patients, they must be informed prior to the initiation of implant therapy that there may be greater bone loss around the implants with the potential of loss of implants. Reasons for the rapid bone loss continue to be investigated.

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CLINICAL SUCCESS OF ZIRCONIA IMPLANT ABUTMENTS: 5-YEAR RESULTS

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Keywords: single implant, zirconia abutment, titanium particles

Purpose/Aim: To investigate the clinical success of single maxillary implants restored with zirconia abutments and the influence of any wear at the titanium-zirconia implant-abutment interfaces on the peri-implant health and prosthodontic outcomes over 5 years in function.

Materials and Methods: Sixteen participants who were part of the original cohort of the prospective clinical trial (27 participants) attended the 5-year recall. These participants were rehabilitated with single implant crowns at the aesthetic zone to immediately replace their unrestorable maxillary tooth. The clinical data collection included the changes in the marginal bone levels, peri-implant mucosa health and prosthodontic maintenance/complication issues. In addition to this, the screw-retained all-ceramic crowns were temporarily removed to assess any presence of foreign particles at the implant-abutment interface as well as to evaluate the surface stability of the zirconia abutments which have been in function for 5 years.

Results: The changes in the marginal bone levels and implant stability were within the acceptable limit according to the current criteria. Low plaque and gingival inflammation scores were observed with shallow probing depths. Scanning electron microscopy and energy-dispersive spectroscopy revealed presence of metallic particles including titanium at the implant-abutment interfaces. The monoclinic content of the zirconia abutments did not change significantly during the 5 years of functional loading. There were also no reports of screw loosening or fracture of all-ceramic implant crowns.

Conclusions: Single maxillary titanium implants restored with zirconia abutments displayed successful clinical outcomes. Although there were evidence of titanium particles present at the implant-abutment interface, this did not negatively affect the peri-implant health. Zirconia abutments used in this study demonstrated a low proportion of monoclinic phase and no fracture after 5 years of functional loading suggesting their clinical stability.

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THE CHALLENGE OF COMPLEX CARE DELIVERY WITHIN A LEARNING ENVIRONMENT

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Keywords: education, complication, prosthodontics

Case Presentation: The occurrence of treatment difficulties, challenges, and complications is a daily reality of clinical practice. Much effort is directed towards prevention of mid- and post-treatment complications as well as their timely identification and management. A specialty residency environment presents a particular challenge with respect to care delivery – how can complex care be delivered predictably by individuals with novice or developing skill sets? Complex surgical implant care, in particular, brings an additional level of administrative and clinical challenges. Many of these treatment challenges are a consequence of a mismatch among resident-relevant parameters (knowledge/skill level and

enthusiasm level/self-confidence), treatment case complexity, and level of clinical supervision. As many Prosthodontic programs begin to expand into the combined surgical and prosthodontic care delivery model, the challenge of risk management becomes particularly relevant. Many approaches can be considered to address this including: "observe first" model, matching case difficulty and resident ability, increasing instructor-to-resident ratio, improving quality of supervision, instituting administrative oversights, and focusing on building skills before confidence. Of course, to a certain degree the occurrence of errors, complications, and difficulties is inevitable. Hence, the focus also needs to be on catching issues in a timely manner and ensuring that maximum learning benefit is derived from each untoward occurrence or near miss. This demands a calm and encouraging learning environment where residents are open about problems and are not afraid to admit and discuss them.

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THE CIRCULARITY OF OSSEOINTEGRATION: A RETROSPECTIVE OF OVER 30 YEARS WITH INTEGRATED IMPLANTS

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Abstract: The introduction of Osseointegration to the North American Dental profession in 1982 irrevocably changed the lives of countless patients and dental practitioners. These changes can take on various shapes depending on the procedure involved and the outcome expected; some where we have gone full circle, others where the learning curve is much less defined. From a collective experience in academics and a private practice career spanning more than 40 years of clinical implant dentistry, Dr Parel will take a candid and retrospective look at where we have been and where we might be going…both good and otherwise.

An exercise of this kind requires subjectivity and speculation, along with a firm belief that good evidence based research is not necessarily required on every occasion. Experience based observations over time can have value, provoke thought, and even create controversy, all of which could well be encountered with this presentation.

Upon completion of this presentation the attendee should be able to:

1) Identify areas of Osseointegration which have come full circle
2) Treatment plan to avoid full arch restoration complications based on profiling
3) Understand more completely the limitations of specific types of learning environments

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WITH THE AIM OF FULL DIGITAL DENTISTRY; FROM VIRTUAL PLANNING TO FINAL PROSTHESIS

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Abstract: Nowadays, the concept of an implant therapy is changing as "prosthetic driven". This is so called a "top-down treatment concept." For this "top-down treatment concept", first of all, we have to visualize a final goal.
Based upon this final goal, we must consult with the patient and make a treatment plan and all of necessary treatments to be performed. Unfortunately, all of the above mentioned steps have a complexity. Consequently, almost all clinicians think of the "top-down treatment concept" as an illusion. But if we have powerful diagnostic software, it can be easily done.
Fortunately, in our daily practice, we already use lot of digital hardware implements.
CBCT is an especially effective diagnostic source because of its 3-D characteristics. Nowadays many clinicians use CBCT image in their implant dentistry. Furthermore, present day CAD/CAM systems become attractive methods beyond a prosthetic field. And I think to myself, "What a wonderful digital dentistry!"
However, even though each implement are great, connecting each factor as a harmonious status is the most important thing.
In my presentation I would like to introduce what is a "full digital dentistry." Digital dentistry is not hype; it is NOW! Eureka!

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PROSPECTIVE STUDY ON PRF AND BMP FOR TREATMENT OF BRONJ

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Keywords: BMP, PRF, Bisphosphonate

Purpose/Aim: The purpose of this prospective study was to assess the feasibility of using leucocyte-rich and platelet-rich fibrin (L-PRF) and Bone Morphogenetic Protein (BMP) for the treatment of bisphosphonate-relatedosteonecrosis of the jaw (BRONJ) in a single group study

Materials and Methods: Study design and data collection: We designed and implemented a single group study involving patients who visited the Department of Oral and Maxillofacial Surgery at the Ewha Womans University Medical Center in Seoul, Korea, between January 2006 and December 2012.The inclusion criteria were: patients who were, or who had had treatment with bisphosphonates, and were diagnosed with BRONJ. After treatment with PRF, BMP, the response of each patient was recorded 1 month and 4 months postoperatively. Further assessments were made of the site, stage, concentration of c-terminal crosslinked telopepide of type 1collagen, and actinomycosis.

Results: 1.Among the total patients, 77% showed complete resolution, 18% had delayed resolution, and 6% showed no resolution with PRF and BMP treatment. 2. There was a significant association between the response to treatment and the stage of BRONJ ($p = 0.002$) but no other significant associations were detected.

Conclusions: 1.We evaluated overall response to treatment with L-PRF, BMP together with its association with several characteristics of BRONJ including the site of the lesion, the stage of BRONJ,sCTX < 150 pg/ml at the time of diagnosis, and the presenceof actinomycosis. Of these, only the stage of BRONJ differed significantly. It is difficult to generalise this finding directlyto response to treatment with L-PRF, but it indicates that con-servative approaches with L-PRF were less effective in more advanced disease and active intervention may be required toprevent the disease from getting worse. BMP might more effective in more advanced disease.

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RESIDUAL RIDGE RESORPTION ASSOCIATED WITH IMPLANT-RETAINED OVERDENTURE AND COMPLETE DENTURE

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Keywords: residual ridge resorption, cone-beam computed tomography, finite element analysis

Purpose/Aim: The purpose of this study was to explore the residual ridge resorption induced by an implant-retained overdenture and its associative mechanics and compared to a conventional complete denture after a period of one year.

Materials and Methods: Twenty implant-retained overdenture participants and nine complete denture participants were involved in this study. Their residual ridge reduction was quantified in a three dimensional manner using cone beam computerized tomography (CBCT) images acquired before and after one year of treatment. Their maximum bite forces were also recorded. Three-dimensional finite element analysis models were created from the CBCT images of two participants as a representative model for each group. The two participants were of the same gender, age (62 years old), almost similar built and scored the highest maximum bite force value in their respective treatment group. Hydrostatic stresses, contact surface deformation and strain energy absorption in soft tissue mucosa from the finite element modeling were correlated with the changes in residual ridge reduction for both implant-retained overdenture and complete denture participants.

Results: The results revealed that with the implant-retained overdentures, contact surface deformation on the mucosa was two times greater than that for complete dentures (0.32 ± 0.23 mm vs 0.16 ± 0.06 mm) and it is in agreement with the amount of residual ridge reduction measured, which was also two times higher for the implant-retained overdenture compared with the complete denture (-3.8% ± 4.5 vs -1.9% ± 0.4). Having taken into account the difference in biting forces between the two prostheses which again was measured to be two times higher for the implant-retained overdenture, the hydrostatic stress within the mucosa was found to well correlate to the residual ridge reduction map measured over the one year interval of treatment.

Conclusions: Implant-retained overdenture leads to at least twice residual ridge reduction as compared with the complete denture and this could be due to higher hydrostatic stress and less effective energy absorption capabilities of the mucosa underneath the implant-retained overdenture. While implants associated with the overdenture provide the capability of exerting more biting forces, they could potentially concentrate hydrostatic stress and cause higher residual ridge reduction compared to a conventional complete denture.

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EFFECTS OF CYCLIC LOADING ON RESISTANCE OF DIFFERENT ZIRCONIA IMPLANTS

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Purpose/Aim: The aim of the present investigation was to evaluate the fracture resistance (fracture load and bending moment) of three different zirconia oral implants after long-term thermomechanical cyclic loading in an aqueous environment in the artificial mouth. Non-loaded implants served as control group.

Materials and Methods: A total of 48 zirconia implants were evaluated: 16 one-piece implants made of alumina-toughened zirconia (ATZ; Group A) and 32 differently connected two-piece implants (16 screwed, Group B; 16 adhesively bonded, Group C) made of Y-TZP (B) and ATZ (C), respectively. These three groups have been divided into two subgroups composed of 8 samples. The samples of subgroups 1 were not exposed to any cyclic loading, whereas subgroups 2 were loaded with 10 million cycles at 100 N load. Subsequently, all 48 implants were statically loaded to fracture in a universal testing machine. One-way ANOVA and an adjustment with Student-Newman-Keuls' method were used for multiple pairwise comparisons to identify statistical differences between the groups. The following t-test allowed a comparison of loaded and non-loaded samples within the groups.

Results: All implants survived the long-term thermomechanical cyclic loading resulting in a survival rate of 100% in all groups. In Group C2, six of eight samples showed mobility between the implant and the abutment due to debonding and internal fracture of the locking-mechanism. For the static loading the following average fracture load and bending moment values were found: A1: 1443 N / 362 Ncm; A2: 1683 N / 399 Ncm; B1: 2168 N / 398 Ncm; B2: 1893 N / 346 Ncm; C1: 1138 N / 380 Ncm and C2: 771 N / 252 Ncm. Foregoing dynamic loading significantly increased the fracture load and bending moment to fracture values of Group A implants, whereas Group B and C implants showed significantly decreased fracture resistance values.

Conclusions: Regarding their fracture resistance, Group A and B implants seem to be able to resist physiological chewing forces long-term, whereas the connecting mechanism of Group C implants seems to be unreliable for long-term usage.

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ZIRCONIA FAILURES IN IMPLANT PROSTHODONTICS: WHAT GIVES?

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Abstract: It has been reported that failure of zirconia abutments and restorations occurs more frequently in implant supported restorations than in tooth supported restorations. This discussion will focus on the properties of zirconia used in dental implant supported restorations and the need for caution in materials selection.

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KEY PROSTHETIC FACTORS ON IMPLANT ESTHETICS

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Abstract: The presentation will define the key prosthetic factors for long-lasting esthetics on implant-supported restorations in the esthetic zone. Treatment sequencing, prosthetic profils, materials, digital technologies and other details will be described in order to favor a natural result on implants.

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BETTER ONE THAN NONE: THE SINGLE MANDIBULAR MIDLINE IMPLANT

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Abstract: Edentulism is still very common in elderly people all over the world. However, only a minority of edentulous patients can effort multiple implants to retain their full prostheses. While most edentulous patients get along with their prosthesis in the maxilla, many have severe problems with their mandibular prosthesis.
The use of a single implant in the middle of the mandible to stabilize a mandibular full prosthesis in elderly patients has been described nearly 20 years ago as social treatment option for edentulous patients who cannot afford 2 or more implants. In the meantime the not indisputable treatment concept has been evaluated in various clinical trials. This lecture reviews the currently available clinical data and illustrates the clinical outcome after five years of selected patient cases. Over the first five years the published clinical studies reveal an excellent clinical outcome using a single implant in the middle of the mandible, provided that modern implant surfaces are used and immediate loading of the ball attachment is avoided. However maintenance requirements of dentures retained by one implant only might be higher than using 2 or more implants to support a mandibular full prosthesis.

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TREATMENT OUTCOMES OF IMPLANT- SUPPORTED OVERDENTURES FOR MAXILLA: SYSTEMATIC REVIEW

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Keywords: maxillary, implant, overdenture

Purpose/Aim: This systematic review was aimed to evaluate the treatment outcomes of maxillary implant overdentures depending upon attachment system in terms of implant survival rate, prosthetic maintenance and complications, and patient satisfaction.

Materials and Methods: A literature search was conducted using PubMed search strategy and hand searching of relevant journals considering inclusion and exclusion criteria. Randomized Clinical Trials (RCT) and prospective clinical comparative studies on maxillary implant overdentures until December 2014 were selected. Seven hundred seventy six articles were gathered, 10 from the 776 articles were selected and 2 articles selected from hand searching. A total of 12 articles were finally selected. Information on the implant survival rate, prosthetic maintenance and complications, and patient satisfaction were analyzed. Meta-analysis was conducted to evaluate the data on implant survival rate relative to attachment system.

Results: Twelve articles utilizing bar attachment showed implant survival rate (SR) of 76-100%. Eight articles with ball attachment showed SR of 61-73.5%. Two articles with locator attachment showed SR of 83.3-100%. Finally, three studies with telescopic attachment presented a SR of 81.8-100%. Three studies presented overdenture survival rate (77-95% for bar and ball attachment). Bar is the most common attachment system from the articles included. The prosthetic maintenance and complication for bar attachment are change of clips, occlusal adjustment, marginal adaptation and overdenture fracture. Maintenance for ball attachment includes change of resilient ring and marginal adaptation. Locator attachment required prosthetic maintenance such as marginal adaptation. In eight studies, patient satisfaction was evaluated using Visual Analog Scale (VAS) scores and questionnaires. VAS scores after treatment was 7.30- 8.63, while the questionnaires' evaluated that the patients were fully satisfied after the implant overdenture treatment regardless of the attachment system used.

Conclusions: The implant survival rate of maxillary overdentures is still not as favorable as mandibular overdentures. There are many prosthodontic maintenance mentioned for maxillary overdentures but patient satisfaction is typically high regardless of attachment system.

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3D-FEM MODEL USING CONE-BEAM CT FOR STRESS PREDICTION AROUND IMPLANTS

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Purpose/Aim: The authors have previously analyzed the bone stress distribution in a precise 3D finite element (FE) model created from cone-beam CT (CBCT) data of an implant-inserted human dried mandible and found that it was similar to that in a 3D FE model generated from micro-CT data. Based on those findings, the present study aims to create a 3D FE model from patient CBCT data to predict, before implant insertion, the stress that would arise in the peri-implant bone.

Materials and Methods: This study was approved by the Ethics Committee of Niigata University Faculty of Dentistry (# 25-R39-12-12). A patient, who was partially edentulous and presented to our hospital asking for implant placement in the mandibular molar region, gave her informed consent for the use in the present study of her CBCT data obtained for treatment planning purposes by a CBCT scan (AUGE SOLIO, Asahi Roentgen, Japan; resolution of 0.1 mm). These DICOM data were converted into TIFF files, which were input into a computer program for bone structure analysis (TRI/3D-BON, RATOC, Japan). Then, an 8-mm screw implant (SLA, Straumann), to which a solid abutment had been connected, was scanned with a resolution of 0.067 mm by a micro-CT scan (ELESCAN, Nittetsu Elex, Japan). The 3D implant data were

superimposed over the bone data using the superimposition program (TRI/3D-BON, 3D-ADJ). Based on these data, a 3D FE model, consisting of implant with abutment, cortical and trabecular bone was constructed, and a 200 N axial load was applied on top of the abutment, using the same software and a 3D-FEM pre- and postprocessor program (TRI/3D-FEM-PPP). The mechanical stress analysis was performed by a FEM solver (TRI/3D-FEM).

Results: The bone structure reproducibility in the 3D FE model was high, enabling a clear distinction of the trabecular structure and a precise stress analysis, comparable to those obtained in our previous studies from CBCT images of a dry skull. Furthermore, the shape of the screw implant with abutment was accurately reproduced, in all the details, by minimizing the artifacts. Moreover, by separately obtaining the bone and implant CT images, these could be freely superimposed, to allow the intended position of the implant in the edentulous ridge.

Conclusions: By using the TRI/3D-BON software, CBCT data of the edentulous mandibular ridge could be combined with separately obtained micro-CT implant and abutment 3D data to construct a 3D FE model in which both the trabecular structure and the implant shape were accurately reproduced, enabling a detailed analysis of the stress at the bone-implant interface. This method will be used in further analyses to predict bone stress at potential implant sites, by changing the position, size or number of implants.

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A 10-YEAR RETROSPECTIVE CLINICAL STUDY OF THE DENTIUM® IMPLANTS

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Keywords: Dental implant, Survival rate, Risk factors

Purpose/Aim: The aim of this retrospective study was to evaluate the cumulative survival rate (CSR) and the associated risk factors of Dentium® implants for 10 year.

Materials and Methods: Four types of dental implants (Dentium®, Seoul, Korea) were placed at the Korea University Guro Hospital from 2004 to 2013 were included. These implants were investigated with several identified risk factors (Patient and fixture characteristics, anatomy, surgery and Prosthetic variables, etc.). Clinical and radiographic examination data were collected from patient records including all problems during follow-up period according to protocols described earlier. Life table analysis was undertaken to examine the CSR. Cox proportional hazard model was conducted to assess the association between potential risk factors and CSR.

Results: Six hundred ninety five Dentium® implants were placed in 289 patients (mean age 56.0 years, range 19 to 86 years) during 10years. Mean follow-up was 51.8 months. Fourteen of 695 implants failed. Seven of these were lost before loading. The 10-year implant cumulative survival rate was 95.0%. Cox proportional hazard model demonstrated a significant predictive association between CSR and smoking and arch ($P<.05$). The most common mechanical complication encountered was screw loosening. There were few complications related to peri-implant diseases (5.9%)

Conclusions: The 10-year CSR of Implantium implants was 95.0%. The implant survival may be dependent upon smoking and arch ($P<.05$).

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MINIMALLY INVASIVE INTERVENTIONS FOR REPLACING MISSING TEETH WITH IMPLANTS: CURRENT STATUS AND FUTURE DIRECTIONS

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Abstract: In order to achieve optimal aesthetics and function, bone augmentation procedures are frequently necessary to optimize implant positioning and creating an adequate soft tissue support. The term 'restorative-driven' treatment planning has been mostly considered using these procedures. However, an undesirable aspect of 'restorative-driven' treatments is that they are mostly invasive to the patients. It is natural that no patient wants to have invasive treatment. On the other hand, latest minimally invasive treatment procedures like graftless solutions, flapless surgery and immediate loading have found favor with the most patients, and they are now recognized as 'patient-driven' implant treatment procedures.
According to the Bråemark protocol, a stress-free healing period is one of the most emphasized requirements for implant integration. However, recent studies have encouraged a progressive shortening of the healing period and immediate loading has been proposed for the edentulous cases. Almost all edentulous patients desire restoration of their chewing ability as soon as possible after placement of dental implants.
The purpose of this presentation is to show latest minimally invasive immediate loading procedures which can predictably provide the patient with early functional rehabilitation. This presentation will also review current trends and recent advances in this field, with an emphasis on the supporting literature and relevant clinical procedures.

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RCT OF MANDIBULAR IMPLANT OVERDENTURES WITH BALL ATTACHMENTS FOR 3-YEAR

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Keywords: Mandibular implant overdenture, ball attachment, success rate

Purpose/Aim: The aim of this study was to evaluate treatment outcomes of mandibular implant overdentures with ball attachments.

Materials and Methods: This study was designed to place two fixtures (Simpline II, Dentium, Korea) on the anterior mandible in 40 edentulous patients. After healing period, two different ball attachments (Dentium Mini-ball attachment/Straumann Anchor attachment) were connected to the fixtures in each group (20/20) randomly. Success rate, radiographic marginal bone evaluation, implant stability (ISQ & Periotest values), periodontal and prosthetic complication, and patient satisfaction were evaluated during 36 months follow-up period. Success rate and complications between the two groups were analyzed using Independent T-test, while implant stability, marginal bone resorption and satisfaction were analyzed using two-way ANOVA (a=.05).

Results: Two from forty patients were dropped out as they died. Implant success rates was 100% and both groups showed stable ISQ and Periotest values and there was no significant difference in marginal bone evaluation, periodontal and prosthetic complication and patient satisfaction between two ball attachment groups. However, there were significant differences on patient satisfaction between before and after connection of attachments.

Conclusions: There was no significant difference on treatment outcomes of two ball attachment groups in terms of implant success rate, peri-implant tissue status, prosthetic maintenance and complications, and patient satisfaction. There were significant differences on patient satisfaction between before and after connection of attachments.

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ANALYSIS OF DEFORMATION CHARACTERISTICS OF IMPLANT COMPLEXES UNDER STATIC LOADING

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Keywords: Dental implant, Implant-abutment connection, Yield strength

Purpose/Aim: The purpose of this study was to investigate the effect of different implant material properties and connection designs on yield and fracture strength and to analysis deformation characteristics under static load.

Materials and Methods: Six groups of implant fixture-abutment complexes were fabricated according to ISO 14801 set-up (n=10). It were consisted the combination of 3 platform (external, internal, and Morse tapered) connections and 2 materials (titanium grade2 and titanium grade4) as follows: external –titanium 4(ET4), internal - titanium 4(IT4(S), IT4(D), IT4(N)), internal -titanium 2(IT2), Morse tapered-titanium 2 (MT2). Yield and fracture strength were evaluated with a computer-controlled Universal Testing Machine and failed implant complexes were observed by radiographic image, optical microscope and scanning electron microscope for deformation characteristics analysis. Statistical analysis performed using one-way ANOVA and Tukey's test, respectively, with the level of significance set at 0.05.

Results: The highest mean value was group IT4(S) and the lowest mean value was group IT2 in yield and fracture strength. The group ET4 and group IT4(N) had not significantly different values although they had different connection. The group MT2 had higher fracture strength than group IT2 even though they made by same materials. The systems had similar connection type appeared similar deformation characteristics.

Conclusions: Yield strength, fracture strength and deformation characteristics of each implant system to static load tended to depended on material properties and wall thickness of fixture as well as implant connection design itself.

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EFFECT OF IMPLANT ANGULATION ON RETENTIVE FORCE OF OVERDENTURE ATTACHMENTS

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Keywords: SFI-Anchor, LOCATOR, Overdentures

Purpose/Aim: This in-vitro study evaluated the influence of implant angulations on the retentive behavior of two overdenture attachments during cyclic dislodging.

Materials and Methods: Custom fabricated polyvinylchloride (PVC) models simulating a two– implant overdenture situation were fabricated. Each model had an upper and lower member. The lower member comprised of two implants and the overdenture attachments, while the upper members contained the attachment housings and the retentive elements. The experimental models were divided into five groups based on their simulated implant angulations (Groups: 1=0°; 2=20°; 3=30°; 4=40°; 5=60°). Each group was further divided into two subgroups based on its attachment system (control attachment: LOCATOR®; Test attachment: SFI-Anchor®). Group 5 did not have a LOCATOR® subgroup as it is not indicated for use in angulations exceeding 40°. An Instron® testing device was used for the experiment. All the models underwent 10,000 insertion-removal cycles in a wet environment. Mean retentive forces were recorded. ANOVA and linear regression models were used for statistical analyses; the level of significance was $p<0.05$.

Results: Custom fabricated polyvinylchloride (PVC) models simulating a two– implant overdenture situation were fabricated. Each model had an upper and lower member. The lower member comprised of two implants and the overdenture attachments, while the upper members contained the attachment housings and the retentive elements. The experimental

models were divided into five groups based on their simulated implant angulations (Groups: 1=0°; 2=20°; 3=30°; 4=40°; 5=60°). Each group was further divided into two subgroups based on its attachment system (control attachment: LOCATOR®; Test attachment: SFI-Anchor®). Group 5 did not have a LOCATOR® subgroup as it is not indicated for use in angulations exceeding 40°. An Instron® testing device was used for the experiment. All the models underwent 10,000 insertion-removal cycles in a wet environment. Mean retentive forces were recorded. ANOVA and linear regression models were used for statistical analyses; the level of significance was $p<0.05$.

Conclusions: This in vitro study confirmed that implant axial inclinations do not affect the retentive behavior of the SFI-Anchor® even at angulations of up to 60°. Hence, the SFI-Anchor® may therefore be particularly indicated for clinical situations with marked implant axial discrepancies.

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THE IMPORTANCE OF INTERFACE PRECISION IN CONICAL CONNECTION IMPLANT SYSTEMS

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Abstract: A key aspect of performance assessment is that a system is only as strong as its weakest link, and that the performance of any component depends not only on the component itself, but also on its interactions within the system. The interface between implant and abutment is critical for joint stability. Manual adjustment of a cast or substitute abutment can alter the contact angle and contact length. This can result in an undefined contact situation that could bring unknown risks to the patient. Consequently, selecting the matching abutment is crucial for system performance, as it does not only affect the fit of the restoration on the implant itself, but as it may also impact performance-relevant parameters.

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HIGH TECH DIGITAL PROSTHODONTICS: FROM DIAGNOSIS AND TREATMENT PLANNING TO FABRICATION OF THE FINAL RESTORATION

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Outline: Computer technology has provided a tremendous advantage in all aspects of prosthodontic treatment. The advances in digital radiography have aided dental diagnosis. Cone beam CT scanning has provided clinicians with a unique perspective into the dental anatomy and has enhanced diagnosis and treatment planning. CT scanning software has provided not only a three-dimensional view of the anatomy but has allowed the incorporation of implant planning. While CT scanning and planning can be used to fabricate computer-milled custom surgical guides for the edentulous patient, alternative techniques can be used in the dentate patient that is transitioning from periodontally hopeless teeth to an implant restoration. Utilization of extraction sockets as markers can correlate the positions of the CT scan and plan to the patient.

The CAMLOG® dental implant system provides a tight connection between the abutment and the implant. This tight connection allows for accurate indexing. With tilting of implants, the timing of the CAMLOG® implant is essential since there are only three positions for the angled screw-retained abutments. Once the implant is properly positioned, the connection provides a stable connection for long-term function.

The Teeth In A Day ®protocol has been a huge benefit for the patients and for the clinicians as well. The patients enjoy the benefits of fixed teeth on the day of implant placement. For the clinician, the Teeth In A Day® protocol provides a more streamlined and accurate approach to the prosthetic rehabilitation. The provisional prosthesis will be the blueprint for the final restoration, and the three-month trial period enables the patient to provide feedback for fabrication of the final restoration.

Computer-aided design has brought the fabrication of dental restorations into the 21st century. Titanium frameworks can be scanned or designed virtually and milled following CAD/CAM technology. The AvaDent® technology has greatly improved the veneering of the titanium milled frameworks. A monolithic acrylic resin material can be designed and milled to the titanium framework providing a strong and durable restoration.

The application of all these computer advances can greatly improve the speed, accuracy, and durability of the prosthetic rehabilitation.

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LEFORT I AND ZYGMATIC IMPLANTS

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Keywords: Maxillofacial surgery Lefort I and Zygomatic Implants

Case Presentation: Implant insertion and prosthetic rehabilitation of patients with an extremely atrophied maxilla are especially difficult issues. In this clinical situation the bone resorption of posterior and anterior part of maxilla, the widening of sinuses can dramatically reduce the possibility of implant insertion and prosthetic rehabilitations. In this clinical situation, the zygomatic implants are indicated with, sometimes, the help of conventional dental implants in the frontal region of the maxilla.
I) Patient: Since 8 years, the patient (female 48 years old) has been edentulous on both arches. The removable dentures which tried to treat this patient offered a worse functional and esthetic results. Clinically, the difficulties are first an extremely atrophy upper arch, and secondly a Class 3 skeletal relationship.
II) Treatment plan: The clinical approach chosen was, in the same time, an osteotomy (Lefort I) of the upper arch followed by the insertion of two zygomatic implants and four conventional implants in the anterior part of maxilla.
III) Clinical sequences Laboratory step: two surgical templates were prepared on an articulator in order to control the displacement of the osteotomy. On templates, the artificial teeth were fixed to give some spatial indications during the osteotomy. On the labial side of upper and lower templates two arch bars were sticked.
Surgical steps: 1) Lefort I: The two templates are screw on their arches the edentulous arches became dentulous 2) Zygomatic implants; 3) Conventional implants.
Prosthodontic steps: 1) The impression of the upper arch with the 6 implants was taken, the maxilla-mandibular relationship recorded, the patient was always asleeping.
IV) Dental office 8 days after the surgery, the fixed transitory implant restoration was screwed on implants. The loading was "early" loading.

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MARGINAL FIT OF IMPLANT-SUPPORTED CROWNS WITH DIFFERENT ANTIROTATIONAL ABUTMENT FEATURES

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Keywords: marginal fit, dental implant, antirotational

Purpose/Aim: Although there is a debate over cementable implant abutments in recent years, they are still commonly used for implant-supported single crowns especially in the posterior region. In such restorations, an antirotational feature exists on the abutment surface to prevent rotation of the crown. This feature can be a flat surface or a groove that may vary according to the manufacturer. Marginal fit is one of the key factors that affects the peri-implant health and long-term success of a restoration. Many factors affecting the marginal fit of implant-supported restorations were evaluated by clinical or in vitro studies. However, the effect of different antirotational features on marginal fit of implant supported single crowns has not been thoroughly evaluated. The purpose of this in vitro study was to compare the marginal fit of metal copings fabricated

with laser melting, CAD / CAM and lost wax-up techniques on the abutments with two different antirotational features.

Materials and Methods: A total of sixty abutments with the same length and convergence angles were used. The cylindrical body of one of the abutments was characterized with a flat surface area (n=30) while the other had three grooves as an antirotational feature (n=30). Thirty abutments of a kind were then divided into 3 subgroups and 10 metal copings were either fabricated with laser melting, lost wax-up or CAD/CAM technique. All metal copings were cemented with polycarboxylate cement. Marginal gap measurements were performed using a stereo microscope at a magnification of 45X and data were analyzed by two-way and one-way ANOVA tests.

Results: Statistically significant differences were found between the mean marginal discrepancies of two abutments with different antirotational features ($p<.0001$). The copings fabricated by laser melting technology demonstrated significantly lower values when compared to lost-wax up and CAD/CAM techniques ($p<.001$).

Conclusions: Within the limitations of this in vitro study, marginal fit of single implant-supported metal copings was affected by the configuration of abutment's antirotational features and coping fabrication techniques.

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10-YEAR CLINICAL OUTCOME OF WARANTEC ONEPLANT SYSTEM IMPLANTS

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Keywords: implants, boneloss, Warantec

Purpose/Aim: To evaluate 10-year clinical outcome of Warantec Oneplant system and to see if there's any difference in crestal bone loss regarding 1.diameter of fixture, 2.position of implant 3.age, 4.sex, 5.abutment type, 6.initial bone level

Materials and Methods: A retrospective study was performed. Patients who underwent dental implant treatment from 2004.1.1 to 2005. 6. 30 in Gangnam severance dental hospital, department of prosthodontics was chosen. Patient's sex, age, position of implants, type of abutment, type of prosthesis was recorded. Crestal bone loss of each implant was evaluated using ImageJ software. Mesial and distal bone level was measured, and average bone level was calculated. Statistic analysis was performed to evaluate each factor's impact on crestal bone level.

Results: 175 patients underwent implant treatment and 492 implants was inserted. 51 patients came to the clinic for 10-year follow up recall and periapical radiographs were taken for crestal bone level evaluation. In internal morse-tapered friction fit connection, wide diameter fixture showed more bone loss compared to regular diameter fixture. In contrast, in external hex connection implants, wide diameter fixture showed less bone loss than regular diameter fixture. Abutment type, sex, age of patient showed no statistically significant effect on crestal bone loss.

Conclusions: In this study, Warantec Oneplant system showed favorable 10-year outcome compared to other researches regarding long-term crestal bone loss. Diameter of fixture showed statistically significant effect on crestal bone loss, but the effect was opposite regarding connection type. Other criteria evaluated showed no statistically significant effect on crestal bone loss.

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A SYMPHONY CAN CREATE MUSIC THROUGH HARMONY, OTHERWISE IT'S JUST NOISE

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Abstract: Communication between the surgical, restorative and laboratory team is essential for success in implant therapy. In the ideal world surgical and restorative implant therapy results in optimum functional and esthetic results for our patients. In the reality of clinical practice this is not always achievable. The discussion will review the principles of complex implant prosthesis design, their indications, and limitations. Techniques to overcome compromised implant position, while satisfying the needs of a function and orofacial esthetics will be presented. An overview of the immediate loaded scenario for basic and severely compromised completely edentulous patient will be reviewed.

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PATIENT SAFETY AND HARM IN IMPLANT DENTISTRY

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Abstract: As the use of dental implants grows, the incidence of compromised outcomes is increasing. In particular, mucosal and/or osseous interface problems are leading to reduced implant longevity, poor esthetic and functional outcomes and, in some instances, significant harm to patients. This presentation will describe the etiology of some common sub-optimal treatment outcomes and discuss the important patient, clinician implant and implant attributes that lead to successful implant treatment.

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PRE-CLINICAL STUDIES ON DENTAL IMPLANT APPLYING THE CONTROLLED RELEASING SYSTEM OF GROWTH FACTORS

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Abstract: Methods of delivering growth factors to damaged tissue area represent an important aspect of tissue regeneration. The effectiveness of various delivery systems to delivery growth factors has been examined. In particularly, hydrogel, collagen sponge, and a modified scaffold surface have been introduced to extend growth-factor release without initial massive release.
Studies on applying growth factors such as bone morphogenetic protein (BMP) to dental implants are underway. BMP enhances bone formation by promoting the differentiation of osteoblasts from the mesenchymal stem cells (MSCs) and by helping in the biosynthesis of the bone matrix through control of essential factors during osteoinduction to regenerate osseous tissue. However, several studies have reported that use of rhBMP-2 does not have a significant bone formation effect. Such a result was suggested to be attributable to the early release of a large amount of rhBMP-2, the lack of attaining an optimum concentration, and the fact that only one type of growth factor, rhBMP-2, was used, unlike during the natural

regeneration process of the human body wherein multiple growth factors are involved. I studied about growth factors' delivery system around implant for about 7 years. Through this lecture, I want to introduce my results associated with growth factor delivery, based on a number of animal experiments. My topics are like below.

1. Improving osteoblast functions and bone formation on rhBMP-2 immobilized anodized titanium implants.
2. Effects of different rhBMP-2 release profiles in defect areas around dental implants on bone regeneration
3. Effects of the immobilization of rhBMP-2 and another growth factors to implant modified by heparin on the biologic function, osseointegration and bone regeneration

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MAGNETIC FIELDS ENHANCED OSTEOBLAST DIFFERENTIATION VIA ERK PATHWAYS

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Purpose/Aim: The management of bone mass and quality is strongly required for the success of dental treatment including dental implant. To obtain the initial primary stability is the key for the success of dental implant therapy. Recently, researchers take notice of an environment around bone and dental implant in addition to the surface modification such as ultrasound stimulation or magnetic field to lead early osseointegration. It has been discussed that extremely low frequency (ELF) pulsed magnetic fields could cause biological effects. In this study, we focused on ELF pulsed magnetic fields around osteoblastic cells in vitro and investigated the effect of magnetic fields on cell proliferation and differentiation. The purpose of this study is to examine whether the ELF pulsed magnetic fields enhance osteoblast proliferation and differentiation.

Materials and Methods: MC3T3-E1 osteoblastic cells were cultured in 7000 mG (0.7 mT) 6 Hz ELF pulsed magnetic field. Following 24 hours of culture within the magnet field cell proliferation was evaluated by Cell Counting Kit-8 (Dojindo, Kumamoto, Japan) by fluorescence signal at 450 nm. To detect morphology changes in MC3T3-E1 osteoblastic cells, we stained cells with Alexa fluor 488 phalloidin (Molecular Probes, CA, USA) 24 hours after culture in magnetic field. Cells were examined by Confocal Laser Microscan (LSM 5 PASCAL, Carl Zeiss. Inc). Every one week of culture, mRNAs were obtained from cells to determine osteoblast differentiation with or without magnetic stimulation. Quantitative real time PCR was performed for alkaline phosphatase, osteocalcin, and collagen type1. Cell lysate was collected to assess alkaline phosphatase activity at every second day and MAP kinase activity at each time point. Results were compared using the Student's t-test. P values less than 0.05 were considered statistically significant.

Results: With ELF pulsed magnetic fields, proliferation of MC3T3-E1 osteoblastic cells at early time point was slightly increased compared with controls. There were no significant changes in cell morphology with magnetic stimulation. In the magnetic field, alkaline phosphatase production at early time points and osteocalcin production at late time points were both increased. Furthermore, ERK pathways in MC3T3-E1 osteoblastic cells were enhanced by the magnetic stimulation.

Conclusions: The ELF pulsed magnetic field did not affect cell proliferation, but accelerated cell differentiation in MC3T3-E1 osteoblastic cells in vitro. The late differentiation in particular was enhanced via ERK pathways. This magnetic system could have a possibility of clinical implications by supporting earlier wound healing and osseointegration around a dental implant because it can induce early maturation of osteoblast.

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RESISTANCE TO FRACTURE OF ZIRCONIA IMPLANT ABUTMENTS SUPPORTING CANTILEVERED FDPS

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Purpose/Aim: This study aimed to evaluate the resistance to fracture of cantilevered fixed dental prostheses (FDPs) supported by one or two implants and restored with Titanium (Ti) or Zirconia (Zr) abutments after fatigue loading in a mastication simulator.

Materials and Methods: Thirty-two samples were fabricated to simulate the clinical situation of 2 or 3 missing maxillary incisors. Half of the samples received single implants to support 2-unit FDPs with a cantilever extension, whereas the other half received 2 implants to support 3-unit cantilevered FDPs. Each group was divided into 2 subgroups of 8 specimens each (Ti-1, Ti-2, Zr-1, Zr-2) (n=8). Groups Ti-1 and Ti-2 received Ti abutments supporting cantilevered 2 or 3 unit FDPs, respectively, whereas Zr-1 and Zr-2 groups received Zr (IPS Emax) abutments. Standardised 2- and 3-units Chromium-Cobalt (Cr-Co) frameworks with 6 mm cantilever were fabricated using a laser-sintering system and cemented onto Ti and Zr abutments. All of the samples were subjected to thermo-mechanical fatigue loading to simulate 5 years of clinical service. Afterwards, the samples were loaded until fracture in a universal testing machine. Pair-wise Wilcoxon rank tests were performed to test for differences in resistance-to-fracture values with a global significance level of 0.05.

Results: All specimens survived aging. No screw loosening was recorded. The mean resistance-to-fracture values were 226, 551, 601and 664 N for Zr-1, Zr-2, Ti-1 and Ti-2, respectively. Statistically significant differences were found for the comparisons between Ti and Zr groups ($p<0.05$). The number of supporting implants showed a significant effect on the resistance-to-fracture of both abutment materials. Regardless of the abutment material, the resistance-to-fracture values for 3-unit FDPs were significantly greater than those of 2-unit FDPs

Conclusions: Although all tested implant-supported restorations have the potential to withstand physiological occlusal forces applied in the anterior region; cantilevered FDPs supported by 2 implants demonstrate higher resistance than that supported by a single implant. Before considering as a reliable treatment modality, long-term clinical studies are needed to verify the outcome of implant-supported cantilevered FDPs restored with titanium or zirconia abutments.

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TREATMENT OUTCOMES OF PERI-IMPLANTITIS INTERVENTIONS: A SYSTEMATIC REVIEW AND META-ANALYSIS

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Keywords: peri-implantitis, surgical, non-surgical

Purpose/Aim: The aim of this study was to evaluate the treatment outcomes of current approaches in the treatment of peri-implantitis surrounding the osseointegrated dental implants.

Materials and Methods: A systematic review was done to evaluate the current trends of the clinical trials done for the treatment of peri-implantitis. Searches in PubMed, as well as hand search were done. Articles which involved randomized controlled trials (RCTs) and relevant review articles were included in this study. Published articles included in this study were restricted to the English language. Publications and articles accepted for publication up to the December of 2012 were included.

Results: It was observed that most common treatment for peri-implantitis were the surgical approach, followed by non-surgical approach, and local anti-biotic therapy. Bone grafts with or without the use of membranes in bone regeneration can

be successful only to a certain degree which may also vary on the local condition of the defect and the systemic factors for each patient.

Conclusions: There is still no reliable evidence available for the most effective treatment protocol for peri-implantitis. Patient recall longer than 1 year may be suggested to observe if the re-occurrence of peri-implantitis may happen. Larger RCTs with more than 1 year follow-up should be implemented.

Concurrent Session- Occlusion

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OCCLUSAL DYSESTHESIA – CLINICAL FEATURES AND UNDERLINING MECHANISMS

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Abstract: Dentists occasionally experience patients who complain occlusal discomfort without evident occlusal abnormalities. The term "Occlusal Dysesthesia" has been used to indicate the condition of persistent occlusal discomfort. This disorder has also been called as phantom bite syndrome, occlusal neurotic, positive occlusal sense, positive occlusal awareness, proprioception dysfunction, occlusal hyperawareness and other terms over the years. Irreversible dental treatments such as occlusal adjustments, replacement of dental restorations, occlusal reconstructions are not effective in most cases, or their condition could be even getting worse, resulting the loss of trusting relationship between patient and dentist. It has been reported that these patients often visit multiple healthcare providers.
It has been suggested that this condition is related to somatosensory abnormalities of the trigeminal system and/or psychological problems such as somatoform disorders. In our previous study which utilized both biological and psychosocial evaluations, occlusal dysesthesia patients exhibited the more psychological problems than normal controls based on the results of psychological tests, General Health Questionnaire (GHQ60) and Profile of Mood States (POMS - Brief Form), but there was no difference in interdental thickness discrimination ability between occlusal dysesthesia patients and controls when these groups are dealt with as a whole. However, there are not enough scientific evidences to date.
In this presentation, clinical features, possible underlining mechanisms and management modalities for this disorder will be discussed thorough cases and clinical studies that utilized a bio-psychosocial approach.

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EFFECT OF ADVANCEMENT DEVICE AND OCCLUSAL SPLINT ON SLEEP BRUXISM

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Keywords: Randomized controlled trial, sleep bruxism, mandibular advancement device

Purpose/Aim: Evaluation of effect of mandibular advancement device and maxillary occlusal splint on sleep quality, sleep bruxism activity in sleep bruxism subjects.

Materials and Methods: In this RCT, 28 subjects were randomly intervened either mandibular advancement device (MAD) or maxillary occlusal splint (MOS). Subjects sleep quality and sleep bruxism activity was evaluated by Pittsburgh Sleep Quality Index (PSQI) and electromyographic (EMG) activity of masseter by polysomnography, respectively. These variables were evaluated at baseline, 1 month and 3 months follow-up.

Results: Out of 32 subjects, 28 subjects were statistically analyzed as four subjects did not respond at the follow up period.

Both MOS and MAD significantly reduced PSQI and bruxism episodes and bursts in subjects after 3 months ($p<0.05$). The MAD showed greater reduction in sleep bruxism episodes per hour (78.3%) after 3 months as compared to MOS (50.4%). Subjects intervened by MAD showed discomfort in feedback form than subjects by MOS.

Conclusions: MAD and MOS shows improved sleep quality and decrease in sleep bruxism activity in sleep bruxism subjects.

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DECISION MAKING WITH FOCUS ON THE SHORTENED DENTAL ARCH

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Keywords: SDA, decision making , qualitative content analysis

Purpose/Aim: The aim was to study the clinical decision making process among Swedish general dental practitioners (GDP´s) in dentitions with compromised molars resulting in a shortened dental arch (SDA).

Materials and Methods: Eleven Swedish GDPs were purposively selected and all agreed to participate. In-depth semi-structured interviews were conducted and covered treatment considerations concerning two authentic patient cases, initially with complete dental arches and a final treatment plan resulting in an SDA. The cases comprised patients with compromised teeth, mainly in the molar regions. One patient suffered from extensive caries, and the other patient from severe periodontal disease. Qualitative content analysis was used to analyze the data.

Results: In treatment planning, the GDPs gave high priority to the etiology of the dental disease including periods of expectancy and reflection before making the final decision. During the decision making process, a strong focus was put on patients´ needs, background history, age and motivation for treatment as well as a preservation or reconstruction of molar support.

Conclusions: The qualitative content analysis revealed the Swedish GDPs´decision making process concerning compromised molar dentitions, to be characterized by patient centred approach in combination with disease etiology diligence and including a wish for molar support preservation.

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OCCLUSION, REHABILITATION AND COGNITION

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Purpose: This presentation will report on the assessment of clinical outcomes of progressive oral rehabilitation of the edentulous state for patients managed by Faculty of Dentistry prosthodontic postgraduates in the Department of Oral Restorative Sciences at Westmead Centre of Oral Health, Australia. Data from animal and some human studies have confirmed an association between changes in the dental occlusion with tooth height reduction and/or tooth extraction with changes in mastication and loss of high level cognitive function (Weijenberg et al 2013, Ono et al 2010, Ohkubo et al 2012).

Methods & Materials: As an ongoing investigation at the University of Sydney, patients are rehabilitated through: a) designing and fitting new complete dental prostheses – this has been reported to be beneficial in improving quality of life (Lureschi et al 2012); b) mandibular rehabilitation with 2-implant overdentures, followed by 4-implant fixed dental prostheses (in progress – Moule and Klineberg); c) additional maxillary rehabilitation with complete dental prostheses supported by 4 or 6 implants. These interventions progressively complete the transition from the edentulous state with removable dental prostheses to a stable dental occlusion with maxillary and mandibular implant supported prostheses. Assessment is made before and after each treatment and include: UK Oral Health Related Quality of life questionnaire; f-

MRI recordings to determine changes in representation in sensorimotor cortex, prefrontal cortex and hippocampus; and psychological profile assessment with the SCL-90R inventory (Derogatis 1978).

Results: With progressive and staged oral rehabilitation and improved prosthesis stability and function, there is: a) on-going enhancement in oral health related quality of life from old to new complete dental prostheses, to a mandibular implant stabilized prosthesis, to a mandibular implant retained prosthesis, and finally an implant stabilized maxillary prosthesis; b) progressive change in psychological profile with continual reduction in all domains measured by the SCL-90R inventory; c) enhanced representation of sensorimotor cortex with improved function; d) increased cellular activity in areas associated with cognition – the hypocampus and prefrontal cortex

Conclusion: Predictable enhancement in functional rehabilitation is achievable with oral implants and is based on osseointegration linked osseoperception. Data has confirmed a progressive improvement on oral health related quality of life; enhanced psychosocial confidence; improved function and enhanced activation of cognition through greater CNS representation.

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THE USE OF STEM CELLS AND BIOMATERIALS FOR MAXILLOFACIAL BONE REGENERATION

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Abstract: Dealing with the maxillary and mandibular bone defect is still a large challenging problem for oral and maxillary surgeons and prosthodontists. More importantly, the regeneration of bony defect is the fundament for further implants placement and functional restoration, which are the final prosthetic destination in modern dentistry. Several approaches including autogenous bone grafts, allograft, xenograft and synthetic materials have been explored for bony recovery. However, those means involve in many complications separately. With the enhancement of living standard and the improvement of medical condition, patients and dentists pay more attention to looking for a safer and more efficient alternative. Tissue engineering is the relatively new and highly promising fields of reconstructive biology. It generally combines three key elements: bioactive scaffolds, stem cells and molecular factors. By combination of those elements, tissue regeneration can often be accomplished. In past ten years, we did many researches on different animal models, such as mandible defect models on rat and canine, vertical alveolar ridge augmentation models on canine, and sinus augmentation models on rabbits, canine and sheep. In addition to investing the regeneration of maxilla and mandible bone defect, we tried to restore the functional deficit in conjunction with oral implant placement. All those works lay a solid foundation for the translational medicine from bench to bed. New attempts are putting on the design of new biomaterials with modifications on structures and compositions to direct the adhesion, proliferation, and differentiation of stem cells. Through repeated attempts, we are trying to shorten the treatment period, to enhance the repair quality and to improve the accuracy of restoration.

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EFFECTS OF H-TRANSCRIPT FACTOR ON BONE FORMATION AROUND IMPLANT IN DIABETIC MOUSE

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Despite the expansion of clinical applications through the recent progress in implant surface, patients with certain systemic diseases still have limited access to implant treatment. In particular, patients with type 2 diabetes are not often able to receive implant treatment due to high blood sugar level which delays the wound healing process and may cause infections. It has been reported that molecular form of HIF-1α, transcript factor regulating healing process, is not stable in diabetic condition compromising healing process. In addition, recent experiments have proved that HIF-1α improves healing in distal tissues in diabetic rats.

In this experiment, implants with length 1mm and 2mm were placed on femoral implant sites of type II diabetic and normal rats where one side was applied with HIF-1α and the other was left in normal condition. Previous studies used complex methods since deliverance of HIF-1α to the cell nucleus was considered difficult. For the present study, the PTD (Protein Transduction Domain) was implemented to pass HIF-1α through the cell membrane. As such, a much simpler scheme was used to insert HIF-1α into the cell nucleus and the results showed the effect of improving osseointegration of the implant and wound healing problems arising from diabetes.

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EVALUATION OF A NEW MANDIBULAR MOVEMENT THEORETICAL FORMULA AND DEPLOYMENT

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Keywords: Mandibular movement, Tempromandibular dysfunction, Virtual articulator

Purpose/Aim: Explicate clinically generated problems by Dr. Hobo and Dr. Takayama's twin-stage methods. Present the new mandibular movement theoretical formula and conditions.

Materials and Methods: Reviewed and corrected Dr. Takayama's formulae based on more than 25 years of clinical experience and data from Dr. Ito and associates at Landmark Clinic and the International Dental Academy in Tokyo.

Results: Proved tempromandibular dysfunction is concurrent with angular measurement of dental cusp declination due to using the twin-stage methods' condition of molar reconstruction. Supplemented the twin-stage methods and its two conditions with the new mandibular movement theoretical formula and 2 more conditions. Realized satisfactory occlusal function from the new mandibular movement theoretical formula and 4 conditions. Revised Dr. Hobo and Dr. Takayama's lower mandibular movement theoretical formula using Dr.Ito's new formula.

Conclusions: Actualized the new mandibular movement theoretical formula and 4 conditions for prevention of tempromandibular dysfunction and achievement of satisfactory occlusal function. Demonstrated replicability of the new formula's equations on computer software. Integrated new formula with all CAD/CAM/3D printer technology via virtual articulators. Simultaneously developed ITO articulators compatible with the new formula.

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DENTAL OCCLUSION: TRANSLATING PRINCIPLES OF NEUROPLASTICITY INTO EVIDENCE-BASED PRACTICE

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Abstract: Occlusal problems, manifesting as central and peripheral sensorimotor deficits, often arise following tooth loss and oral rehabilitation, as well as following stroke, neurodegenerative diseases, tumors of the head and neck, infections, or traumas. Over the last several decades, neuroscience research has characterized the capacity of the central nervous system to undergo structural and functional changes throughout life, that we now name 'neuroplasticity'. Neuroplasticity is a crucial brain mechanism that underlies how subjects store and retrieve information ('memory'), learn and re-learn new behaviours and sensorimotor skills, recover following injury and/or undergo subsequent rehabilitation to regain a lost motor behaviour, and how they adapt to peripheral alterations. Unfortunately, neuroplasticity may also underlies maladaptive sensorimotor processes including chronic pain conditions. Very little is known about the neuroplastic capacity of the orofacial sensorimotor cortex, the cerebral structure that plays such a crucial role in processing orofacial somatosensory inputs and in the generation and control of orofacial movements. This presentation will present a definition of brain neuroplasticity, review its principles and mechanisms and provide an update of the current state of neuroscience research. This review will integrate the principles of neuroplasticity with the available literature on occlusal rehabilitation. In light of the rapidly growing technology and knowledge in neuroscience, collaboration between clinicians and basic scientists is essential for the

translation of neuroscience research findings into novel evidence-based treatment paradigms. This way, we can capitalize from the growing knowledge-base of adaptive neuroplasticity to prevent maladaptive changes and induce an adaptive occlusal rehabilitation.

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IMPLANTS IN CONJUNCTION WITH REMOVABLE PARTIAL DENTURE: FANTASY & REALITY

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Abstract: When using implants to patients who lost their teeth, we try to treat with fully implant-supported prosthesis, but this option is not always possible. In this case, a treatment with overdenture, which is retained by implants, can be considered. Moreover, it is possible to consider denture treatment with implants in edentulous state. When there is lack of remaining bone mass or anatomic constraints to install a fixture for retaining prosthesis, unfavorable jaw relationship to treat with fixed prosthesis, phonetic problem, esthetic demand, health problem, we can select partial denture treatment with implant. And in the case of many implant installation is impossible, due to patient's economic status, denture with implant can be a favorable treatment. However, we should consider the installation site, number, force distribution of implant and loading protocol.

In addition, as the average life expectancy is increased and satisfying dentistry is offered in developed countries, not only the number of patients who have total anodontia is declining but also even old-aged people who have a large number of teeth are now many. As a result, although demand for the treatment needs of the partial edentulous increases, the elderly patients are less receptive to fixed prosthesis restoration with a number of implant installation compared to younger patients. Well-designed partial denture could be an option; however, in order to get more aesthetic and functional results, if removable partial denture with the remaining natural tooth and a few implant that have been embedded in the strategically right position will be used, it is possible to obtain an additional retention through the implant, and unaesthetic buccal retentive clasp is also not needed.

In this presentation, we will discuss some considerations in partial denture treatment with implant, overall respects of implant like installation site, length, diameter, and distal extended partial denture design using implant along with natural teeth

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iPS CELLS AND THEIR EXPECTED ROLE IN THE FUTURE OF PROSTHODONTICS

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Abstract: Tissue engineering is a new frontier in dentistry with the aim of achieving the regeneration of missing oral tissues, and engineering applications using stem cells in the field of dentistry await the establishment of a stem cell source that allows for easy collection by dentists. Induced pluripotent stem (iPS) cells can be generated through the reprogramming of somatic cells from different tissues by forced expression of defined exogenous factors. These iPS cells efficiently generated from accessible tissues have the potential to be used for various clinical applications. The oral gingiva is an easily obtainable tissue for dentists, and cells can be isolated from patients with minimal discomfort. We successfully generated iPS cells from adult mouse or human gingival fibroblasts via transduction of the Yamanaka factors without c-Myc oncogene. Gingival fibroblasts demonstrate a higher reprogramming efficiency than the skin fibroblasts which have been conventionally used for the generation of iPS cells. These iPS cells were capable of osteogenic differentiation, which could form new bone in the animal models. The generation of iPS cells from the gingiva is expected to provide a breakthrough, especially in the dental sciences, because it offers a promising method for the facile production of pluripotent stem cells by dental researchers. In this presentation, generation and basic aspects of osteogenic capacity of the gingiva-derived iPS cells will be discussed, with an emphasis on potential applications of the iPS cell technologies in the future of prosthodontics.

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REMOVABLE PROSTHESIS FOR ELDERLY PATIENTS WITH FUNCTIONAL DISTURBANCES

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Abstract: With the rapid increase of elderly population, the aim of prosthodontic treatment will be broadened from recovering dentition to improving total oral functions. In dysphagia rehabilitation, prosthesis is considered to be intra-oral devices for supporting physiological process from food intake to bolus swallowing. For successful prosthodontic intervention to dysphagic patients, dentists should choose the proper prosthesis for rehabilitation according to the diagnosis of functional disturbances. Reconstructing oral cavity and occlusal support by complete dentures can improve not only food comminution but also bolus formation and generate proper swallowing pressure. For patients with tongue disability, tongue-palate contact during mastication and swallowing might be facilitated by palatal augmentation prosthesis (PAP). PAP is also expected to improve the articulatory disturbance like as palatal lift prosthesis. In this lecture, basic understanding of tongue-palate-jaw biomechanics for food oral processing and application of removable prosthesis for the rehabilitation of oral functions will be discussed.

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CBK (CRANIAL BALANCING KEY) SPLINT & ANTI-AGING EFFECT

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Keywords: CBK splint

Case Presentation: CBK(cranial balancing key) splint & Anti-aging effect D.D.S., Ph. D., F.I.C.D., Byung kee Choi* ABSTRACT CBK (cranial balancing key) splint is an individual occlusal stabilizing appliance that gives space a thickness of 1.5-2mm to occlusally adjusted posterior area. CBK splint, using night time and workout, reduces the occlusal stress occurred by bruxism or swallowing force. And it protects the teeth and releases the buzzing in the ears, rhinitis, and migraine by effects on the central and peripheral nervous system through the traction of the atlas (C1) and axis (C2). 9 cranial nerves affect the "temporo-mandibular joint". Especially, 5th cranial nerve (trigeminal nerve) is connected to axis. *effects of the CBK splint 1. secure normal TMJ disk space 2. release related nuchal muscles, which constricted and tensed, by upper cervical vertebrae traction 3. promote stability of cranial bone motion 4. remove occlusal interferences and their effect on the cranium 5. remove imbalance of temporal and sphenoid bone Most patients have occlusal diseases such as attrition, abfraction, hypersensitivity, muscle pain etc. After taking occlusal adjustment by T scan, we tried to make ideal occlusion nevertheless our patients have slide in centric. CBK splint reduces the deteriorating force during night by complete releasing of the inferior belly of lateral pterygoid muscle. And it also makes good periodontal conditions by reduced occlusal force. Secondly, most patients using CBK splint have good sleep because of reduced occlusal force which occured by swallowing once a minute while sleep. Third, CBK splint so assigns tensile force on TMJ that makes normal alignment of atlas and axis. It improves the immune system and homeostasis by cranial balancing key effect. Fourth, most people have asymmetrical face. Using CBK splint makes symmetrical facial appearance by releasing of the parieto-temporal and occipito-temporal suture fixation. Conclusion Key of the immune system is putting CBK splint on along with a correct posture of spine, straight walking, abdominal breathing, proper dietary life and positive attitude. CBK splint helps to improve the level of immunity by recovering the spine and cranium which is crucial to regulation of autonomic nerve system. The essences of CBK splint are different thickness from existing splints, different concept of intra-oral treatment such as occlusal adjustment, and connect concept of occlusion to health of whole body by spinal stretching exercise combined with CBK splint. CBK splint might be one of solution for the aging induced by the distortion of spine and cranium, caused by the irritating occlusal force.

Saturday, September 19th
Concurrent Session- Ceramics

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CERAMIC RESTORATIONS CEMENTING OR BONDING?

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Abstract: For FDPs PFM or all ceramic reconstructions are used. All ceramic FDPs can be made of glass based ceramics, or oxide ceramics (aluminum oxide or zirconium oxide). Monolithic materials are less problematic when it comes to strength considerations. The strength varies by the ceramic type, which is an important indicator for the indication, where to use which ceramic. The composition and structure of the ceramic is determining the surface conditioning method for bonding. Based on the structure or strength of the ceramic, bonding may be mandatory or not necessary. Ceramics can be bonded with light cured, dual cured or auto cured resin based cements. If light curing is an option, the dentist must know the light absorption characteristics of the ceramic used as well as the radiant exposure needed to fully cure the luting material. Furthermore the type of adhesive may dictate the application technique when cementing. Moisture control may be crucial. Finally aesthetic demands may influence the choice of material. A decision tree is presented for finding the best cementing material/technique for different FDPs.

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IMPROVEMENT OF ZIRCONIUM OXIDE SURFACES BONDING CHARACTERISTICS TO RESIN CEMENT

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Keywords: Zirconia, surface coating, plasma

Purpose/Aim: The purpose of this study was to evaluate the microshear bond strength of resin cement to zirconia ceramic surfaces with plasma polymerized thin film derived from organosilicon containing monomer.

Materials and Methods: The study was performed using yttria stabilized zirconia (Y-TZP). Forty experimental Y-TZP plates approximately 10 mm in length, 5 mm in width and 1 mm in thickness were fabricated by copy milling technique. Each sample surface was metallographically polished with diamond paste and abraded with 600 grid SiC paper. 5 groups (n=8 in each group) of Y-TZP were samples randomly assigned according to the surface treatments applied which were as follows; Control group, No further treatment (C), Airborne particle abrasion with 50 µm Al2O3 particles (KUM), Laboratory tribochemical silica coating with 30 µm Al2O3 particles + silane coupling agent (ROC), Plasma polymerization (PP), Plasma etching (PA). Surface roughness and film thickness of samples were determined by using the atomic force microscope. Surface chemistry of coated specimens was characterized by X-ray photoelectron spectroscopy. Contact angle measurements were performed with sessile drop technique. All specimens were cemented with 10-methacryloyloxydecyldihydrogen- phosphate containing resin cement (Panavia F 2.0). Microshear bond strength tests were performed with a universal testing machine at a cross-head speed of 0.5 mm/min. The failure mode was also recorded by examining each specimen at x10 magnification using steromicroscope. The study design included multiple dependent variables therefore, a multivariate analysis of variance (MANOVA) test was performed ($F=26.488$, $df=16$, $p=.000$) Then, the differences in mean microshear bond strength values of each group were analyzed using One-way analysis of variance (ANOVA) followed by Post Hoc multiple comparisons.

Results: The average bond strengths and the standard deviations (mean±SD MPa) of the four experimental groups were as follows: KUM (7.92±1.6 MPa), ROC (9.25±2.12 MPa), PP (8.13±1.58 MPa), PA (8.72±2.08MPa). All four experimental groups had higher microshear bond strength values than the control group (5.84±1.37 MPa), ($p<.05$). PP showed the lowest average surface roughness. X-ray photoelectron spectroscopy data showed the presence of Si and chemical bonds in plasma

polymerized thin film structure. The thickness of thin film was measured as 96 nm. Contact angle measurements showed all groups were significantly different from each other (p<.05) and the highest average hydrophilic surface character was obtained from the PA group (52.01°±1.13°). Failure modes were predominantly (%83.3) adhesive.

Conclusions: Although statistically higher bonding values can be obtained with plasma groups than the control group differences between groups were statistically insignificant. This research also shows that surface characteristics can be improved with plasma methods however there is need for further research to clinical use.

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EFFECTS OF SANDBLASTING/SILANIZATION ON THE LONG-TERM CAD/CAM RESIN BONDING

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Keywords: CAD/CAM, surface treatment, bond strength

Purpose/Aim: Advances in digital impression technology and manufacturing processes have led to a dramatic paradigm shift in dentistry and to the widespread use of computer-aided design/computer-aided manufacturing (CAD/CAM) in the fabrication of indirect dental restorations. Research and development in materials suitable for CAD/CAM applications is currently one of the most active fields in dental materials. However, limited information is available about the effect of surface treatment on bonding between highly polymerized CAD/CAM resin blocks and resin cements. The purpose of this study was to assess the effect of surface treatment on bonding and its durability between CAD/CAM resin blocks and adhesive resin cements after sandblasting and/or silanization.

Materials and Methods: Twenty four CAD/CAM resin blocks (KATANA AVENCIA BLOCK, Kuraray Noritake) were divided into two resin cement groups: PANAVIA V5 group (PV5, Kuraray Noritake) and PANAVIA SA CEMENT Handmix group (PSA, Kuraray Noritake). Each group was divided into 4 subgroups depending on the surface treatment methods provided: (1) no treatment subgroup (Co), (2) silanization subgroup (Si), (3) sandblasting subgroup (Sb), and (4) silanization and sandblasting subgroup (Sb+Si). Sandblasting and silanization were conducted with Adabrader (Morita) and CLEARFIL CERAMIC PRIMER PLUS (Kuraray Noritake), respectively. After each surface treatment, resin cements were built up on the blocks and light-cured. Each specimen was stored in water at 37? for 24 hours and cut into 0.7 mm × 0.7 mm beams (n=32 per blocks). Micro tensile bond strengths (μTBSs) were measured immediately (0 month), 1 month, 3 months, and 6 months after immersion in water at 37?. The data were submitted to three-way ANOVA followed by Scheffé's test (a=0.05). The fractured surface after μTBS testing and the surface after each surface treatment were analyzed by scanning electron microscopy (SEM).

Results: μTBSs in a PV5 group were significantly higher than those in a PSA group (P<0.001). In a PV5 group, Si, Sb and Sb+Si subgroups showed significantly higher μTBSs compared to a Co subgroup (P<0.001) and μTBSs after 1, 3, and 6 months were significantly lower than those after 0 month (P<0.001). In a PSA group, Si, Sb and Sb+Si subgroups showed significantly higher μTBSs compared to a Co subgroup (P<0.001) and μTBSs after 3 months (P=0.007) and 6 months (P<0.001) were significantly lower than those after 0 month. Specimens of Co subgroups in both PV5 and PSA groups tended to show interface fracture. In a PSA group, a lot of bubbles were observed on the fractured surface.

Conclusions: Both surface treatment methods, sandblasting and silanization, had positive effect on bonding and durability between CAD/CAM resin blocks and resin cements.

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FROM PLANNING TO EXECUTION. A SUCCESS STORY.

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Abstract: The presentation features the importance of treatment planning before preceding with treatment. Digital analysis is key to determine the road map.
Step by step approach will be presented for cases of different levels.

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MINIMAL INVASIVE TREATMENT CONCEPTS: FACTS AND VISIONS

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Abstract: Aesthetic demands but also restorative needs in anterior and posterior dentition have changed dramatically within the last decades. All-ceramic materials and CAD/CAM technologies are increasingly used in prosthetic dentistry. The paradigm shift in fixed prosthodontics from traditional to minimal invasive treatment approaches is evidenced by the clinical long-term success of bonded glass-ceramic restorations. Modern all-ceramic materials deliver superior aesthetics and reliability, as shown by contemporary material science. Advancements in all-ceramic systems and adhesive technologies enable the development of innovative defect-oriented treatment concepts for restoring compromised dentition. Modified onlay and full veneer preparation geometries evolved and form a reliable alternative for conventional full-coverage crowns. Nowadays non-retentive preparation designs in combination with reduced ceramic thicknesses allow for a minimal invasive treatment approach. A perspective on future developments in minimal invasive adhesive dentistry will be addressed.

Lecture Objectives:

1.) To provide guidelines for minimal invasive preparation designs and recommended ceramic thicknesses
2.) To give rationale of case based selection of modern ceramic materials and CAD/CAM systems
3.) To present scientific evidence pertaining to the clinical success of all-ceramic materials and minimal invasive restorative technologies.

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FATIGUE RESISTANCE OF ZIRCONIA-BASED CROWNS: CORE THICKNESS AND DESIGN EFFECT

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Keywords: Fracture strength; fracture mode; zirconium oxide; Zirconia core design; thickness; crown; ceramics

Purpose/Aim: to evaluate the influence of varying the core thickness and modifying the core design on the fracture strength, mode and extent of zirconia-based crowns and to compare it to the metal-ceramic crowns.

Materials and Methods: An ivorine molar was prepared to receive an all-ceramic crown. Using an epoxy resin, 50 replication dies were made of the prepared tooth. Forty all-ceramic crowns were made using zirconium-oxide cores (IPS e.max ZirCAD) and pressed veneering porcelain (IPS e.max Zirpress). All-ceramic crowns were fabricated according to four different coping designs (n=10/group): 0.6mm even-thickness (group 1), 0.6mm anatomically-shaped (group 2), 1mm even-

thickness (group 3), and 1mm anatomically-shaped (group 4). In addition, ten metal-ceramic crowns were fabricated as controls. All crowns were cemented to their respective dies using resin cement (PanaviaF 2.0). After water storage, crowns were subjected to cyclic loading in a universal testing machine (50–600N for 500,000 cycles at 20Hz). After fatigue, crowns were loaded to fracture at crosshead speed of 0.5 mm/min. Fracture load, mode and extent were recorded. Data were analyzed using factorial ANOVA and chi-square or Fisher's exact test at a=0.05.

Results: All the all-ceramic crowns survived the fatigue test, while two metal-ceramic crowns failed during the fatigue testing. Factorial ANOVA revealed a statistically significant effect for the core thickness (Mean [SD]: 0.6 mm= 2,543 [716] N and 1mm= 3,061 [816] N), but not for the core design and the interaction term. Metal-ceramic crowns showed significantly higher mean fracture load in comparison to group1. All the all-ceramic crowns except two showed fractures involving the veneering porcelain only. Similarly, all the metal-ceramic crowns showed fractures involving the veneering layer only with exposure of the metal copings. Fisher's exact test revealed no significant effect for the core thickness and design on the fracture mode. In contrast, core design but not thickness influenced the fracture extent. Higher percentages of failure involving the axial walls were observed for the even thickness copings.

Conclusions: The core thickness, but not the core design, had a significant effect on fracture strength of zirconia-based crowns. Anatomically shaped copings reduced the extent of the veneering porcelain fracture.

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MICROTENSILE BOND STRENGTH BETWEEN PICN AND COMPOSITE BY ETCHING TIME

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Keywords: polymer infiltrated ceramic network, composite, microtensile

Purpose/Aim: To access the effects of how acid etching time affects microtensile bond strength between PICN and resin depending on different etching time to the surface of PICN.

Materials and Methods: The surface of PICN was etched by hydrofluoric acid for 0, 30, 60, 90 and 120 seconds respectively and after applying multi-purpose silane, composite resin test specimen was made with 8mm thickness. In the control group, feldspartic porcelain was used after etching with 9.5% hydrofluoric acid for 60 seconds. Microtensile bond strength was measured with a bar shape of 1mm length, width and 16mm height. Additionally, the surface of PICN was evaluated by a scanning electron microscope.

Results: Every group etching was processed with 9.5% hydrofluoric acid showed significantly high microtensile bond strength compared with the group etching was not processed. There was no significant difference in microtensile bond strength between a group which etched feldspartic porcelain for 60 seconds and groups which etched PICN for 30, 60, 90 seconds. A group which etched PICN for 120 seconds appeared to have the highest microtensile bond strength.

Conclusions: With the expectation of bonding resin cement to PICN, etching with 9.5% hydrofluoric acid for 30 seconds would lead to a equivalent result of bond strength between feldspartic porcelain and resin which are used traditionally.

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FRACTURE STRENGTH OF DIFFERENT TYPES OF CAD/CAM MONOLITHIC CROWNS

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Keywords: monolithic crowns, resin nano ceramic, implant

Purpose/Aim: To examine the fracture strength of different implant-supported monolithic crowns fabricated with CAD/CAM technology.

Materials and Methods: IPS e.max CAD, Lava Ultimate, and VITABLOCS Mark II CAD/CAM monolithic reconstructions were used in the present study. Mandibular first molar crowns were fabricated and cemented onto the paired abutments with a self-adhesive resin cement. After cementation process, all specimens were kept in distilled water at a temperature of 37 °C for 24 h. Half of the specimens were also submitted to 5000 thermal cycles. Afterwards, the specimens were attached to a custom jig of a universal testing machine and subjected to a compressive force at a crosshead speed of 0.5 mm/min until failure occurred. Furthermore, one fractured specimen of each group was examined under a scanning electron microscope. The data were analyzed with two-way ANOVA and post hoc Tukey-Kramer multiple comparisons tests (a=0.05).

Results: The highest fracture strength value was seen in thermocycled IPS e.max CAD specimens. No significant difference was found in fracture strength between IPS e.max CAD and Lava Ultimate specimens ($p>0.05$). In addition, after thermocycling, significant reduction in fracture strength was found to be for Lava Ultimate specimens ($p=0.002$).

Conclusions: Implant-supported monolithic crowns including lithium disilicate and feldspathic glass ceramics have enough fracture strength to survive under chewing forces in the molar region and resin nano ceramic materials seem to be a promising prosthetic unit for a single crown.

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MAKING SENSE OF COMPLICATION REPORTING FOR FIXED IMPLANT AND TOOTH-SUPPORTED DENTAL PROSTHESES

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Abstract: Unpredicted complications associated with dental prostheses are difficult to classify and cost patients or clinicians both time and money. Clinicians juggle data about outcomes and complications to help guide treatment decisions. But complication reporting is confusing and often misleading. A single complication type can variously be described as part of routine maintenance, a minor or even a major complication, with significantly different biological, mechanical and fiscal consequences. Identifying a mechanical complication is relatively straightforward, such as a fractured implant abutment screw or a fractured veneering porcelain. But identifying biologic complications and appropriate management regimens, such as for implant marginal bone loss, is not as straightforward. Diagnostic parameters – bleeding on probing and evaluation of radiographs are unreliable and misleading and can result in unwarranted "therapeutic remedies", increasing the complication burden. This lecture will explore complications, how they can be identified and classified, and demonstrate the use of a new fiscal-based classification system when comparing the up-to 15-year outcome of single implant crowns and 3-unit tooth-supported FDPs.

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INTEGRATING CERAMIC SCIENCE IN ROUTINE AND COMPLEX PROSTHODONTICS

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Abstract: Dentistry that is esthetic to the patient is an important clinical objective. The knowledge within dental technology, dental science and dental practice has dramatically expanded leading to better quality; artistry and more standards based clinical applications. Ceramics are the most consistently predictable esthetic dental material. Today dentists can offer more treatment options for patient's complex problems. The single phase or monolithic all-ceramic materials have become increasingly more popular and do not chip as do all bi-layered ceramic materials. These types of dental ceramic materials are dominating the market and future development bringing with it more long-term success.

All-ceramic materials were developed to improve ceramic color and marginal fit. Until recently few research reports attempted to study their long term use or factors that relate to their performance without modeling the data. Present bi-layered all-ceramic crowns on molars have reached their full potential. Despite substantial improvements in material strength and toughness, they still fail because of breakage and chipping at relatively high rates. The Lithium Disilicate E Max and Zirconia mono-layered all-ceramic material is changing dentistry and the expectation for long-term ceramic survival. Original research will be presented that studied the clinical behavior of over five thousand all-ceramic restorations and thirty years.

Learning Objectives:

1. To understand what factors and concerns a prosthodontist / dentist would have treating patients that require "esthetic procedures".
2. To understand the problems and controversies that exists with modern dental materials.
3. To understand what clinical factors impact on long term survival of dental ceramic materials.
4. To understand the science of dental ceramic materials with a look to the future

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PREDICTABLY ADDRESSING PATIENTS' ESTHETIC NEEDS: A REAL CHALLENGE

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Abstract: Rehabilitating a patient's anterior esthetic region can be a real challenge for the restorative dentist, since he has to take into consideration several important parameters, including the lip line, gingival biotype, adjacent teeth, remaining tooth structure, tooth vitality, proper lip support, incisal guidance, envelope of function, type of restoration and last but not least the proper material for the individual case. Of utmost importance is the use of a material that will mimic the optical behavior of natural teeth not only by matching the surface texture and the color components of hue, value and chroma, but also by blending with the specific characteristics of the adjacent teeth.
The quest for a material presenting opalescence, fluorescence and similar light absorption, reflection, diffuse reflection and transmission as those of the natural tooth, has led to the development of several ceramic systems. The restorative dentist has to understand the preparation requirements, the biologic response, the optical and mechanical properties and the handling characteristics of the materials available, in order to make his decision. Therefore, a careful search of the existing literature and extraction of useful data are required. An accurate treatment planning, interdisciplinary teamwork and communication with the laboratory technician are also key points for a successful result.
The ultimate goal should be a biologic and functional outcome which will harmoniously integrate the facial and oral characteristics of the patient.

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DIGITIZATION-HOW LONG CAN WE GO IN PROSTHODONTICS?

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Abstract: Digitization has become important part of the contemporary prosthodontics because most of the prosthodontic procedures can be performed with the digital technologies. Patient management, diagnosis, tooth preparation, making impressions, recording jaw movements, shade selecting, and prosthesis manufacturing, etc, all have become or are becoming digital. CAD-CAM has revolutionized not just the fixed prosthdontics (e.g. all ceramic restoration) but has also been used for the CAD-CAM RPD, Complete denture, implant therapies, maxillofacial prosthesis, esthetic dentistry, virtual articulators and digital face bows, robot articulator, or in the field of training, education and research by the use of virtual patient programs, and others. The digitization and technology in prosthodontics can be used both in the clinical and lab procedures like use of CAD-CAM technology, stereolithography, rapid prototyping, and etc. This speech presents various aspects of prosthodontics where digital technology has modified the conventional procedures. The precision, efficiency, accuracy, and its revolutionary changes that the digital technologies bring to prosthodontics will be discussed based on the experience of Peking University School of Stomatology. The usage of digitization and digital prosthodontics has shown a splendid future to all clinicians.

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ARE THE CERAMIC ABUTMENTS THE SOLE WAY TO TRANS-MUCOSAL IMPLANT ESTHETICS?

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Synopsis: The esthetics in the peri-implant/restorative interface depend on the cervical morphology of the restoration, the healthy and harmonious mucosal contour and the cervical optical behavior of the abutment that provides the overlying soft tissue with internal lighting. Although, upon excellent clinical management, the custom-made all-ceramic trans-mucosal Zirconia abutments provide the restorative site with these characteristics resulting to acceptable esthetic outcomes, in certain aspects their application contains some limitations:

1. The long-lasting mechanical properties of Zirconia custom-made abutments are in question due to the phenomenon of low temperature degradation.
2. The opacity that characterizes their optical behavior as well as the absence of fluorescence restricts the adequate trans-illumination of the soft tissues.
3. Unflavored implant inclinations restrict their use not providing the restorations with adequate retention.

The presentation after covering the historical development of esthetic abutments since the 90's of last century, will present the alterative solution found in the application of the ceramo-metal trans-mucosal abutments.

Learning Objectives:

a) To draw the attention to the esthetic parameters of the transmucosal area.
b) To evaluate the limitations in applying prefabricated or custom-made CAD CAM all-ceramic abutments.
c) To explore the clinical application of the ceramo-metal abutments, and discuss the existing scientific evidence in evaluating their performance.

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INFLUENCE OF CERAMIC PRIMERS ON THE BOND STRENGTH TO ZIRCONIA

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Keywords: zirconia, adhesion, MDP

Purpose/Aim: (1) to evaluate and compare the effect of a novel MDP containing ceramic primer (Ceramic Primer II. (GC)) with Clearfil Ceramic Primer (Kuraray) on the bond strength of resin cements to zirconia. (2) to compare the effects of ceramic primers applied on a polished or on a sandblasted zirconia surface.

Materials and Methods: Nine groups of sintered zirconia plates (n=12) were prepared with different surface treatment methods, either polished (P), or sandblasted (SB). Surface treated specimens were prepared by bonding cylinders of luting cements (f=2,5mm, h=3mm). Shear bond strengths were measured with a universal testing machine. The following resin based luting materials and proposed ceramic primers were used in this study: Panavia F 2.0 cement (Kuraray), Clearfil Ceramic Primer (Kuraray), G-Cem LinkAce cement (GC) and Ceramic Primer II. (GC). A resin reinforced glassionomer cement (F) Fuji Plus (GC)luted on polished zirconia surface served as control (Group C). Both resin cements were tested on polished surface witht and without the application of ceramic primers, and on sandblasted surface with or without the application of ceramic primers.

Results: Both Clearfil Cemamic Primer and Ceramic Primer II. could increase bond strength. The bond strength of G-CEM LinkAce was significantly higher than those of Panavia F 2.0 in each subsets. Sandblasting increased significantly the adhesion of both examined luting materials and this effect was significantly higher compared to the effects of the chemical adhesion improvement (via ceramic primers). The highest shear bond strenght values were measured following both sandblasting and priming, but the improvement did not reach the sum of the improvements provided by sandblasing or priming alone.

Conclusions: The application of a primer, containing both silane and MDP can improve bond strength of MDP containing resin cements to zirconia. However sandblasting and priming do not show synergistic effects.

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CONSERVATIVE RESTORATIVE MANAGEMENT OF WORN DENTITION USING DAHL CONCEPT

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Keywords: tooth wear, verrtical dimension of occlusion, adhesive techniques

Purpose/Aim: To use adhesive principles with conservative technique to restore worn teeth ensuring favorable pulpal health and sufficient remaining tooth structure

Materials and Methods: Tooth surface loss (TSL) is a normal physiological process that occurs throughout life. However, if the rate of wear challenges the viability of teeth or is the source of concern to the patient, then TSL may be considered pathological. While for some cases passive management and monitoring may suffice, for a proportion of cases active restorative intervention will become necessary. In the majority of the patients, TSL is accompanied by dento-alveolar compensation to preserve the efficacy of the masticatory system and the inter-occlusal clearance is seldom available to accommodate restoration. One option would be to follow traditional prosthodontic protocols through tooth reduction to conform to the existing occlusion. An alternative approach is to create the necessary space by re-organizing the occlusion by means of arbitrary increase of vertical dimension of occlusion (Dahl concept). It refers to the relative axial tooth movement that is observed when a localized appliance or restorations are placed in supra-occlusion and the occlusion re-establishes over a period of time. With advances in adhesive dentistry a number of options have become available including direct and

indirect composite resin, ceramic restorations and cast adhesive alloy. The steps in restoring worn dentition in some cases with adhesive materials are presented.

Results: Use of adhesive restorations was proved to be a viable option to treat worn teeth

Conclusions: Treatment of worn teeth using adhesive materials helps to intercept tissue destruction and to restore proper tooth biomechanics, function and esthetics which do not further invade hard tissue

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A 3D KERATINOCYTE CULTURE MODEL CREATING A KERATINIZED EPITHELIAL EQUIVALENT

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Keywords: alveolar mucosa, gingiva, keratinization

Purpose/Aim: Gingival augmentation requires surgical procedures which usually discomfort the patients. Complete understanding of the molecular mechanisms of oral mucosal keratinization would help to develop less invasive procedures. Recently refined 3D culture models create a stratified equivalent to the native gingiva. In these models, additional feeder cells and connective tissues enable keratinocytes to differentiate and keratinize; unfortunately, their complex biological interactions complicate the measurement of molecular phenomenon. We tried to establish a feeder- and connective tissue-free 3D culture model of oral mucosal keratinocytes to create a keratinized epithelium mimicking the native gingiva.

Materials and Methods: Keratinocytes isolated from gingiva and alveolar mucosa of pigs were cultured in a progenitor cell targeted defined medium, CnT-57 (CELLnTEC, Bern, Switzerland) with 0.07 mM calcium and 6 μg/ml bovine pituitary extract. Fourth to sixth passage keratinocytes were seeded into 0.4 μm pore inserts in 24-well plate and were grown until confluent. The medium was replaced with a 3D prime medium, CnT-02-3D (CELLnTEC) with 1.2 mM calcium. An air/liquid interface at cell layer was made and kept for 1 and 2 weeks. The frozen sections of cell sheets at each period were prepared for keratin (K) immunohistological analysis. Targets were K1/K10 specific to keratinized mucosa and K4/K13 specific to non-keratinized mucosa.

Results: The cell sheets derived from gingival keratinocytes (GCS) and alveolar mucosal keratinocytes (AMCS) showed a similar development of cell layer; they created basal and suprabasal layers at 1 week and added a keratinized layer at 2 weeks. K1 distribution in GCS and AMCS accorded with that in the native gingiva; however, the other Ks' distribution did not. K10 was localized in GCS but not in AMCS. K4 and K13 were distributed before keratinization. After keratinization, K4 was localized weakly in GCS but not in AMCS, while K13 was localized in both GCS and AMCS.

Conclusions: This 3D keratinocyte culture model created a stratified keratinized epithelium mimicking gingiva and could be useful to detect the molecules which suppress oral mucosal keratinization in vivo. The findings also suggest that alveolar mucosal keratinocytes have a potential to keratinize and Ks are not necessarily appropriate markers to measure keratinization.

EFFECTS OF ULTRASONIC/ACID CLEANING ON THE LONG-TERM CAD/CAM RESIN BONDING

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Keywords: CAD/CAM, adhesion, surface treatment

Purpose/Aim: Recently, dental restorations milled out of resin blocks by computer-aided design/computer-aided manufacturing (CAD/CAM) technology have been established. Several highly polymerized CAD/CAM composite resin block materials are available on the dental market. However, although several bonding methods are recommended as the surface treatment of CAD/CAM composite resin, available information is scarce. The purpose of this study was to assess the long-term effect of ultrasonic and acid cleaning on CAD/CAM resin blocks with a micro tensile bond strength (μTBS) test and scanning electron microscopy (SEM).

Materials and Methods: Twenty four experimental CAD/CAM resin blocks (KATANA AVENCIA BLOCK, Kuraray Noritake) were divided into 2 resin cement groups: PANAVIA V5 group (PV5, Kuraray Noritake) and PANAVIA SA CEMENT Handmix group (PSA, Kuraray Noritake). Each group was divided into 4 subgroups: (1) no treatment subgroup (Co), (2) ultrasonic cleaning subgroup (Uc), (3) acid cleaning subgroup (Ac), and (4) ultrasonic and acid cleaning subgroup (Uc+Ac). All specimens were first sandblasted with Adabrader (Morita) and silanized with CLEAFIL CERAMIC PRIMER PLUS (Kuraray Noritake). Resin cements were built up on the blocks and light-cured. Each specimen was stored in water at 37°C for 24 hours and cut into 32 beams (0.5mm2). Twenty four beams were randomly chosen in each subgroup, and μTBSs were measured immediately (0 month), 1 month, 3 months, and 6 months after immersion in water at 37°C. The data were submitted to three-way ANOVA followed by Scheffé's test ($p<0.05$). The surfaces after each treatment and the fractured surfaces were analyzed by SEM.

Results: Three-way ANOVA analysis revealed a significant effect for the parameters 'surface treatment' ($p<0.001$, $F=40$), 'resin cement' ($p<0.001$, $F=697$) and 'aging' ($p<0.001$, $F=72$). μTBSs in a PV5 group were higher than those in a PSA group. In a PV5 group, μTBSs in a Co group were significantly higher than those in Uc, Ac and Uc+Ac groups ($p<0.001$). In a PSA group, the surface treatment methods showed no significant influence on μTBS ($p>0.05$). μTBS values decreased over time in both PV5 and PSA groups, and they showed statistically significant time-dependent differences ($p=0.04$~$p<0.001$). Regarding surface morphology, differences were not found between Co group and Ac group. Most specimens were fractured within the part of resin cement and a lot of bubbles were observed on the fractured surface in a PSA group.

Conclusions: Ultrasonic and acid cleaning after sandblasting had no effects on increasing the long-term bonding durability between non-contaminated CAD/CAM resin blocks and resin cements.

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EFFECT OF CHRONIC MYALGIA IN TMD PATIENTS ON SLEEP STATUS

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Keywords: chronic pain, TMD, Sleep

Purpose/Aim: Central sensitization syndrome proposed by Yunus is a group of disease to develop central irritation as a cause. The chronic myalgia of masticatory muscles which are difficult to treat is thought to be included in this disease concept. Also, the possibility that sleep problem has an influence on the chronic pain has been reported in recent studies. We have reported that sleep quality and physical activities play an important role not only on chronic jaw pain but also chronic body pain. The objective of this study is to clarify how chronic myalgia in TMD patients affect their sleep status.

Materials and Methods: Female TMD patients (n=7, 39.3±9.9 years old) and female non-TMD patients (n=9, 41.2±10.2 years old) were recruited in this study. Sleep condition was recorded with Actigraph. Subjects were directed to wear Actigraph for 14 consecutive days and to answer following questionnaire everyday: 1) subjective jaw pain intensity at every three hours after awakening (visual analog scale); 2) subjective body pain intensity (visual analog scale); 3) subjective assessment of sleep quality (visual analog scale).These parameters were statistically analyzed using a linear mixed effect model in which patient's age and the presence of menstruation were compensated. A linear mixed effect model is a statistical model containing both fixed and random effects. These mixed models are useful in settings where repeated measurements are made (longitudinal study) to suggest the causal relationship. This study was approved by the Ethics Committee on Clinical Research of the Osaka University Graduates School of Dentistry and was supported by Japan Society for the Promotion of Science (JSPS), Grant-in-Aid for Scientific Research (B) #25293392. The authors have no conflict of interest regarding this research.

Results: The higher the jaw pain of the previous day (within 6-hours after awakening), the lower the sleep quality became (Odds ratio=.993, p=.049, 95%CI: .987-.999). The intensity of jaw pain in the previous day did not affect the total sleep time.

Conclusions: The study results, along with our previous report that sleep quality and physical activities play an important role not only on chronic jaw pain but also chronic body pain, suggest that the chronic myalgia and sleep status could form the vicious cycle.

	Dependent variables							
	Total sleep time				Quality of sleep			
	Odds ratio	P	95% CI		Odds ratio	P	95% CI	
Covariates			min	max			min	max
The maximum jaw pain within 6 hours after awakening	1.000	.859	.997	1.002	.993	.049	.987	.999
The maximum jaw pain after more than 6 hours from awakening	.999	.428	.997	1.001	.995	.130	.990	1.001

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3D ENGINEERING IN IMPLANT PROSTHODONTICS

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Abstract: One of the important goals of comprehensive dental rehabilitation is to achieve a pleasing harmony between the face, smile and teeth. Here, a number of tools are being implemented by the clinicians to evaluate the relationship between the different components of the face and to provide guidance for treatment planning as well as for the fabrication of the final restorations. With the emergence of digital technologies, a shift towards implementing digitally-driven 3D engineering tools is obvious. Compared to conventional methods, the ultimate goal of these 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 digital workflow in comprehensive dento-facial rehabilitation and discuss different possibilities and advantages when using a conventional or a digital approach. Focus will be given to implant rehabilitation.

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SIMPLE, FAST AND PAYABLE. CAD-CAM FOR EDENTULISM

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Abstract: Demographics still show a high incidence of edentulism. The multiple options to treat edentulous patients challenge the restorative dentist on many levels. Beside biological and esthetic aspects – especially in implant-supported restorations- also technological problems have to be solved. The presentation gives a comprehensive summary of the scientific background, the clinical solutions that are available today and the decision making process for their selection. Special emphasis is given to CAD-CAM procedures fabricating simple acrylic complete dentures as well as more complex high-tech ceramic superstructures. The demanding treatment of edentulism is analyzed step-by-step and critically evaluated.

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CLINICAL IMPLICATION OF CAD/CAM IN CONVENTIONAL FIXED PROSTHODONTICS IN KOREA

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Abstract: This presentation will discuss the clinical implications of CAD/CAM in conventional fixed prosthodontics.

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DIGITAL PROSTHODONTICS: WHAT IS COMING NEXT?

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Abstract: Current development of digital technologies in dentistry is still segmented and it is necessary to complete the patient's treatment from A to Z. Development cycle of new technologies and new products in digital world has become shorter and shorter. The digitalization is affecting to what we do in everyday dentistry as well. To keep up current and upcoming digital technologies and products in dentistry could be difficult for practitioners. This presentation will provide updated knowledge on the current and future flow of the digital prosthodontics, which is integrating some areas of the digital technologies in dentistry. Current status of digital technologies and their limitations will be discussed in this presentation as well as upcoming digital technologies.

Goals and Objectives:

1. To provide knowledge of Digital prosthodontics work flow
2. To provide an insight of limitations of the digital prosthodontics at present time
3. To provide upcoming of Digital prosthodontics information

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SCANNING ACCURACY AND LEARNING CURVE OF 3D INTRAORAL SCANNERS

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Keywords: intraoral scanner, accuracy, learning curve

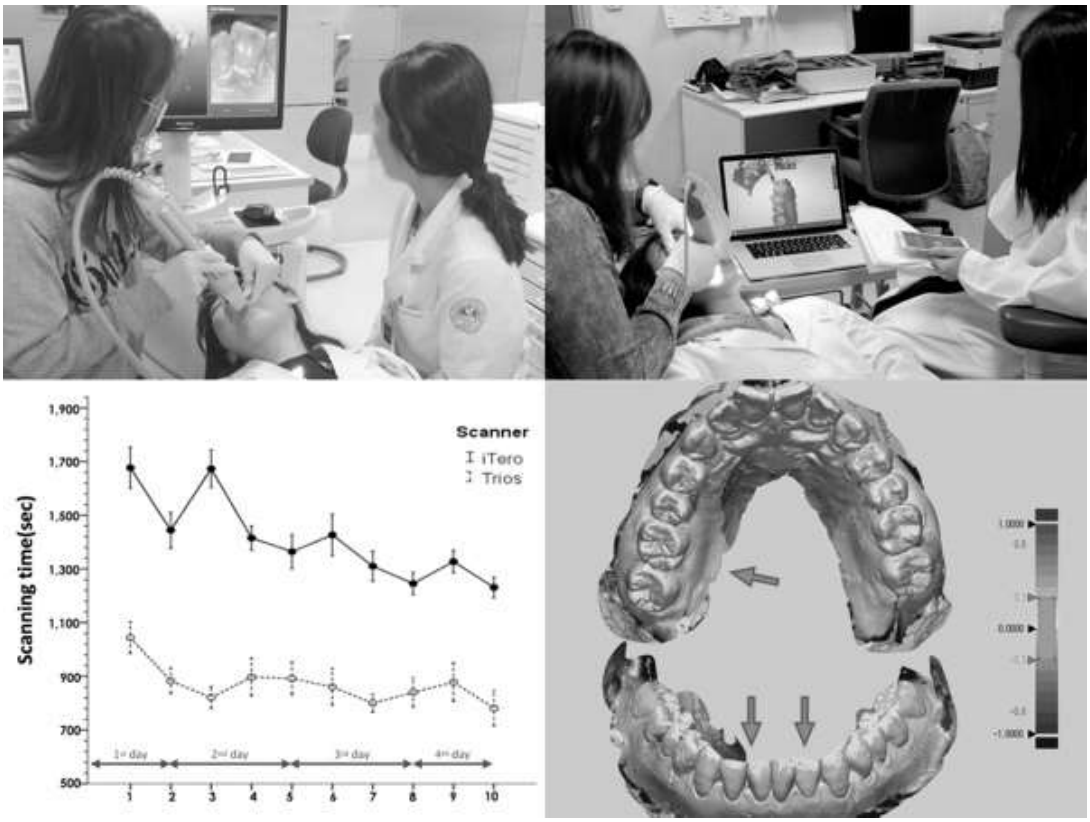
Purpose/Aim: This study aimed to compare the learning curves of two three-dimensional intraoral scanners for making digital impressions and determine whether repeated scanning could change the scan time. And the scanning accuracy during learning period was studied according to the same independent variables.

Materials and Methods: A total of 29 applicants with more than 3 years of working experience scanned the oral cavity of subjects 10 times using the iTero or the Trios intraoral scanner. The recorded scan time (ST) was analyzed and changes in the ST were compared between the two devices. The intraoral scan image and rubber impression scan data of the same subjects were superimposed using reverse engineering software. The superimposed images were measured to acquire trueness and precision accuracy. The data were analyzed with repeated measure one factor and two factor analyses and the significance level was set at $p<.05$.

Results: The average ST for 10 sessions was greater with iTero than with Trios. After the learning curve was completed, the decrease in the measured ST was greater for iTero than for Trios ($p<.05$). When the applicants were stratified by clinical experience, the mean ST with iTero showed statistically significant differences ($p<.01$) between groups, while there was no significant difference with Trios. Among the four subjects scanned, the total scanning time was influenced by the complexity of subjects' oral structures. For precision parameter, Trios group showed statistically lower deviation ($p<.01$). With regard to trueness, statistically increased accuracy was shown with iTero during the learning period ($p<.01$). There was significant difference according to clinical experience ($p<.05$), subject's oral condition ($p<.05$) in the iTero group.

Conclusions: Although the learning rate of iTero was fast, the average ST was longer than that with Trios, with clinical experience having an influence on manipulation. The learning rate of Trios, on the other hand, was slow, but the measured ST was shorter and was not influenced by clinical experience. The learning procedure of iTero intraoral scanner influenced on the scan accuracy. The repetitive practice of iTero scanner is recommended for its clinical application because the clinical

experience and the oral condition also showed to have an influence on the accuracy. While the learning effect couldn't be found in Trios group, this device could be used easily in the clinic because the precision was better than iTero scanner and the trueness was not influenced by the same independent variables.



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CAD/CAM BEYOND ITS LIMITATION

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Keywords: THE DIGITAL COMMUNICATION & COLLABORATION

Case Presentation: Recently, CAD/CAM has been focused in the field of dentistry world-wide Because of this interest, its equipment and materials have improved with remarkable speed. Also, the digital prosthetic production method is even easier to get communication and collaboration between a dentist and technician than the traditional analog way. I think that the digital method called for much more understanding and standards for clinicians because of many reasons that you can notice the problems directly that also happen in analog. For material, in my opinion, esthetic materials like glass and zirconia have been brought into focus. In the case of glass, it can be formed by CAD/CAM milling and pressing, however zirconia can be made only by milling. Nowadays, for milling, the way using CAD/CAM is being used more than the manually copy milling way which is the analog way. Especially monolithic zirconia, this way is widely used. Monolithic zirconia has been used for the posterior part because of its high strength, but it has been used narrowly because of the limitation of its esthetic usage etc. However the usage of monolithic zirconia is spreading increasingly because of its remarkable development. So, I am going to introduce THE DIGITAL COMMUNICATION & COLLABORATION between a dentist and a technician by understanding the characteristics of materials made from various clinical experiences and CAD/CAM milling by the utilization of MONOLITHIC ZIRCONIA to get some ways that maximize the benefit in the process from COLOR INTRA ORAL SCANNER to intra-oral clinical application and to get the best result. Furthermore,I would like to introduce analogue implant installation-digital monolithic zirconia prosthesis, and the latest digital surgical guide implant installation-provisional prosthesis cases.

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INNOVATIVE DRUG DELIVERY METHODS FOR THE TREATMENT OF DENTAL DISEASE

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Abstract: Dentinal hypersensitivity and pulpal inflammation pose significant challenges to both patients and clinicians. The pulp is encased in hard tissue and therefore, treatments provided systemically are rarely effective, and local drug delivery is difficult to perform without invasive procedures.
In this presentation a novel technology to deliver therapeutic magnetic particles to the dental pulp using naturally occurring dentinal tubules will be described. This innovative application is designed to be a platform technology. Data will be presented to support its use for the treatment of pulpal inflammation, dentinal hypersensitivity and to improve composite bond strength to dentin.
This technology depends on the use of powerful, miniature, safe magnets. Using these magnets, magnetic arrays can be designed to direct forces to produce efficient delivery of nanoparticles to the pulp.
If successful, this technology could produce a paradigm shift of how dentists treat dental disease.

Concurrent Session- Evidence Based Dentistry / Tissue Engineering

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THE RELEVANCE OF DENTAL RESEARCH IN CLINICAL PRACTICE

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Abstract: Does current dental research have relevance to practice today? Few of the thousands of papers published annually result in guidance for clinicians to provide their individual patients with objective, predictable treatment outcomes. Arithmetic means and survival statistics are helpful but do not address the multifactorial problems involved in managing a specific clinical scenario. This paper will highlight some of the limitations of current research methodology and explore possible methods to narrow the dichotomy between research and practice to benefit the public we serve.

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EVIDENCE-BASED ESTHETICS OF THE SMILE: A SYSTEMATIC REVIEW

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Objectives: Evidence-based knowledge on the parameters that define an attractive smile is limited, and for this reason assessment of smile esthetics in clinical dentistry is mostly expert-based rather than evidence-based. Therefore, the aim of this study was to systematically review the literature to find, appraise, and synthetize the available evidence on the characteristics that define an attractive smile.

Methods: Electronic databases were searched from January 1996 up to January 2012, and complemented by hand searching of the 7 most relevant dental journals. Only survey studies that used digitally modified images to quantify the population's preferences on specific esthetic parameters of the smile were included. The quality of individual reports was assessed following the STROBE criteria.

Results: The search retrieved 41 studies reporting on 28 different parameters of smile esthetics. These reports are summarized in the following guidelines that define a beautiful smile. Central incisors should have a width-to-length proportion of 75-85% and should be 135-200% wider and 1.0-1.8 mm more incisal than lateral incisors. The vertical position of central incisors' gingival margins should be within 1.5-2.1 mm of each other and 0.4-0.6 mm apical to the laterals. While smiling the lip should not cover more than 2.9 mm of the central incisors nor display more than 4.5 mm of gingiva. The maxillary midline should be within 3.2 mm and 3.6 mm of the facial and mandibular midlines respectively. The diastema should be smaller than 1.5-2.0 mm. Buccal corridors should represent less than 19.5% of the distance between the commissures.

Conclusions*:* This systematic review suggests that a beautiful smile can be defined by objective and quantitative parameters that could be used as guidelines for evidence-based dental esthetic treatments.

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LIFE QUALITY ASSESSMENT DEPENDING ON PERSONAL CHARACTERISTIC AND DENTURE INSTALLATION

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Keywords: life quality, personal characteristic, denture installation

Purpose/Aim: The aim of this study is to verify the quality of life depending on the state and the need for the denture prosthesis on the basis of the 5th (2010~2012) National Health and Nutrition Examination Survey Raw data.

Materials and Methods: This study was implemented using the 5th (2010~2012) National Health and Nutrition Examination Survey data. The number of subjects was 13,661, over 40 year-old. The socioeconomic characteristic of subjects was divided into 5 groups which are sex, age, location, education and income. The state of prosthesis was divided into 5 groups (natural tooth, fixed partial denture, removable partial denture, fixed partial denture- removable partial denture, Complete denture) for both jaw, but in this study only 2 states of both jaw was chosen. (complete denture, removable partial denture). The quality of life was assessed by the statement of denture and requirement using EQ-5D-3L and EQ-VAS.

Results: 1. In the EQ-VAS analysis of the quality of life, the average of the complete denture group was similar with that of the removable partial denture group. The EQ-VAS value of the natural tooth group was higher. ($p<0.05$) 2. According to the socioeconomic characteristics of EQ-VAS analysis, men who were under 65 years, highly educated, and have high income showed a better life quality. ($p<0.05$) Also depending on the location of residence, the Dong subgroup showed higher quality of life than the Eup/Myeon subgroup, but it was not statistically significant. ($p>0.05$) 3. According to the socioeconomic characteristics of EQ-5D analysis, men that were under 65 years and highly educated, lived in the Dong residence, and had high income showed better life quality. ($p<0.05$) In the comparison of education level in detail, the values of the middle-school graduates and the college graduates were not significantly different. For the income level, the high income group and the mid-high income group showed no statistically significant difference.

Conclusions: In a limited assessment using EQ-VAS and EQ-5D analysis, it is considered that the state of prosthesis affect the quality of life.

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EFFECTS OF RDP ON MASTICATORY PERFORMANCE IN SDA

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Keywords: masticatory performance, shortened dental arch, distal-extension removable dental prosthesis

Purpose/Aim: To synthesize knowledge about effects of distal-extension removable denture prostheses (RDPs) on masticatory performance of subjects with (extreme) shortened dental arches ((E)SDAs).

Materials and Methods: A systematic search of articles in English published in 2003-2014 was conducted in PubMed, MEDLINE, Cochrane Library, Embase, and Science Direct databases. Studies exposing data on subjects with (E)SDA and on masticatory performance with RDP were included.

Results: Four studies providing data on comminution tests, 3 on mixing ability tests, and 1 on both tests were included. Direct comparisons were hindered by a variety in experimental designs. Three studies revealed that comminution or mixing ability in subjects with (E)SDA was 28 to 39% lower compared to that of subjects with complete dentitions. In 2 studies, comminution test outcomes when chewing with an RDP in situ, ranged from 2 to 32% reduction indicating better chewing function (smaller X50) compared to comminution without the RDP. One study reported 28 to 83% lower mixing ability when chewing unilaterally at the RDP side than chewing at the dentulous side. Generally, more artificial teeth (or longer occlusal platform) in experimental RDPs resulted in better comminution and better mixing ability (significant in 4 out of 5 studies), indicating a "dose-effect" relationship.

Conclusions: Based on this systematic review it was concluded that: (1) subjects with (E)SDA had a reduced masticatory performance in the order of 30-40%; (2) distal-extension RDPs could compensate this reduction partially (some 50%); (3) more artificial teeth in RDPs resulted in better performance. (4) Distal-extension RDPs in subjects with SDA partially compensate reduced masticatory performance.

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PLATELET ADHESION BEHAVIORS ON 5 DIFFERENT MODIFIED PURE TITANIUM SURFACES

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Keywords: Titanium, Surface modification, Platelet adhesion, Surface topography

Purpose/Aim: To evaluate the platelet adhesion ability on pure titanium surfaces modified with different techniques, analyze the relationship between surface properties and platelet adhesion ability and obtain the information of optimal surface properties beneficial for bone formation.

Materials and Methods: Pure titanium specimens were treated with 5 different surface modification techniques, including machine polish(MP), dual acid-etch(DAE), sandblast-large grit and acid-etch(SLA), micro-arc oxidation(MAO) and anodized titania nanotube(TNT). The surface topographies of specimens were observed using scanning electron microscopy (SEM). Chemical compositions, surface roughness and static water contact angle of specimens were detected by energy dispersive spectrometer (EDS), confocal laser scanning microscope (CLSM) and contact angle analyzer respectively. Platelets were cultured on specimen surfaces for 30min. The amount and viability of platelets adhered were evaluated. Platelet distribution and morphology were observed by CLSM and SEM.

Results: Surface topographies of the five groups of specimens differed significantly. MP, DAE, SLA and MAO surfaces showed micro-scale topographies between 1 to 10μm, while TNT surfaces showed nano-scale topography with nanotubes at the diameter of (80.46±0.35)nm. MAO surface contained calcium and phosphorus elements and the surface roughness was measured (1.96±0.07)μm, which was the highest among the 5 groups. TNT surfaces demonstrated the lowest roughness, (0.72±0.04)μm, as well as the lowest static water contact angle, (13.55±0.39)°. The amount of platelets adhered on TNT surface was the greatest (300729) platelet/μL and platelet viability was the best. Platelet adhered intensively on TNT surfaces, forming pseudopod, extending and connecting with each other.

Conclusions: Surface properties of pure titanium affect platelet adhesion ability. Nano-scale topography can greatly improve platelet adhesion. Increased surface roughness and hydrophilicity can improve platelet adhesion ability.

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CEMENT SHADE EFFECT ON THE COLOUR OF PORCELAIN VENEERING MATERIALS

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Keywords: Lithium disilicate Glass Ceramics, Resin cements, Spectrophotometer

Purpose/Aim: The aim of this study was to evaluate the effect of cement shade on the color of the porcelain veneering materials.

Materials and Methods: Twenty-four veneers and 24 bars of Lithium disilicate glass ceramics (CAD blocks) with length 14 mm, width 12 mm and thickness 1mm were prepared. The veneers were divided into two groups Group A (N=12 veneers and 12 bars) and Group B (N=12 veneers and 12 bars). Shade evaluation of the veneers were done before cementation with Spectrophotometer for CIE La*b* and the veneers were cemented with the bars with two resin cements, Resin cement A (Calibra, Dentsply) and Resin cement B (Relyx, 3M). Shade differences among the two Groups before and after cementation with resin cements were measured using a spectrophotometer (Datacolor 600 TM), and data were expressed in Commission Internationale d'Eclairage (CIE) La*b* system coordinates. Paired t-test was used to analyze the data for significant difference between the shade of the veneers before and after cementation. Independent T test was used to compare the shade difference between the two groups (Group A and Group B).

Results: The La*b* value of the before and after cementation of the Group A were affected by the Resin cement A and Resin cement B. There was no significant difference in shade change between the two groups when the comparison was done between Group A and Group B.

Conclusions: The analysis revealed that there was substantial change in La* b* color data as the veneers were cemented to the bars using resin cements. There was no shade change when comparison was done between two resin cements.

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PRECISION SURGICAL GUIDE STENT WITH THE TOP-DOWN APPROACH FOR EDENTULOUS

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Keywords: stent, top-down, Edentulous

Case Presentation: Nowadays, the scanner, a high-tech equipment has been used in building a stent for the implant surgery. It is a very good attempt even though its several improvements have been pretty required. However, every dentist can't use this equipment because of, especially, its high cost. The researcher, as a dentist, has built the precision surgical guide stent for edentulous patients, using a temporary denture of a patient's own. This method has several benefits in patient's recovery and overall occlusal scheme and appearance of the prosthesis through continuous masticatory movements of the patient with his or her own denture. Above all, it can make it possible to expect the final prosthesis which can fit the patient best. A precision surgical guide stent can be made from occlusal surface to bone in direction, with the top-down approach. And then, the stent can be stable during the surgery, using the intra-oral reference point. And it can be modified to be comfortable while flapping tissues. Best of all, the patient can masticate and chew food even one month after the implant surgery because the existing denture of the patient is used. It can make the patient feel stable socially and psychologically, which is very important for the patient. Also, if the placed implant can afford to endure loading immediately, the temporary fixed prosthesis can be made for the patient with temporary denture or surgical stent. Therefore, it is considered desirable to introduce and share this procedure in detail.

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RESPONSES OF INTERFACE BETWEEN NEW BIOGLASSES USING HOC BY TEM

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Keywords: new bioglasses, human osteoblast cells, TEM

Purpose/Aim: Many biomaterials are currently used in dentistry. In 1969, Prof. Hench first discovered bioactive glass and named it 45S5. In 1990, Yamamuro and Kokubo developed A/W (apatite-wollastonite) bioactive glass. Recently, various studies of AP40 and RKKP have been performed. Furthermore, Ravaglioli and Krajewski have developed RBP1 and RBP2 based on AP40. We have reported the response of the interface of new types of bioactive glass (RKKP, RBP1, RBP2), evaluated using human gingival epithelial cells by TEM. The results showed that only RKKP directly binds to cells, and other types of glass showed a gel-like structure at the interface. The purpose of this study was to investigate differences in the interface between new types of bioactive glass (RKKP, RBP1, RBP2) and mirror-polished titanium alloy, using human osteoblast cells (HOC) evaluated by TEM.

Materials and Methods: Mirror-polished titanium alloy (MTi), bioactive glass (RKKP, RBP1, RBP2), and plastic culture dishes (Falcon [F]) as control were used in this experiment. 1.0×105 HOC cells were plated on the materials and cultured for 1 week. For TEM, HOC was fixed in 2.5% glutaraldehyde, postfixed in 1% osmium tetroxide, dehydrated, and embedded in Epon 812. After polymerization for 48 hours, the sample was removed with liquid nitrogen, and the specimen was re-embedded in Epon 812, sliced into semithin sections 200 nm thick, and stained with a mixture of 1% toluidine blue, 1% Azur II, and 1% borax. After confirming the presence of cells, the specimens were sliced at a thickness of approximately 78 nm, double-stained with uranyl acetate and lead citrate, and examined with a TEM.

Results: After 1 week of incubation, the cells directly bound to Falcon and RKKP. In Falcon, we found an extremely thin density layer on the material side, and focal and close contact was observed. RKKP directly bound to collagen fibers, showing bone matrices of HOC at all sites. RBP1 and RBP2 showed an intervening, gel-like layer about 100 nm in thickness. In MTi a non-structured homogeneous layer was observed.

Conclusions: The interface showed completely different phenomena between bioactive material and bio-inactive material. Furthermore, even the same bioactive materials showed different patterns because of their different compositions. RBP1 and RBP2 showed a gel-like layer, and MTi showed a non-structured homogeneous layer. In contrast, Falcon directly bound to a very thin, dense layer, suspected to be some kind of adhesive protein from cells. Collagen fibers bound to RKKP with no intervening layer. On the basis of these results, we conclude that RKKP might be best as a biomaterial because human epithelial and bone cells directly bind to RKKP, without an intervening layer.

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EVALUATION OF ESTHETIC OUTCOME AFTER IMMEDIATE LOADING OF DENTAL IMPLANTS

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Keywords: soft tissue bio type, dental implant

Purpose/Aim: To evaluate the influence of soft tissue biotypes (thick and thin) on esthetic outcome of immediately loaded (non-functional) dental implants at different time intervals of 3 and 6 months.

Materials and Methods: Thirty patients were selected who fulfilled the inclusion and exclusion criterion of the study. Patients were divided into two study groups based on soft tissue biotypes (Thick and thin) - GROUP A - Patients with thick

soft tissue biotype (thickness > 2 mm) and GROUP B - Patients with thin soft tissue biotype (thickness = 2 mm) Biohorizons tapered internal implant (Biohorizons, Birmingham, AL, USA) were placed followed by immediate loading (Nonfunctional) in both the study groups. Follow up examination were made at 3 months and 6 months interval. Following indices were observed by three observers (two prosthodontists and one periodontist): Papillary index, implant esthetic score, Pink and white esthetic score.

Results: The papillary index was observed to be significantly higher in Group A (2.33±0.23) than Group B (1.23±0.20) at 3 month. The papillary index was also found to be significantly higher in Group A (2.86±0.09) compared with Group B (2.30±0.20) at 6 month. total implant esthetic scores were significantly ($p<0.01$) higher among the patients of Group A as compared to Group B at 3 month. Mesial papilla and distal papilla of pink esthetic scores were significantly ($p<0.01$) different between Group A and Group B at 3 month. However, no significant ($p>0.05$) difference was found in curvature of facial mucosa and level of facial mucosa between Group A and Group B. The Soft tissue colour and texture & total pink esthetic scores were observed to be significantly different ($p<0.01$) between Group A and Group B at 3 month in PES. Only Translucency in white esthetic score was significantly ($p=0.02$) significantly higher in Group A (0.87±0.13)as compared to Group B (0.46±0.14). But all other factors and total WES score was found to be insignificant in Group A (5.27±0.18) and Group B (5.23±0.34). Total pink and white esthetic scores(PES + WES) was significantly ($p=0.02$) higher in Group A (12.46±0.54) compared with Group B (10.53±0.58) at 3 month. There was no significant ($p>0.05$) difference in total pink and white esthetic scores (PES+WES) between Group A (16.07±0.26) and Group B (15.54±1.45) at 6 month.

Conclusions: With respect to esthetic evaluation, all indices (Papillary index, Implant esthetic score and pink and white esthetic score) showed significantly higher score in thick soft tissue biotype as compared to thin soft tissue biotype at 3 months of time interval.Only Papillary index showed significantly higher score in thick soft tissue biotype as compared to thin soft tissue biotype at 6 months of time interval.

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STRESS DISTRIBUTION USING FEM IN THREE DIFFERENT MANDIBULAR PROTOCOL PROSTHESES

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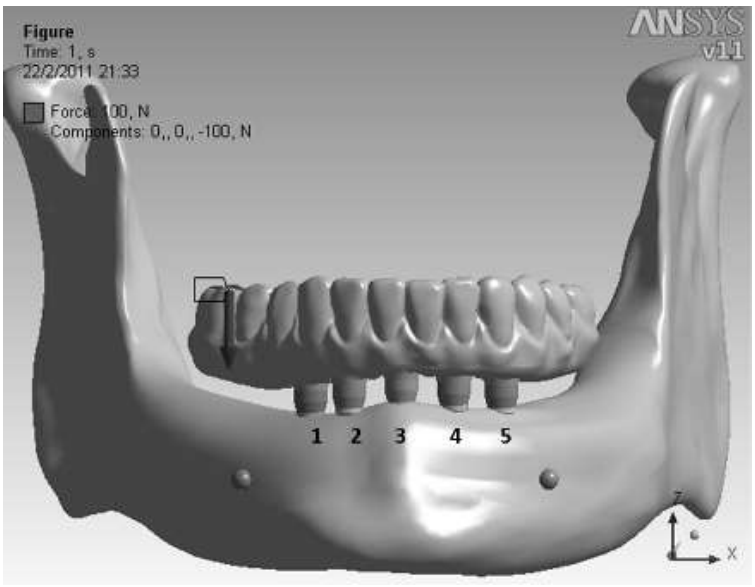
Keywords: finite element method, biomechanics, dental implants

Purpose/Aim: The objective of this study was to assess the stress distribution generated by a simulated loading (100 N) in the area of the cantilever in the cortical bone, implants, fixation screws, abutments, and denture base in 3 different implant-supported fixed complete-arch mandibular (protocol) prostheses using the finite element method (FEM).

Materials and Methods: The FEM analysis was carried out in 3 dimensional models: a) model A, simulating a temporary all-acrylic mandibular protocol prosthesis; b) model B, simulating a metal-acrylic mandibular protocol prosthesis; and c) model C, simulating a metal-ceramic mandibular protocol prosthesis.

Results: The biomechanical behavior of the temporary all-acrylic, metal-acrylic, and metal-ceramic mandibular protocol prostheses have shown qualitative and quantitative differences in the Von Mises stress distribution over the supporting bone and implant components. The all-acrylic model promoted the highest maximum stress values on the implant close to the cantilever loading point as compared to the other two models: a) on the cortical bone tissue surrounding the implant (24.7 MPa), b) on the body of the implant (91.6 MPa), c) on the abutment (116.5 MPa), d) on the prosthesis fixation screw (76.3 MPa) and, e) on the denture base (30.5 MPa).

Conclusions: The results of this study reinforces the need for a metallic bar reinforcement in addition to the acrylic in the denture base to prevent these undesirable loading effects.



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BRAIN FUNCTION ON MODULATION OF OCCLUSAL FORCE AND SENSORY INTEGRATION

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Keywords: modulation ability of occlusal force, Brainfunction

Purpose/Aim: The activities in the brain region has been reported to be driven by discrimination or recognition tasks. The prefrontal cortex is especially known to have an important cognitive function for making the future plan, decision and control for behaviors. It also affects the masticatory movement, which is thought to be controlled not only by primitive jaw movements (open-close) but also external information, such as past memory, visual and auditory sensations. The purpose of this study was to investigate the relationship between the modulation ability of occlusal force and sensory integration focusing on the brain function activities, especially in the prefrontal cortex.

Materials and Methods: We enrolled 5 healthy young students without missing teeth. Occlusal force was measured using a load cell transducer (Unipulse, Tokyo, Japan) placed between the upper and lower first molars. The experimental task was to keep the occlusal force between 25 and 30 N through the load cell transducer. The subjects tried the task watching numerical values on a digital data indicator (Unipulse, Tokyo, Japan), while performing modulation of occlusal force for 30 seconds. Results were relayed to the students using three types of external information: LED lighting corresponding to the range of the occlusal force, buzzer ringing, and without external information. Occlusal force was measured while cerebral blood flow in the prefrontal cortex were measured using a wearable near infrared spectroscopy (HITACHI, Tokyo, Japan). All measurements were repeated five times for each case.

Results: An increase in the cerebral blood flow in the prefrontal cortex was observed through the task and sensory integration occurred in each group. The cerebral blood flow by visual and auditory sensation especially increased more than those without external information. As for the modulation ability of occlusal force, the occlusal force in the task using visual information was more stable than those in other tasks.

Conclusions: As for the modulation ability of occlusal force and sensory integration, sensory integration in the prefrontal cortex occurred regardless of the external information. In particular, visual information might play an effective information for the modulation ability of occlusal force.

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FUNCTIONAL SIGNIFICANCE OF THE MAIN OCCLUDING AREA FOR PARTIALLY EDENTULOUS

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Keywords: main occluding area, mastication

Purpose/Aim: Mastication is an essential function for processing foods into a bolus in the oral cavity. This behaviour is thought to be controlled by a central pattern generator in the brain stem and to be influenced by the morphological properties and the texture of foods. Moreover, occlusion also plays an important role in mastication .The "main occluding area", where food crushing occurs during the first stroke of mastication, is reported to be an important concept in occlusion. Our clinical survey suggested that the fracture of hybrid resin and porcelain veneer on implant superstructures often occurred at this area. The purpose of this study was to clarify the changes in the location, contact area, and bite force of the main occluding area before/after implant treatments and to assess the clinical significance in prosthodontic treatment.

Materials and Methods: We enrolled 50 partially edentulous and 22 normally dentate subjects. To identify the location of the main occluding area, each subject was instructed to freely bite once on a dental stopping (GC, Tokyo, Japan) 3.4 mm in diameter and 4.0 mm in length, using the partially edentulous side or the normally dentate area. The occluding contact area and bite force were measured using Dental Prescale sheet (Fuji, Tokyo, Japan) and an analysing computer (Occluzer FPD-703; GC). The location, occluding contact area, and bite force of the main occluding area before/after the implant treatments were analysed. The centroid point of the main occluding area also evaluated using the Pict (Inet, Osaka, Japan) and investigated the detail location "mesial or distal region" in main occluding area.

Results: The main occluding area was located at a reproducible location in both the partially edentulous and normally dentate subjects. This location was principally the first molar region for the normally dentate subjects. For the partially edentulous patients with missing teeth in the molar regions, it moved from the premolar region to the first molar region after treatment. The occluding contact area and bite force for the main occluding area significantly increased after the implant treatment in the partially edentulous patients with missing teeth in the molar regions. As to the detail location, the main occluding area was highly located at the distal region of the first molar, and then the mesial region of the second molar. The detail location of the main occluding area was high in the following order; at the distal region of the first molar and the mesial region of the second molar.

Conclusions: These results suggest that the main occluding area can be restored to between the distal region of the first molar and mesial region of the second molar, and may be an important factor in the assessment of prosthodontic treatment.

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TIMING OF OCCLUSAL CONTACTS - GET THE TIMING RIGHT EVERYTIME!

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Keywords: occlusion, implants, cantilever

Purpose/Aim: Today everyone is smile-conscious and wants to look beautiful. Internet has made everyone realize that missing teeth can have real-life-like appearance in terms of replacement. But we as dentists should place equal importance in terms of balancing the function with esthetics.

Materials and Methods: Implants, being the first choice of replacement of missing teeth, are also prosthetically driven. So any replacement – be it complete dentures, crowns, bridges, implant restorations do have to keep in mind the occlusal

scheme and the associated factors to have long term success. And again, it is not just the occlusal contacts that determine the longevity of our replacements, it is the timing of occlusal contacts with the optimum occlusal scheme that will determine how efficient our replacements are.

Results: long term success vs failure is dependent on the prosthetic factors primarily the occlusal scheme chosen and the various components of implant protected occlusion for implant restorations.

Conclusions: adequate knowledge about the occusal schemes in various situations, timing of occlusal contacts, different challenges and troubleshooting encountered and simple tips to get the balance between function and esthetics is of utmost importance.

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OCCLUSAL RECONSTRUCTION IN A PATIENT WITH DEFORMED AND UNSTABLE CONDYLES

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Keywords: bone change, osteoarthritis, adapted centric posture

Case Presentation: A 37-year-old woman came to the clinic with the complaint of chewing disturbances because of missing of bilateral molars in the lower jaw. Both condyles were highly deformed with the dislocated discs bilaterally and had to occupy the anterior position in the glenoid fossa to make the upper and lower teeth contact together. Habitual closing movements varied considerably, but were stable enough to determine provisionally an occlusal position for an occlusal splint. The occlusal splint was seated and equilibrated until the stable HCM can be performed. Then, the splint-induced occlusal position was tranfered to the new restoration as the ICP. Finally, two 3-unit-fixed partial dentures were seated in the upper jaw and four metal crowns and a removable partial denture in the lower jaw. Since then, the acquired ICP was positionally and functionally maintained without any bony support of the condyle for 25 years.

Concurrent Session- Maxillofacial Prosthodontics

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ANATOMY OF THE MAXILLA

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Abstract: As an introduction of the maxillofacial AM session, this presentation will give a brief overview of the anatomy of the maxilla while the remaining speakers will discuss reconstruction and rehabilitation of the maxillary defect. The associated facial structures as they relate to form and function will also be described.

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RESTORATION OF ACQUIRED ORAL DEFECTS WITH OSSEOINTEGRATED IMPLANTS

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Abstract: Treatment of tumors of the oral cavity may result in severe functional disability and cosmetic disfigurement. Not so long ago, it was difficult to rehabilitate these patients on a consistent basis. Today, however, it is possible to restore most patients to near normal form and function, enabling them to lead useful and productive lives. Two advances have made this possible and both were introduced in the 1980's, osseointegrated implants and free vascularized flaps. Implants permit the prosthodontist to provide additional stability, retention and support for our intra-oral prostheses and free flaps enabled the surgeon to reconstruct oral tissues such as the mandible and the tongue on a consistent basis. This presentation will focus on the impact both these technologies have had on the rehabilitation of oral defects secondary to resection of oral tumors

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MAXILLOFACIAL PROSTHODONTICS IN THE REAL WORLD

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Abstract: Maxillofacial Prosthodontics is one of the most challenging aspects of Prosthodontics, with patients requiring physical, aesthetic and psychological rehabilitation/intervention. Improvements in techniques, materials and technology over the years have made it possible to satisfactorily rehabilitate patients with even the most extensive maxillofacial defects. The use of implantology and technology such as rapid prototyping has seen rehabilitation of many such challenging cases. These developments however often come at a higher cost which socio-economically disadvantaged patients might not afford; and even if cost is not a barrier there are often reasons such as the patient's medical conditions and preferences which may contraindicate these 'high tech' procedures. In light of this reality the older and more 'appropriatech' methods will still be needed by many when carrying out maxillofacial prosthodontic rehabilitations. Procedures that have been referred to as the 'past techniques' may just be the 'present' for many around the world. It is imperative that Maxillofacial Prosthodontists are aware of this reality so that they can be part of the solution.
This presentation will use case studies to highlight the use of both 'appropriatech' and 'high tech' in maxillofacial prosthodontic rehabilitation. It will highlight the need for embracing and appreciating newer developments but also most importantly to acknowledge the place of the original techniques and their current application when the need arises.

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FUNCTIONAL MAXILLECTOMY REHABILITATION - REMOVABLE OBTURATION VS VASCULAR FREE FLAP TISSUE TRANSFER

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Abstract: Statistics from the World Health Organisation (Globocan 2008) indicate that cumulative head and neck cancer incidence and mortality exceed that of breast cancer! In addition, this disease is the leading loss to the economy in Disability Adjusted Life Years (DALY) in low income countries.
Survival statistics for this malignant disease are sadly still relatively low.
This disease and its treatment alternatives have a morbid impact on the quality of life of our patients mainly as it often ablates or compromises the area where 4/5 human senses exist.
Practitioners who specialize in the treatment and rehabilitation of these patients, particularly Prosthodontists, are faced with the challenges of balancing disease management, financial and clinical resources and optimal functional outcomes.
Craniofacial implantology has significantly changed the rehabilitation options of conventional obturation and may offer a realistic alternative to this and resource intensive microvascular surgery. This lecture will outline the multi-disciplinary management objectives and South African initiatives to improve treatment outcomes for these unfortunate patients with respect to prosthodontic obturation and free flap tissue transfer.
The oral care team in particular are inherently and indispensably involved and can offer improved QOL for these patients with appropriate understanding and training.

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THE IMPACT OF ONCOLOGIC TREATMENTS ON PROSTHETIC REHABILITATION

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Abstract: Head and neck cancer patients have to deal with multiple complications following their oncologic treatments. In recent years, the introduction of intensity modulated radiation therapy (IMRT) has allowed for more healthy tissue sparing which potentially opened the doors to more prosthodontics treatment options for cancer survivors. This presentation will discuss the differences between conventional beam radiation therapy and IMRT on patients' saliva, potential implants placement and risk of osteoradionecrosis.

Education Objectives:

1. To present current complications of head and neck cancer treatments
2. To present coping measures and/or solutions for IMRT patients
3. To look to future therapies that will potentially improve prosthodontic rehabilitation for head and neck cancer patients

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OSTEOCUTANEOUS FLAP RECONSTRUCTION OF THE MAXILLA: ADVANTAGES AND COMPLEXITIES

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Abstract: The maxillary defect presents with many different complex restorative options. With today's modern reconstructive techniques, a myriad of treatment options exist for patients with a maxillary defect. Depending on different clinical situations, some patients are more appropriately reconstructed with surgical correction, and some are more appropriately reconstructed with obturation. This lecture will focus on the advantages and complexities that present with osteocutaneous flap reconstruction of the maxillary defect.

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DIGITAL PROSTHETIC PLANNING AND PREFABRICATION IN MAXILLARY RECONSTRUCTIONS COMBINED WITH IMPLANT SUPPORTED REHABILITATION

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Abstract: Maxillary and mandibular defects due to ablative surgery for tumor removal need a complex interdisciplinary approach for optimal rehabilitation. More often combined use of vascularized grafts, implantology, and prosthetics is needed to replace successfully missing parts, like bone, soft tissue, and teeth. Backward planning from occlusion was advocated by Rohner, to establish a predictable rehabilitation process. This technique, the interdisciplinary collaboration, and the options to use a digitalized workflow will be discussed.

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COMPUTER SIMULATIONS FOR MAXILLOFACIAL PROSTHODONTICS

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Abstract: Maxillofacial deformities and malfunctions can result from congenital defect, trauma, or excision for the treatment of cancer or infection. To rehabilitate patients with these defects, various prostheses have been used. As complex biomechanical forces during oral and maxillofacial function can cause the movement of the maxillofacial prosthesis and arise detrimental effect on the residual tissues, biomechanical analysis of the maxillofacial prosthesis is important.
For the analysis of the biomechanical behavior of maxillofacial prosthesis, several methods including mechanical analysis and photoelastic analysis have been used. Computer simulation is an excellent method in studying biomechanics of the maxillofacial prosthesis because it can be helpful in revealing the relation between maxillofacial structures and its functions. Computer simulations are becoming essential part in studies related to the stomatognathic system and can be applied to clinical situations such as treatment planning and diagnosis. They have many advantages. In computer simulation many errors related to clinical methodology and human error can be eliminated. Variables related with maxillofacial function can be tested and the normal or pathologic function of the structures are better understood. In addition computer simulations can give us insight into variables which are difficult to measure and conceptualize in human and animal experiments. Currently several models including rigid body, finite element and combined models are used in the computer simulation of maxillofacial area. Computer simulation is a safe method which does not harm the person or environment and can show us the impacts or future directions of maxillofacial prosthodontic treatment.

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OPTIMAL DENTURE COVERAGE OVER RETROMOLAR PAD FOR LOWER DENTURE RETENTION

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Keywords: lower denture retention, retromolar pad

Purpose/Aim: Purpose: Establishing the base outline of complete denture is important factor for denture retention and stability. However, especially in the retromolar pad area of mandibular complete denture, establishing the outline differs

among dental clinicians. The purpose of this study is to measure retentive force of lower complete denture base from coverage difference with a denture base over the retromolar pad and establishing optimal base outline of lower complete denture.

Materials and Methods: Method: Total 20 edentulous patients who consented the purpose of this study were included. A preliminary impression was taken including the retromolar pad. The posterior border of individual tray is matched to the distal end of the retromolar pad. Close mouth impression was taken with a dental silicone impression material and master cast is completed. Experimental dentures covering the entire surface of the retromolar pad area were fabricated on the master cast. The retraction hook was attached to the anterior teeth cetral region and a theread dental floss was tied on the retraction hool before the test.
The experimental denture was inserted to the patient's mouth and then retraction force depending on coverage difference was tested with the digital force gauge. The retromolar pad area of experimental dentures were reduced to the 2/3 area, the middle part and the anterior margin respectively from the diatal end of retromolar pad after each test.

Results: Result: In both direction, the retentive force measured by digital force gauge was highest when the experimental denture base cover the entire retromolar pad area. As denture base over retromolar pad area was reduced, retention force was reduced. Forward retentive force were generally lower than upward retentive forces.

Conclusions: Conclusion: Denture base over retromolar pad have very important role for complete sealing of mandibular complete denture. In order to secure the border seal and optimize retentive force of lower complete denture, it was suggested that the denture posterior border should be defined at least above 2/3 area of retromolar pad and should be extended to distal end as much as possible. To cover entire surface of retromolar pad with denture base, deformation of retromolar pad area during preliminary impression should be minimized.

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ATBC, TBC AND HYPERBRANCHED-POLYESTER IMPROVED VISCOELASTIC STABILITY OF TISSUE CONDITIONER

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Keywords: stablility of viscoelasticity, tissue conditioner

Purpose/Aim: The purpose of this study was to evaluate the use of new plasticizers ATBC, TBC and hyperbranched polyester with regard to stability of viscoelasticity.

Materials and Methods: Polyethyl methacrylate (PEMA, Mw: 850,000 and particle size of 35~45 μm), ATBC (Mw: 402.48), TBC (Mw: 360.44), BPBG (Mw: 336.38), DBP (Mw: 278.34), BB (Mw: 212.24), and ethanol (=99.8%) were used in this study. In addition, 8.7wt% of hyperbranched polyester (Mw: 4245) was added to ATBC and TBC for measurement respectively. In control groups, Shofu Tissue Conditioner II (Shofu) and GC Soft-Liner (GC) were used for comparison. Powder/liquid (P/L) ratio of experimental groups were 1.2. All the specimens were the same (diameter: 25mm; thickness: 1.5mm; n=6 for each group). Rheometer was used to evaluate viscoelastic properties including G', G'', loss tangent (tan d) and complex dynamic shear modulus (G*). The observed periods were 0, 1, 3, 7, 14 and 28 days.

Results: TBC combined with hyperbranched group presented smaller G' during testing periods. DBP and Shofu groups had smaller change of G'' during the period of 0-28 days. BB group had smaller change of tan d. However, the group of ATBC combined with hyperbranched polyester exhibited the smallest change of G', tan d and G* during the test periods.

Conclusions: Within the limitations of the study, plasticizers of ATBC combined with hyperbranched polyester (8.7 wt%), and ethanol in tissue conditioner exhibited more stable viscoelastic properties during 28 testing days.

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SPEECH FUNCTION EVALUATION IN THE DENTIST-ORTHOPEDIST PRACTICE

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Keywords: spectral analysis, phonation, speech defects after prosthetic repair

Purpose/Aim: To study sound pronunciation in patients with tooth wear before and after prosthodontic treatment.

Materials and Methods: Eighty-one patients (39 male and 42 female patients) between 35–79 years of age were examined. Among these, 49 patients had orthognathic occlusion and intact teeth (group 1), and 32 patients had been diagnosed with articulation disorders (group 2). After veneers application, group 2 patients demonstrated some whistle, noises, lisping, and other strange sounds during pronunciation. Particular attention is paid to the study of the "S", "V", and "F" phonemes as the most important in prosthodontics. To study sound production were made recordings of phonetically balanced phrases using a headset connected to a dictaphone in order to assess specific pronunciation defects in patients with tooth wear before and after prosthodontic treatment. The obtained sets of sounds and power spectra were investigated using spectral analysis.

Results: By applying the spectrometric investigation method to disordered sound pronunciation, we were able to objectively, qualitatively, and quantitatively analyze the performed treatments and sound characteristics.

Conclusions: Spectral analysis of the sounds emitted before and after treatment is one of the most informative methods for the differential diagnostics of pronunciation defects. The analyzed method can be used to effectively assess various stages of prosthodontic treatment.

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CASE REPORT OF FULL MOUTH REHABILITATION BY CAD/CAM OVERLAY RESTORATIONS

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Keywords: VDO, overlay, CAD/CAM

Case Presentation: Lift of vertical dimension of occlusion is used sometimes clinically for full mouth rehabilitation for heavily worn dentition and sensitive subject with fatigue pain of masticatory muscles. Occlusal overlay is a minimum invasive way of adhesive fixed restoration. We applied the CAD/CAM ceramic overlays (E Max CAD) and laminate veneers (E Max Empress) to fulfill the object of full mouth rehabilitation and at the same time, the threshold (beginning time) of fatigue pain of masseter muscles was evaluated by near infrared spectroscopy before and after the full dentition's restoration. This case presentation shows that the CAD/CAM ceramic overlays being able to satisfy the functional and esthetic requirement of full mouth rehabilitation. The beginning time of masseter muscle's fatigue pain of subjects during strong continues biting was postponed statistically after restoration and a period of application.

Concurrent Session- Fixed & Removable / Maxillofacial Prosthodontics

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EVALUATING SHEAR BOND STRENGTH OF OPAQUERS BETWEEN TITANIUM AND COMPOSITES

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Keywords: Shear bond strength, indirect laboratory composite systems, titanium alloy.

Purpose/Aim: The aim of this study was to evaluate the shear bond strength (SBS) of using four different opaquers between titanium alloy (Ti6Al4V) and two indirect laboratory composites.

Materials and Methods: Four chemically different opaquers (Ivoclar Vivadent SR Nexco Paste, GC Gradia, Shofu Ceramage, Bisco Tescera) and 2 indirect laboratory composites (Ivoclar Vivadent SR Nexco Paste, GC Gradia) were bonded on the 100 Ti6Al4V disks to test SBS. These 100 samples were divided into 2 main groups; first group (a) treated by thermal cycle and the other group (b) had no thermal cycle. These 2 groups also divided into 5 subgroups by brand names of opaquers. After sand-blasting of machined Ti6Al4V disk samples, Ivoclar Vivadent SR Link as a metal primer agent used for all samples. For Group 1a/b (n=10), selected as a control group which samples were prepared according to manufacturers advise (Ivoclar Vivadent SR Nexco Paste opaquer and Ivoclar Vivadent SR Nexco Paste indirect laboratory composite applied to surface of Ti6Al4V). For all other groups GC Gradia indirect laboratory composite were used, however, for group 2a/b, group 3a/b , group 4a/b and group 5a/b; Ivoclar Vivadent SR Nexco Paste, GC Gradia, Shofu Ceramage, Bisco Tescera opaquers were used respectively. All samples were tested by Instron for SBS. Finally, debonded surfaces are evaluated by Modified Adhesive Remnant Index (ARI) (Score 0 = no opaquer on the surface, Score 1 = <1/2 covered with opaquer, Score 2 = >1/2 covered with opaquer, Score 3 = completely covered with opaquer).

Results: There were significant differences between SBS of opaquer groups ($p<0.01$). Before thermal cycle application, the highest mean of SBS is found in Group 2b. On the other hand Group 3a had the highest mean of SBS ($p<0.01$) after thermal cycle. Some groups showed higher mean of SBS after thermal cycle application (Group 2a/b, Group 3a/b). In all debonded surfaces when detected by modified-ARI, incidence Score 1 (43) was more frequent followed by Score 2 (29), and Score 0 (28) and none of samples showed Score 3.

Conclusions: Different but chemically appropriate metal primer and opaquers together can be used for preparing or repairing indirect laboratory composite as a superstructure for Ti6Al4V.

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20-YEAR OUTCOME OF CASES TREATED WITH DOUBLE CROWN RESTORATIONS

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Keywords: Removable denture, Restoration, longevity

Purpose/Aim: Telescopic crown restorations are regarded as appropriate prosthodontic therapy in patients with substantially reduced residual dentition. The success of this type of treatment depends mainly on the preservation of the abutment teeth selected. Therefore careful assessment of the risk of tooth loss and the anticipated longevity of the planned prosthodontic solution is needed as a prerequisite for a sound therapeutic decision-making. Since patients with severely reduced dentition differ considerably in their initial clinical situation this assessment constitutes a major challenge for the dentist. The study analyses case histories of patients treated with double crown restorations in order to identify predictors for the sustainability of this type of therapy. All patients underwent an observation period of 20 years regardless of the period of wear of the first restoration inserted. Therefore shifts in the form of treatment could be studied and analysed.

Materials and Methods: The study is based on the case histories of 82 patients that had been treated with double crown restorations in a dental clinic during the period 1981 – 1989. For inclusion the cases had to be followed up for an interval of at least 20 years. A multi-state-model was used to analyse the changes of restoration and form of therapy. The effect of the initial findings on course of treatment was evaluated.

Results: Within a 20-year period 23% of the initially inserted restorations survived. After 10 years the rate of survival was 63%. However the proportion of patients that were supplied with double crown restorations 20 years after initial treatment was 73%. 35% of the patients underwent one and 15% more than one revision of the double crown restoration. Complete dentures were inserted in 23% of the cases. In 5% implant borne restorations were provided. A significant predictor for the occurrence of edentulism within the 20 year interval was the amount of alveolar support of the abutment teeth.

Conclusions: The rate of patients in which the concept of the double crown restoration was functioning for a period of 20 years was considerably high. Special scientific attention is required to differentiate between cases with good and poor prognosis. Double crowns restorations represent an alternative form of therapy in cases with severely reduced dentition in which also implant-borne restorations can be applied.

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EFFECT OF CLEANSERS ON SURFACE-ROUGHNESS AND MICROHARDNESS OF ARTIFICIAL TEETH

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Purpose/Aim: The study aims to compare the effect of different denture cleansers on surface roughness and microhardness of posterior complete denture teeth with different contents.

Materials and Methods: 168 specimens were prepared with four subgroups (n=42) as Group 1:Orthotyp PE (polymethylmethacrylate), Group 2:SR Orthosit PE (Isosit), Group 3:SR Postaris DCL (double cross-linked), Group 4: Phonares II (nano-hybrid composite). After all specimens were immersed in Corega Tabs, sodium hypochloride and distilled water (control)(n=14) to simulate 180-day immersion period, surface roughness and microhardness were tested. The data was analysed using One-Way Anova, Kruskal Wallis, post hoc Tukey HSD, Conover's non-parametric multiple comparison test and Spearman's Rank Correlation analyses. ($p<.05$)

Results: While Phonares II had rougher surfaces compared to Orthosit PE in distilled water ($p<.001$); Orthotyp PE and Phonares II had rougher surfaces compared to Postoris DLC when immersed in Corega Tabs ($p<.001$). With-in group comparisons revealed that Corega Tabs caused rougher surface compared with the control group specimens for both Orthotyp PE and Orthosit PE ($p<.001$). While Orthosit PE had higher microhardness values compared to Orthotyp PE, Postaris DLC and Phonares II groups in distilled water ($p<.001$); Phonares II revealed higher values compared with Orthosit PE and Postaris DLC groups ($p<.001$) when immersed in Corega Tabs. Corega Tabs caused higher microhardness values than distilled water and sodium hypochloride for Orthotyp PE ($p<.005$). Specimens immersed in distilled water had higher microhardness than the Corega Tabs group and sodium hypochloride group than Corega Tabs group for Orthosit PE ($p<.001$). Postoris DLC specimens showed higher microhardness when immersed in distilled water or sodium hypochloride compared with Corega Tabs ($p<.003$). There was no correlation found between surface roughness and microhardness in any of the groups.

Conclusions: Corega Tabs seem to have caused a difference on the surface roughness and microhardness of denture teeth hence should be used with caution. However there is need for further clinical research.

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FLOW PROPERTY OF PVS IMPRESSION MATERIALS BY SHARK FIN TESTING

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Keywords: Flow Property, Polymerization, Polyvinyl siloxane

Purpose/Aim: To determine the flow property of polyvinyl impression materials at various conditions and time intervals.

Materials and Methods: Flow was measured using shark fin testing apparatus in dry and wet conditions. A pin was released at 30sec, 45sec and manufacturer's working time. The shark fin device was kept in an incubator to allow final setting. The height of the "shark fin" was measured by digital caliper. Statistical analysis was done by two-way ANOVA and Tukey test at $p<0.05$.

Results: For dry testing of regular PVS, I-SIL had the greatest height at 30 and 45 seconds. Aquasil Ultra XLV was highest at 30 and 45 seconds dry testing of light PVS. In wet testing of light PVS, Imprint™ Garant™ was highest at 30 seconds while Aquasil Ultra XLV at 45 seconds. Imprint™ Garant™ regular and light body were highest at all manufacturer's working time for both conditions. Significant increases in height were observed from dry to wet testing conditions.

Conclusions: All materials decreased height from 30 seconds to manufacturer's working time except for Flexitime® Monophase, Imprint™ Garant™ Regular and Imprint™ Garant™ Light body. Wet condition specimens increased height except for Flexitime® Monophase.

Table 1. Five polyvinyl siloxane impression materials subjected to shark fin testing

Materials	*Manufacturer*	*Type*	*Viscosity*	*Manufacturer's working time (minutes)*	*Lot No.*
Imprint™ Garant™	3M ESPE (MN,USA)	PVS	Regular body	1:00	N490331
			Light body	1:00	N499932
Examixfine	GC Corp. (Tokyo, Japan)	PVS	Regular body	2:00	1302251
			Light body	2:15	1303151
I-SIL	Spident CO., Ltd (Inc., Korea)	PVS	Regular Body	2:00	PISR1305
			Light body	2:30	PISL1317
Aquasil Ultra	Dentsply Caulk (DE, USA)	PVS	Regular body (LV)	1:10	120809
			Light body (XLV)	1:10	120725
Flexitime®	Heraeus Kulzer (Hanau, Germany)	PVS	Regular body	2:30	370427
			Light body	2:30	R370317

PVS: polyvinyl siloxane; LV: light viscosity; XLV: extra light viscosity

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MASTICATORY FUNCTION AND HEALTH-RELATED QUALITY OF LIFE IN MAXILLECTOMY PATIENTS

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Keywords: maxillectomy, mastication, health-related quality of life

Purpose/Aim: To investigate the relationship between masticatory function and oral health-related quality of life (OHRQoL) in partial maxillectomy patients with a dento-maxillary obturator prosthesis.

Materials and Methods: Inclusion criteria of the current study were patients having undergone partial maxillectomy for head and neck tumor, no surgical reconstruction performed, patient satisfaction with the intraoral prosthesis (i.e., did not require adjustment at enrollment time), and having worn the prosthesis for at least 6 months. In accordance to these criteria, 32 consecutive patients (10 women and 22 men; mean age, 62 years; age range, 20–86 years) were enrolled between September 2014 and June 2015. Three measures were used to assess masticatory function, two objective and one subjective measures. One objective measure was masticatory performance (MP) which was estimated by measuring glucose extracted from gummy jelly. The other objective measure was food mixing ability (a*) which was assessed using color-changeable chewing gum. The subjective measure was perceived chewing ability which was rated as masticatory score (MS) based on patient responses to a food intake questionnaire. OHRQoL was measured using the Geriatric Oral Health Assessment Index (GOHAI). The relationships between the three masticatory function measures and OHRQoL were analyzed using Spearman's rank correlation coefficient.

Results: Correlation coefficients were as follow: MP and a* ($r = 0.517$, $P = 0.002$); MS and GOHAI ($r = 0.57$, $P = 0.001$); MP and GOHAI ($r = 0.247$, $P = 0.173$); a* and MS ($r = 0.019$, $P = 0.919$); MP and MS ($r = 0.199$, $P = 0.257$); and a* and GOHAI ($r = -0.173$, $P = 0.343$).

Conclusions: Among the three masticatory function measures used in this study, only the subjective MS showed significant positive correlation with GOHAI score. Therefore, perceived chewing ability could be an important factor for estimation the OHRQoL in partial maxillectomy patients with a dento-maxillary obturator prosthesis.

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SALIVARY GLAND VOLUME/SALIVA FLOW RELATIONSHIP FOLLOWING IRRADIATION OF NASOPHARYNGEAL CARCINOMA

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Keywords: radiotherapy, saliva gland volume, saliva flow

Purpose/Aim: The aim of this study was to determine the effect of intensity-modulated radiotherapy (IMRT) on salivary gland volume and flow rates in nasopharyngeal carcinoma (NPC) patients of Chinese descent.

Materials and Methods: Twenty-one males and three females (median age: 50 years) scheduled for IMRT were recruited. Radiation dose to the parotid, submandibular glands and oral cavity was measured. Total parotid and submandibular gland volumes were measured at pre-radiotherapy (pre-RT), 3-months and 2-years post-radiotherapy (post-RT). At the same time intervals, resting and stimulated saliva flow rates were also measured. Relationship between salivary gland volumes and salivary flow rates and that between post-RT:pre-RT salivary gland volume ratios and reduction in salivary flow rates were assessed using Spearman's correlation.

Results: One patient presented with American Joint Committee on Cancer (AJCC) Stage 1 disease, 7 with Stage II, 11 with

Stage III and 5 with Stage IV. 22 (92%) and 15 (63%) patients returned for the 3-month and 2-year post-RT reviews respectively. Total radiation dose to the head and neck region was 70 Gy. Mean radiation dose to the parotid, submandibular glands and oral cavity was 38.6 ± 5.0 Gy, 64.9 ± 2.4 Gy and 44.5 ± 3.8 Gy respectively. Total parotid gland volumes at pre-RT decreased from 72.33 ± 19.4 cm3 at pre-RT to 48.17 ± 13.2 cm3 at 3-months post-RT ($p<0.001$) and to 55.9 ± 15.0 cm3 2-years post-RT ($p=0.005$). Total submandibular gland volumes decreased from 19.3 ± 5.1 cm3 at pre-RT to 12.9 ± 3.0 cm3 at 3-month post-RT ($p<0.001$) and to 9.48 ± 3.3 cm3 2-years post-RT ($p<0.001$). The median (IQR) resting and stimulated saliva flow rates decreased from 0.4(0.2~0.88) ml/min and 1.26(0.89~2.05) ml/min at pre-RT to 0.03(0~0.11) ml/min and 0.07(0~0.2) ml/min at 3-months post-RT ($p<0.001$ for both); and to 0.07(0~0.22) ml/min and 0.34(0.15~0.66) ml/min 2-years post-RT, ($p=0.001$ for both), respectively. No correlation was observed between the gland volumes (parotid and submandibular) and the saliva flow rates (resting and stimulated) at all time points. Correlation between post-RT:pre-RT submandibular gland volume ratio and reduction in resting saliva flow rate at 2-years post-RT was statistically significant (rho=-0.518, $p=0.048$).

Conclusions: Submandibular gland volume continued to decrease in NPC patients two years after completion of IMRT. Correlation between post-RT:pre-RT submandibular gland volume ratio and reduction in resting saliva flow rate was statistically significant. (Acknowledgement: This research was supported by the National Medical Research Council Research Training Fellowship)

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VIDEO-ENDOSCOPIC EVALUATION OF MANDIBULAR ADVANCEMENT DEVICE IN OSA

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Keywords: obstructive sleep apnea, prospective studies, videoendoscopy

Purpose/Aim: Evaluation of efficacy of Mandibular Advancement Device (MAD) on Obstructive sleep apnea through changes in sagittal and lateral dimension of airway at velopharyngeal level.

Materials and Methods: Ten OSA subjects fulfilling inclusion and exclusion criteria were enrolled in this longitudinal study. MAD was fabricated at 75% of maximum protrusion and 20% of maximum inter-incisal opening. Endoscopic evaluation was done without appliance in supine position at velopharyngeal level and then images were processed. The same evaluation was repeated after four weeks with appliance. The significance level was set at $P<.05$.

Results: Statistically significant difference ($P<.05$) was found after using MAD at sagittal and lateral dimension.

Conclusions: Sagittal and lateral dimension at velopharynx was increased with the use of MAD. This increase in dimension was more pronounced in sagittal plane than lateral plane.

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EFFICACY OF SHIELDING STENTS IN BUCCAL CARCINOMA PATIENTS

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Lucknow, Uttar Pradesh, India

Keywords: buccal carcinoma, shielding stent

Purpose/Aim: The purpose of the study was to evaluate the efficacy of shielding stents in preventing adverse Radiotherapeutic Effects in Buccal Carcinoma patients.

Materials and Methods: Tumor stage T3 and/or nodal stage N1, M0 according to TNM classification of the UICC-AJCC (Union for International Cancer Control-American Joint Commission or Cancer Staging and End Resulting Reporting) were eligible to be part of the study. Patients with N1 disease i.e. one ipsilateral nodes, less than 3cm in diameter, were included in the study. Total 24 patients were selected, which were equally divided into two groups: group 1 comprises radiotherapy with shielding stent and group 2 radiotherapy without shielding stent. Patients with buccal carcinoma in both groups were treated with ipsilateral external beam radiotherapy technique using a dose of 46 Gray.The effects of radiotherapy was observed in the patients of study groups and control groups at baseline, 1 month and 3 months post conclusion of radiotherapy.

Results: A significant decrease in the unstimulated salivary flow rate level was observed from baseline to 3 months and 1month to 3 months. However, in the group 2, there was significant ($p<0.05$) decrease in the unstimulated salivary flow rate from baseline to 3 months.There was no significant ($p>0.05$) difference in the level of stimulated salivary flow rate between the group 1 and 2 at baseline, 1 month and 3 months.Pain on swallowing was significantly lower in the group 1($p<0.05$) compared to group 2 at baseline, 1 month and 3 months.The taste alteration showed no significant difference ($p>0.05$) between the groups at 1 month and 3 month.The mucositis was significantaly lower in group 1 at baseline, 1 month and 3 months ($p=0.04$(baseline),$p=0.03$(1 month), $p=0.02$(3 months).Dysphagia has also significantaly lower in the group 1 as compared to th group 2 at baseline, 1 month and 3 months ($p=0.06$),($p=0.04$),($p=0.03$).

Conclusions: It was concluded that radiation stents were effective in protecting part of oral cavity from mucositis and xerostomia by placing these parts out of radiation field. Future long term research with larger patient cohort could substantiate the potential useful role of radiation stent.

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REHABILITATION OF A MAXILLARY DEFECT USING A FREE FIBULA FLAP

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Oral Rehabilitation
Pretoria, Gauteng, South Africa

Keywords: free fibula flap, detachable obturator

Case Presentation: This case report serves to illustrate the surgical and prosthodontic management of an oncology patient. Diagnosis of an osteosarcomaof the maxilla was confirmed both clinically and histologically. The proposed treatment plan included a diagnostic phase, surgical resection, harvesting and placement of a free fibular flap with immediate implant placement, , chemotherapy and possible radiation, delayed placement of a provisional prosthesis following completion of chemotherapy and radiation , and placement of a definitive prosthesis. Virtual planning and rapid prototyping were used for the proposed resection surgery, immediate implant placement and fabrication of surgical guides. Surgical complications reported were loss of two implants and formation of a palatal fistula. Following the surgical phase, chemotherapy commenced but no radiation therapy was administered. After one year an acrylic provisional prosthesis was fabricated and placed. The definitive prosthesis was fixed on all four remaining implants, and comprised a titanium framework with porcelain veneering, and a detachable obturator.

Sunday, September 20th

Focus Session II: Keynote Presentations

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FIXED PROSTHODONTICS 2020: NEW TECHNOLOGIES, MORE MATERIALS - UNLIMITED POSSIBILITIES?

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Abstract: Digital impressions and computer-aided manufacturing of restorations steadily gain in importance within restorative dentistry. Irrespective of the fact that digital impressions have been introduced to dentristry more than 30 years ago with the development of the Cerec CAD/CAM system, their application in daily clinical practice was was not very frequent - until recently. Today, a high number of intraoral scanners and associated CAD/CAM procedures are available.
One of the factors raising the attractiveness of computerized procedures may be an increase in precision of the restoration. One further factor may be the raise in efficiency as compared to conventional procedures. Finally, the high variety of new restorative materials which were introduced for the computerized manufacturing may be another reason.
High strength ceramics, lithium-disilicate glass-ceramics or non-precious alloys are already well established as restorative materials. New hybrid materials like e.g. nano-ceramics even promise to be long-lasting, highly esthetic and less costy. They can be used in the monolithic stage, and processed chairside in the dental practice. An increase in the application of these monolithic tooth – and/or implant- borne restorations can be observed in daily clinical practice. Still, the literature on their outcomes is very scarce.
The lecture will critically evalulate the possibilities that the new technologies offer to the practician, and will highlight whether or not they are unlimited. A clinical decision tree for the selection of the restorative material will be given.

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LOST IN THE SHADOWS OF THE FOREST: HOW SYSTEMATIC ARE SYSTEMATIC REVIEWS?

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Summary: If every person in the world participated in one great trial, we would definitively know THE answer. If many small groups of people participated in many small trials, together, the data could estimate AN answer. Combined results… systematic reviews… have we become Lost in the Shadows of the Forest Plots?

So, how does this affect you? Journals seem to be tripping over themselves in efforts to publish these manuscripts. Systematic reviews, especially those including meta-analyses, have been heralded as the panacea for evidence based medicine & dentistry. It is tempting to hold those results as infallible. But, despite authors' sometimes-heroic efforts, no systematic review is actually systematic. This does not mean that the "systematic review" is redundant, but it does mean that we need to know which ones are good, and which ones are not so helpful. This lecture will explore how to identify reviews with good search strategies and discuss some of those confusing meta-analytical statistics. The aim is to help you identify the good reviews that have sound conclusions so that WE do not remain Lost in the Shadows of the Forest Plots.

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FRAIL ELDER CARIES: RISK ASSESSMENT AND MANAGEMENT

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Abstract: Prosthodontic patients are often at a high risk for caries, and assessing that risk prior to treatment is important. Historically, the nature of dental education and clinical practice has oriented clinicians toward recognizing and correcting the damaging effects of caries, rather than actively assessing and managing caries risk potential. New developments have led to better diagnostics and protocols for caries management, although one adapted to the specific needs of the frail elderly has not been proposed. Our purpose is to outline caries risk assessment and management for the elderly prosthodontic patient.

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IMPLANT ASSISTED PLANNING AND TREATMENT OPTIONS FOR EDENTULOUS ARCHES: FINDING SUCCESS AND AVOIDING COMPLICATIONS

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Abstract: Implant assisted treatments for edentulous arches can improve patient function, esthetics and self-esteem, however their complexity can vary with outcomes be ing inconsistent. This program will focus on planning and treatment factors commonly associated with successful outcomes and complications. Specific considerations will include patient evaluation, with emphasis on restorative space. Discussion will include implant morphology, number and position (including inclination). Consideration will be given to abutment and connection options and prosthodontic alternatives.

Learning Objectives:

- Identify parameters associated with elevated treatment risk and successful outcomes in management of edentulous arches
- Identify surgical planning and treatment options designed to improve outcomes and reduce complications for edentulous arches
- Identify implant / abutment options that can improve outcomes and minimize risk when managing edentulous arches
- Describe patient presentations illustrating both complications and instances where these were avoided

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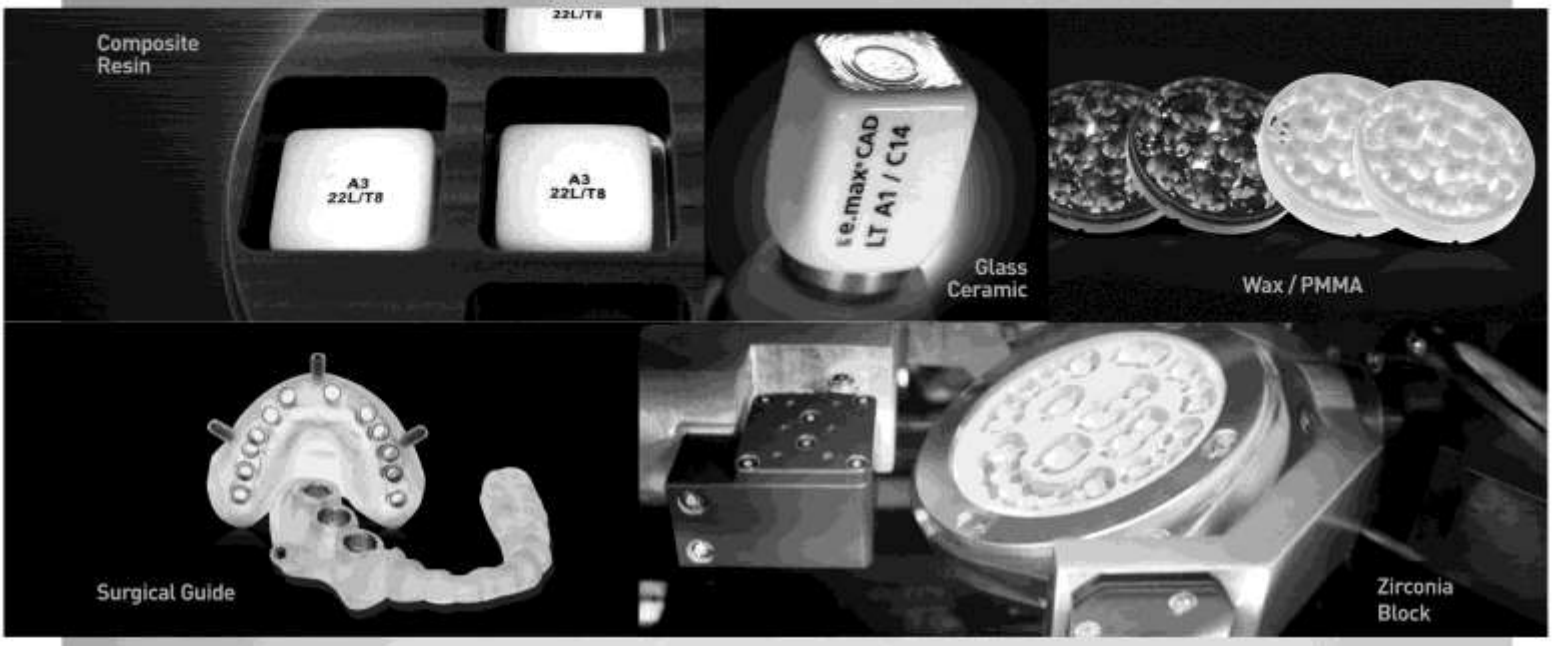

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Poster Presentations

Thursday, September 18th 18:15

Poster 1

THREE DIMENSIONAL CONTROLLING CAPABILITY OF BITING FORCE

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Keywords: 3D, biting-force, PMR

Purpose/Aim: This study aimed to evaluate the difference in 3 dimensional (3D) controlling capability of biting force between incisors and molars, and effect of impaired periodontal mechanoreceptors (PMR) on those capabilities.

Materials and Methods: Informed 10 dentists with healthy natural dentition (mean age: 28.3 yr) at Osaka University Graduate School of Dentistry participated in this study with ethic committee permission. The participants were instructed to split the test foods (half peanuts) put on the 3D force transducer without any hesitant at right central incisors and first molars to investigate the difference in direction specificity of PMR of those target teeth. The 3D force transducer was used to measure the force occurred on the test food when splitting in vertical, sagittal, and frontal direction. Local anesthesia was injected around target teeth to reveal the effect of impaired PMR. The mean occlusal force when splitting was compared between incisors and molars with/without the anesthesia, in each direction. ($p<0.05$)

Results: The incisors showed significantly lower biting force in frontal direction than the molars did, while in sagittal direction there were no significant difference between incisors and molars. In vertical direction, there were no significant difference between incisors and molars. These tendencies were observed in both before and after anesthesia. After anesthesia, higher occlusal force were observed with both incisors and molars in sagittal and frontal direction. However, there were not so difference about occlusal force in vertical direction between before and after anesthesia.

Conclusions: Participants controlled their occlusal force more precisely with their incisors compared with molars, especially they are superior to control their occlusal force in frontal direction. However it is difficult to control both in frontal and sagittal direction after anesthesia. Therefore, by evaluating from 3 dimension, it was suggested that incisors have superior capability to control occlusal force precisely especially in frontal direction, compared with molars.

Poster 2

SEROTONIN RECEPTOR GENE POLYMORPHISM IN SLEEP BRUXISM: A POLYSOMNOGRAPHIC STUDY

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Purpose/Aim: In our previous study we found a significant association of 102C>T (rs6313) single nucleotide polymorphism (SNP) in serotonin receptor 2A gene (HTR2A) with sleep bruxism, where C allele of 102C>T SNP was identified as a risk allele for sleep bruxism. The aim of this study was to further investigate the associations between 102C>T SNPs and masseter muscle activity patterns during sleep.

Materials and Methods: A total of 29 individuals (16 females and 13 males, mean age 26.4 ± 2.8 y) participated in this study after signing the university-approved consent form. Polysomnographic recordings were conducted in the sleep laboratory for two consecutive nights. The first night allowed them to adapt to the laboratory setting and the second night data were analyzed. Sleep architecture was analyzed according to the guideline of American Academy of Sleep Medicine. Sleep bruxism events were identified by masseter muscle activity along with audiovisual confirmation and every sleep bruxism event was categorized into phasic, tonic, or mixed event (Lavigne et al., 1996). Genomic DNA was extracted from

whole blood to determine the genotype of 102C>T SNP,using fluorogenic TaqMan probe with real-time PCR system. Every participant was categorized into the risk allele group (either C/C or C/T genotype) or the risk allele free group (T/T genotype). Masseter muscle activity patterns were compared between the 2 allelic groups using Mann-Whitney's U tests ($p < 0.05$).

Results: No abnormality of the sleep structure of the participants was found with averaged total sleep time 429.7 ± 14.7min, sleep efficiency 95.1 ± 3.1%, sleep latency 7.4 ± 7.5min, REM sleep 16.2 ± 4.5%, apnea/hypopnea index 2.48 ± 4.41 times/hr, and arousal index 12.7 ± 6.1 times/hr. Twenty individuals (69.0%) were diagnosed as having severe sleep bruxism according to the definition by Lavigne (1996). Regarding 102C>T SNP genotype, there were 5 individuals with C/C genotype, 18 with T/C, and 6 with T/T. Allelic frequency of C allele in 102C>T was 48.3% for all participants, 55.0% for bruxers, 33.3% for individuals with low muscle activities, respectively. C allele in 102C>T showed adequate sensitivity (85.0%) but poor specificity (33.3%) to predict sleep bruxism. The averaged sleep bruxism event number did not differ significantly depending upon the presence of the risk allele, however the averaged tonic event number for the group with C allele (median: 1.43 times/hr, range 0-4.12) resulted to be significantly higher ($p = 0.029$) than that for the group without C allele (median: 0.49 times/hr, range 0-2.36).

Conclusions: These results suggest that 102C>T SNP might be related to tonic burst events, which reflect tooth clenching during sleep. However, as is evident by poor sensitivity, further studies, which include a sufficient number of control group, are necessary to confirm the found association.

Poster 3

PRELIMINARY STUDY ON THE EFFECT OF EVAPORATION ON DIESPACER THICKNESS

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Keywords: die spacer, casting, film thickness

Purpose/Aim: Cemental interface has to be considered during the wax up for the luting cement to occupy the same - therefore die spacer is applied for casting relief. While the bottle is open, there can be evaporation of the volatile components. The purpose of this study was to evaluate the effects of component evaporation and die spacer mixing technique.

Materials and Methods: bottle of Gold tru-fit die spacer was left open for 0,1,4,8,24 hours at 22 degree C. spacer solutions were either shaken with hand or on a vibrator for 1 minute. One even brush stroke of spacer was applied to clean glass slides. Three die spacer films were made for each combination of time and mixing techniques. Statistical analyses were determined with 2 way anova.

Results: handshaking provided greater die spacing thickness, which increased with the time the bottle was open. Vibration provided lower thickness with no statistical increase in time.

Conclusions: insufficient agitation causes lower die thickness. excessive evaporation causes higher thickness

Poster 4

THE INFLUENCE OF BUILD ORIENTATION ON ACCURACY OF 3D-PRINTED RESTORATIONS

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Keywords: Additive manufacturing, digital light processing (DLP), build orientation

Purpose/Aim: With the advancement in CAD/CAM technology, additive manufacturing (AM)/3D-printing is emerging in the dental field and is promising in manufacturing of dental restorations. The aim of this study was to evaluate the effect of the build orientation (the support angle) on the dimensional accuracy of 3D-printed full coverage dental restorations.

Materials and Methods: A full dental crown was digitally designed and 3D-printed using digital light processing technology (DLP-AM). Nine angles were used for the build orientation as follows; 90°, 120°, 135°, 150°, 180°, 210°, 225°, 240° and 270°. The specimens were digitally scanned using a high-resolution optical surface scanner (IScan D104i; Imetric; Courgenay, Switzerland). The dimensional accuracy was evaluated using digital subtraction technique. The 3D-digital files, exported in standard tessellation language (STL) format, of the scanned printed crowns [test model] were superimposed with the STL files of the designed crown [reference model] using Geomagic® studio; 2014 (3D Systems, Rock Hill, SC, USA). The root mean square estimate values (RMSE) were evaluated and deviation pattern on color map was further assessed.

Results: The build angle is suggested to influence the dimensional accuracy of 3D-printed restorations. The lowest RMSE was found with the build angle 135° and 210°. Nevertheless combining the results with the deviation pattern, the overall deviation is more apparent in 210° build angle around critical locations such as the margin. Therefore, build angle of 135° is more preferable.

Conclusions: Within the limitations of this study, the recommended build orientation using DLP-AM technology is 135°. The selected build angle offers the highest accuracy of the printed restorations and offers the crown geometry a self-supporting property along the building process. It also offers the most preferable deviation pattern at the fitting surface of the crown.

Poster 5

MANDIBULAR IMPLANT-SUPPORTED OVERDENTURES WITH TWO DIFFERENT MINI-IMPLANT SYSTEMS: CASE REPORT

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Keywords: mini-implant, implant-supported overdenture

Case Presentation: Purpose This case report describes the treatment of two fully edentulous patients with mini-implant supported over-denture using two different systems on narrow mandibular alveolar bone ridge. Materials and Method Two fully edentulous patients, 68 and 87 years old, were referred with narrow mandibular alveolar ridges. New upper and lower complete dentures were fabricated in the conventional way. The completed dentures were duplicated to be used as a radiographic stent. Panoramic and CT images of the patients were taken along with the radiographic stents for correct placement of implants. Four implants using one-body type implant (Slimline, Dentium, Seoul, Korea) was used for a patient. Four implants using two-piece type implant (LODI, Zest Anchors, Escondido, California, USA) was used for the other patient. Four implants on the mandibular arch were placed for each patient. Eight weeks after installation, impressions were made for attachment of the female component. The attachments applied were ball and Locator attachments that were provided by the respective companies. Visual analogue scale regarding patient satisfaction, function, esthetics,

pronunciation, and pain was given before implant installation and after attachment connection. Results VAS scores showed improvement of function, esthetics, pronunciation, and pain for both patients after connection attachment. Both patients presented good overall satisfaction upon recall. Conclusion Satisfactory therapeutic results using over-dentures supported by 4 mini-implants with two different attachment systems placed in edentulous mandibular ridges were obtained. However, long-term follow-up is needed for further evaluation.

Poster 6

PROSTHODONTIC REHABILITATION OF A PATIENT WITH OSTEOMYELITIS: A CASE PRESENTATION

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Case Presentation: Osteomyelitis is an infection of medullary portion of the bone that becomes necrotic and leads to sequester formation. Osteomyelitis patient is generally suffering from functional impairments like speech and mastication as well as esthetic deformity. Prosthetic rehabilitation can be a recommended treatment choice for functional and esthetic improvement for such patient. This report presents a prosthetic rehabilitation of a patient diagnosed with maxillary osteomyelitis by using heat curing soft acrylic resin. It also evaluates the speech function performance. A 66-year-old male patient was diagnosed with osteomyelitis of the maxillae. Bilateral sequestrectomy of the maxillary molar region was performed causing perforation on the left maxilla to sinus. He was referred to the maxillofacial prosthetics clinic of Tokyo Medical and Dental University (TMDU) for prosthetic rehabilitation. The prosthetic treatment plan was started with immediate surgical obturator and subsequently definitive obturator. The first definitive obturator was fabricated in conventional manner with hard acrylic resin and metal framework. Due to frequent anatomical landmarks alteration that caused by osteomyelitis, a new obturator was needed. The fitting surfaces of the new obturator was produced with heat curing soft acrylic resin to reduce the irritation. Speech performances were evaluated using digital acoustic analysis. Although, the new obturator was fit and the nasalance was reduced in his speech, the patient still had complaint of consonant production. Additional adjustment for the polished surface was done according to the results of acoustic analyses to improve the consonant production. Consequently, he was satisfied with the adjusted obturator. Prosthodontic rehabilitation for osteomyelitis patient can be a reasonable and recommended treatment option for functional improvements and minimizing the risk of further osteomyelitis.

Poster 7

OBSERVATION OF SOFT TISSUE AND VERTICAL DIMENSION CHANGES USING 3DMD

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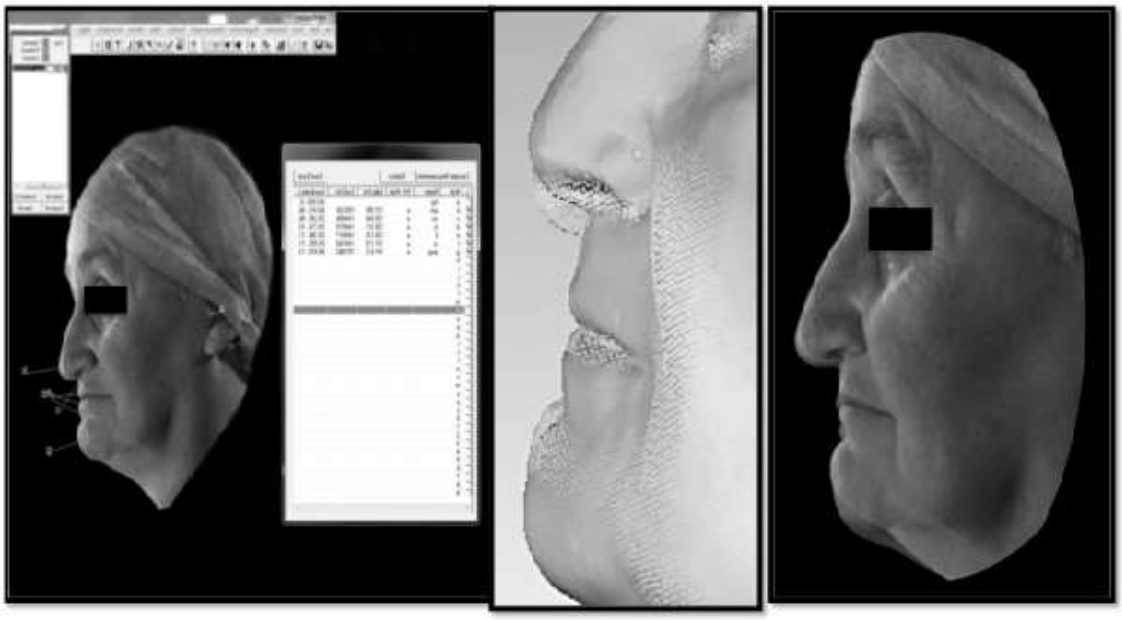
Case Presentation: PURPOSE: The aim of the present study was to analyze the accuracy and validity of 3dMD to predict the position of the soft tissues of a complete denture patient three dimensionally. MATERIALS AND METHODS: A 62-year-old female patient was referred to the clinic for renewal of her 10-year used denture. The extraoral examination revealed that the vertical dimension was reduced. Totally 15 photos were taken by a 3D imaging device (3dMD Ltd., London, UK) that shots every pictures in 1.5msec. The patient was positioned in rest position, centric relation position both with old dentures and new dentures. Vertical dimension of rest position was 63mm, centric relation position with old dentures was 51 mm and centric relation position with new dentures was 57 mm. Linear changes and discrepancies of soft tissues were evaluated by 3dMD software. And also 3D changes and deviations were calculated by using Geomagic Control. The topographic color coded map of deviations were reported. RESULTS: According to obtained the data the changes before and after treatment were 2.68mm for labiale superius, 2.92mm for labiale inferius, 1.99mm for subnasal, 2.89mm for pogonion, 1.98mm for pronasal and 2.96mm for sulcus inferior. Points moved forward positions after treatment. The area of

the upper and lower lips also calculated. The results were 388.9569mm2 and 442.6625mm2 before treatment and 435.5113mm2 and 529.8522mm2 after treatment, respectively. The area of the lips was increased. CONCLUSION: 3D imaging produces clinically acceptable three-dimensional soft tissue predictions and alternative method in determining vertical dimensions in complete denture patients.



Poster 8

3D ACCURACY OF FIT OF IMPLANT-SUPPORTED RESIN NANO CERAMIC CROWNS

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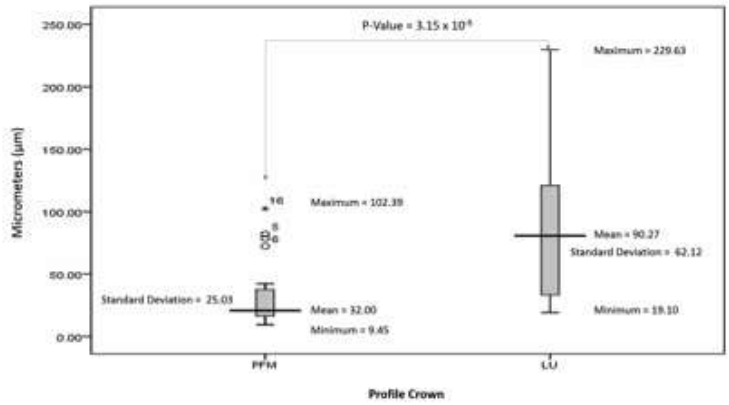
Keywords: Implant Fit, Lava Ultimate, CAD/CAM

Purpose/Aim: The progressive development in nanotechnology produced an innovative line of material known as resin nano ceramic (RNC). It combines the advantages of ceramic materials with those of highly cross-linked composite resins. Lava™ Ultimate (LU) CAD/CAM crowns fabricated using RNC material were recently introduced. However, no information is available on the three-dimensional fit of these crowns over dental implants. The purpose of this in vitro study was to compare the three-dimensional accuracy of fit of LU CAD/CAM with implant-supported porcelain fused to metal (PFM) crowns.

Materials and Methods: Twenty-five PFM crowns were fabricated on each mounted implant analogue following the well-established conventional technique (control group). Then, the PFM crowns were scanned using CEREC®-4 system to fabricate the corresponding LU crowns (experimental group). The three-dimensional (3D) internal fit was assessed using the F25 Microsystem Coordinate Measuring Machine (F25-CMM). The data were statistically analyzed using Wilcoxon ranks test with a significance level set at $p = 0.05$.

Results: The LU crowns had 3D misfit almost three times more than the PFM group (90.27 ± 62.12 µm and 32.0 ± 25.03 µm, respectively) (p-value 3.15 X 10-5). The maximum point of deviation in the LU crowns was 229.63 µm and the minimum point was 19.10 µm. In comparison, the gap ranged from 9.45 µm to 102.39 µm in PFM group. The total mean deviation in x-axis of LU crowns was significantly higher than the PFM crowns (p-value = 0.04). No significant difference was found between the groups when the other parameters were compared (y and z-axes and total distortion).

Conclusions: Within the limits of this in vitro study, the PFM crowns showed significantly less 3D total and x-axis distortion than Lava Ultimate CAD/CAM crowns constructed on titanium prefabricated implant abutments using CEREC ® 4 system. Nevertheless, all crowns produced were within the recommended acceptable range of fit (50 -200 µm).



Poster 9

THE MULTIDISCIPLINARY MANAGEMENT OF CRANIOFACIAL DEFECTS: DEALING WITH COMPLICATIONS

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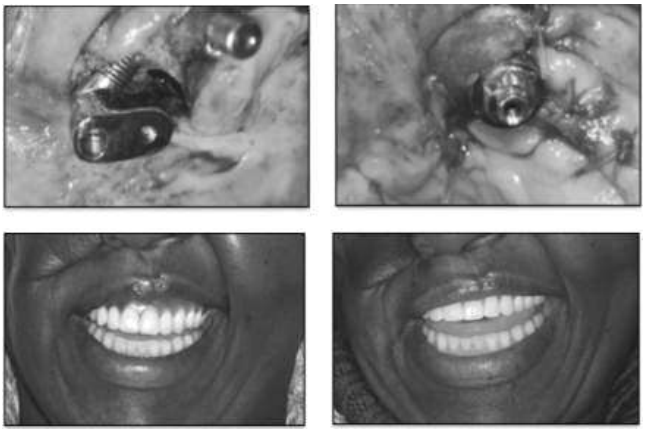
Case Presentation: Purpose: Squamous Cell Carcinoma (SCC) of the head and neck can result in large craniofacial defects that require a careful multidisciplinary management approach. Surgical challenges may compromise the prosthodontic rehabilitation. Modification of the management strategy and the use of custom made components may allow the prosthodontic rehabilitation to be retrieved. Methods and Materials: A case is presented of forty year old female diagnosed with SCC of the right orbit and maxilla. A prior exenteration and hemi-maxillectomy was completed with a rectus abdominus graft and placement of 4 root-form implants in the left alveolar ridge and a zygomatic implant in the left zygoma. The patient received 30 Gy radiation therapy. A provisional acrylic fixed implant supported prosthesis (ISP) was to be converted into a final dentoalveolar fixed ISP. However, one root-form implant failed to integrate, and the zygomatic implant was placed incorrectly resulting in prosthetic access too labially and within a shallow sulcus. The rectus abdominus graft was too bulky and aesthetically displeasing. The patient returned due to pain and hyperplastic tissue around the head of the zygomatic implant. To manage this complication a sulcoplasty and keratinised tissue graft was completed. A custom-made abutment was placed on the zygomatic implant and an implant supported overdenture was delivered. The graft was debulked and as a result an adhesively retained orbital prosthesis could be constructed. Results: The course of treatment and resultant rehabilitation will be presented. Conclusion: SCC may leave large defects that require multidisciplinary treatment planning. Due to the challenging nature of these resections and rehabilitations maintenance complications may arise. A multidisciplinary approach, coordinated by the prosthodontist, is required to manage these complications and allow for functional and aesthetic rehabilitation



Poster 10

IMPRESSIONS FOR IMMEDIATE DENTURE : PROCEDURES RELATED TO CLINICAL CHARACTERISTICS

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Keywords: immediate complete denture, impressions

Purpose/Aim: The aim of the study was to determine which impression procedures should be conducted related to clinical parameters.

Materials and Methods: The characteristics of teeth have to be analyzed first. Three factors are decisive: - the mobility of teeth; - the position of teeth; - the existence of retentive elements on teeth (intermediary element of bridge, cervical lesions, large mesio-distal width of the teeth compared to a small mesio-distal cervical width...) Three individualized impression trays may be carry out : - an individualized tray spacing out around the teeth; - an individualized tray with an occlusal shutter; - an individualized tray with an vestibular shutter.

Results: - When teeth have low mobility, with a normo-position : The preliminary impression is realized with a perforated tray and irreversible hydrocolloid is the impression material of choice. The final impression used and individualized tray spacing out around the teeth and zinc oxyde eugenol impression paste is the impression material for edentulous surfaces combined with an elastic impression material around teeth. - When teeth have an intermediate mobility, with or without retentive zones: The preliminary impression is realized with a plastic perforated tray, with vestibular shutter and irreversible hydrocolloid is the impression material. The final impression used an individualized tray with an occlusal shutter with holes in regard with teeth. The final impression can be realized with a two step approach : zinc oxyde eugenol impression paste first for the edentulous surfaces, then an elastic impression material around teeth. - When teeth have a high mobility, with retentive zones : For the preliminary impression, the teeth are first embedded with silicone material in order to create a smooth shell, then impression is realized with a perforated tray and irreversible hydrocolloid. After the polymerization of the impression material and the withdrawal of the tray, the silicone shell is withdraw with attention and replace in the hydrocolloid impression. The final impression used an individualized tray with an vestibular shutter. The final impression have to be realized with a two step approach : zinc oxyde eugenol impression paste first for the edentulous surfaces, then an elastic impression material around teeth.

Conclusions: These impression protocols allow to obtain accurate impressions for the edentulous surfaces and for the teeth. It provides a secure technical approach to maintain the teeth before the extractions and the denture insertion.

Poster 11

THE IMPACT OF CHANGES TO SALIVA ON PROSTHODONTIC MANAGEMENT

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Purpose/Aim: Saliva is critical to the maintenance and preservation of oral health yet often receives little attention until there are changes in its quantity and or quality. The purpose of this review is to highlight the management challenges of changes in saliva quality and quantity.

Materials and Methods: Selected literature since the 1970s was reviewed with a view to highlighting issues which would affect prosthodontic management.

Results: Salivary gland hypofunction occurs when stimulated and unstimulated salivary flow is significantly reduced. This reduced flow leads to changes in the quality of saliva such as a decrease in bicarbonate ions and buffering capacity, and a drop in pH. Xerostomia, on the other hand is, the subjective experience of a dry mouth. A significant number of patients, approximately 30-40%, experience some degree of a dry mouth, making it a relatively common patient concern. Salivary flow rates have been associated loss of teeth, high BMI in the young, and xerogenic drugs in the elderly. Symptoms of dry a mouth include halitosis, pain, difficulty talking and swallowing, and alteration of taste sensations. Saliva lubricates and therefore protects oral structures or tissues by acting as a barrier. The most important contribution to this function is by mucins, complex protein molecules of high viscosity and elasticity, highly adhesive and of low solubility. Speech, mastication, swallowing and mucosal integrity are facilitated by this function of saliva. A decrease in salivary quantity is challenging for the patient and clinician. For the patient, quality of life is diminished and the clinician has to overcome many treatment and prognostic factors in order to provide optimal treatment outcomes.

Conclusions: This poster presentation will suggest appropriate strategies under different conditions of altered salivary properties in the form of a flow chart.

Poster 12

FACTORS IMPROVING OHRQOL BY CONVENTIONAL AND IMPLANT COMPLETE DENTURE THERAPY

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Keywords: new conventional and implant supported complete dentures, factors related to improvement of OHRQoL

Purpose/Aim: Introduction: The removable denture (RD) treatment success may depend on various factors, such as quality of new dentures, anatomical concerns of denture bearing area, patients' psychological traits and social features. Identification of factors contributing to a treatment success is complex issue. In the recent years there has been a shift to patient based measures as best methods for measuring patient centered outcome. Aim of the study was to assess how and to which extent some factors contribute to improvement of oral health-related quality of life (OHRQoL) by conventional complete denture (CD) therapy, or by implant supported complete denture (I-CD) therapy.

Materials and Methods: All patients were previous conventional RD wearers. Sixty eight patients (40 females, 28 males), 48-93 years old (68.58±11.17) received new, good quality CDs. Fifty four patients (44 females, 10 males), 42-82 years old (67.3±9.39) received new, good quality I-CDs (implants inserted in the mandible). They completed twice each of the 3 structured questionnaires: the short form of the oral health impact profile (OHIP-14), the Orofacial esthetic scale (OES) and the Chewing function questionnaire (CFQ): at baseline - prior treatment and 3 month after new dentures had been delivered and all adjustments finished. The OHIP 14 represented multidimensional construct reflecting physical, psychological and sociological impact of removable denture wearing. The OES and the CFQ represented unidimensional questionnaires reflecting only orofacial esthetics (OES) or chewing ability (CFQ). Age, gender and education of patients were recorded. Baseline summary scores, after treatment summary scores and summary score differences were calculated for each questionnaire. The linear multifactorial regression analysis was made with the OHIP score difference (improvement of OHRQoL by a therapy) as dependent variable and: CFQ score difference (improvement of chewing function), OES score difference (improvement of orofacial esthetics), age, level of education and gender as independent variables.

Results: The OHIP summary score difference was -13.95±10.26 in the CD, and -15.8±8.59 in the I-CD wearers. In the CD wearers the regression model explained 63.4% of variability of the dependent variable with only 2 significant factors: improvement of chewing function (53.1%) and improvement of orofacial esthetics (10.3%). Factors: age, gender and level of education were excluded ($p>0.05$). However, in the I-CD wearers only improvement of chewing function explained 18.6% of the variability of the dependent variable, while improvement of esthetics, age, level of education and gender were excluded factors ($P>0.05$).

Conclusions: Patients' based measure: chewing function improvement is the most contributing factor for improvement of OHRQoL in both, conventional and implant CD therapy. Improvement in esthetics was not important factor in I-CD wearers. More research is necessary to account for other important factors that participate in improvement of OHRQoL in I-CD wearers.

Poster 13

STRESS DISTRIBUTION ON ALVEOLAR RIDGE WITH DIFFERENT BORDER MOLDING MATERIALS

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Keywords: border molding, impression

Purpose/Aim: To compare the stress distribution on edentulous alveolar ridge when impression by different border molding materials (non-elastic and elastic), and with and without border molding.

Materials and Methods: An edentulous ridge model was made with Stone and Vinyl Polyether Silicone and a flexible stress sensor sheet (10mmX10mmX0.5mm) was fixed on it. 2 customized trays were made with and without wax spacer. Then each of tray was used to impression in following 4 different ways: (1) border molding with Virtual heavy body (Ivoclar) and final impression with Virtual light body (2) Virtual regular body as preliminary impression material and final impression with Virtual light body (3) border molding with green stick compound and final impression with Virtual light body (4) green stick compound as preliminary impression material and final impression with Virtual light body. After each impression, the tray was loaded about 49N force and the stress distribution around the ridge was recorded.

Results: Stress distribution of most groups concentrated on both ridge area and slope area evenly, but not border area and the distribution patterns are similar except groups with preliminary green compound impression their stress concentrated on slope area.

Conclusions: Border molding does not impact the stress distribution pattern on ridge when impression by BPS materials, but it does by green compound. The fabrication way of customized tray (with and without spacer) didn't reveal a significant difference in stress distribution when impression.

Poster 14

A FUNCTIONAL ANALYSIS OF MEDIAL PTERYGOID MUSCLE IN HUMANS

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Keywords: medial pterygoid muscle, single motor unit, isotonic movement

Purpose/Aim: Temporomandibular disorders (TMD) are characterized by pain in or around the jaw joints and/or the jaw muscles and may present difficulty in jaw movements. There is still a limited understanding of the pathogenesis of TMD and a poor evidence base for some of the treatments provided. One common view is that hyperactivity of the jaw muscles leads to the pain and dysfunction. Many of the previous studies that have explored the relation between pain and jaw muscle activity have focused on the activity of the superficial jaw muscles in experimental and clinical TMD pain, while few investigations have been carried out on the medial pterygoid muscle. However, this muscle may play a role in TMD given that it is reported to be tender to palpation in some TMD patients. Furthermore, the normal function of this muscle has been poorly studied probably due to its deep location and complex anatomical features. This study aims to identify the functional properties of the medial pterygoid muscle during standardized horizontal and vertical jaw movement tasks.

Materials and Methods: 5 participants (3 female and 2 male; average age: 24.4±1.52 yrs) have been tested thus far. They had no signs or symptoms of TMD and no history of any chronic pain condition. Participants were asked to perform standardized jaw movement tasks by tracking a linear bank of light-emitting diodes aligned on a monitor displaying the mid-

incisor point. Single motor unit (SMU) activity of the right medial pterygoid was collected by intramuscular electrodes. A CT scan was performed at the end of experiment to verify the placement of the electrodes within the muscle.

Results: Medial pterygoid muscle was always active during contralateral and protrusive jaw movement in all participants. Seventeen SMUs were discriminated, of which 13 were active during contralateral movement. Of the 7 SMUs that were discriminated during protrusion, 4 were also active during contralateral movement. Electrode placement was verified in the medial pterygoid muscle in all participants.

Conclusions: The data suggest an important role for the medial pterygoid muscle in the generation and control of contralateral and protrusive jaw movements.

Poster 15

FITNESS AND OCCLUSAL CONTACT OF CROWN FABRICATED BY 3DP TECHNIQUE

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Keywords: Marginal fit, internal fit, complete crown

Purpose/Aim: The aim of this in vitro study was to compare the marginal and internal fit and occlusal contact of dental complete crown cast from three-dimensional printing (3DP)technique and conventional fabricated wax-patterns.

Materials and Methods: Twenty standardized stone dies of right mandibular first molar preparation were prepared and randomly divided into 2 groups according to the wax-patterns fabrication method (3DP technique and conventional method) (n=10). The complete crowns were casted from these 20 wax-patterns. The marginal fit and internal fit were evaluated by a silicone replica technique with light body silicone to fill the space between crown and plaster model and heavy body silicone to stabilize the light body film. All specimens were cut in 4 sections; each section was evaluated in 4 points: marginal gap, mid-axial wall, axio-occlusal edge and centro-occlusal. All points were measured using stereomicroscopy with a magnification of 40×. The occlusion was checked by occlusion foil. Data from the replica scores were analysed by t-test.

Results: Medians of mean gap widths of the conventional method group were: 67.29 μm (SD12.06 μm)in the marginal gap, 83.29 μm (SD11.55 μm) in the mid-axial wall, 112.28 μm (SD14.37 μm) in the axio-occlusal edge of the abutments, and 144.24 μm (SD15.12 μm) in the centro-occlusal location ,and of the 3DP technique group: 46.35 μm (SD7.47 μm), 65.62 μm (SD6.24 μm) and84.59μm (SD7.70 μm), 99.55μm (SD10.60 μm) respectively. The analysis revealed significant differences between the 2 groups for each point. After the crown insertion, the number of occlusal points was decreased in the conventional group, while was equivalent in the 3DP technique group. The number of occlusal points on the crowns fabricated by 3DP technique also more than the conventional technique.

Conclusions: Within limitations of this study, dental complete crowns cast from 3DP wax-patterns had significantly better marginal and internal fit than the conventional method. And there was a trend for better occlusion for the crowns cast from 3DP wax-patterns.

Poster 16

SURFACE CLEANLINESS OF CUSTOMIZED ABUTMENTS AFTER CLINICALLY DIFFERENT CLEANING PROCEDURES

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Keywords: customized abutment, cleaning,ultrasonic

Purpose/Aim: The surface characteristics of the dental implant abutment which penetrates through the gingival mucosa and is exposed to the oral cavity could play an important role not only for the bacterial adhesion and stagnation but also for the biocompatibility. In fact, the presence of contaminant at the implant abutment connection has been suggested as a cause of associated tissue inflammation and activates osteoclastogenesis. Nowadays, the esthetic request in implant dentistry is highly increasing, thus the use of customized abutments is increasing noticeably. However, the evidence on the quality of preparation on the abutment surface topography is not enough. The influence of conventional cleaning protocol of customized implant abutments has not yet been investigated and reliable. The purpose of this study is to evaluate surface topography and cleanliness of customized abutments after different cleaning procedures.

Materials and Methods: 30 titanium customized abutments were randomly divided into 3 groups. First group was taken by steam cleaning only (control group), second group underwent steam cleaning and scrubbing with disinfectant gauze (test group 1) and third group underwent ultrasonic cleaning (test group 2). For all specimens SEM analysis was performed to evaluate micro-particle contaminants on abutment surface and connection. And analysis of bacterial colonization on abutment sufaces was performed. Statistical differences were determined by one-way ANOVA. The level of statistical significance was set at P=0.05.

Results: Control group shows large numbers of titanium debris and lubricants. In test groups, there is almost no pollutants abutment surface. Microbiologic analysis demonstrated the present of bacteria growth on the abutment surface only in the control group. In the test group, absence of growing microorganisms was found.

Conclusions: Ultrasonic cleaning can be adopted for customized abutment cleaning process after dental technical laboratory stage.

Poster 17

EFFECT OF SURFACE TREATMENT AND AGEING ON STRENGTH OF ZIRCONIA

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Keywords: Zirconia, Strength, Ageing

Purpose/Aim: Y-TZP is now increasingly used as both layered and full-contour restorations which may be subject to hydrothermal degradation in the presence of oral fluids. This is in conjunction with the need for clinical adjustment of Y-TZP which may add additional mechanical stresses to the material. The aims of this study are to assess how different surface adjustments and polishing can affect the long-term flexural strength of Y-TZP.

Materials and Methods: 510 beam shaped Y-TZP specimens were subjected to 10 different surface preparation protocols and three durations of ageing (0, 3 and 6 hours) in an autoclave (134°C at 0.2MPa). One sample from each group was tested with XRD to assess the surface monoclinic content. Uniaxial flexural strength was tested by a three point bend test with an Instron 5655 universal testing machine. Statistical analysis was conducted with two-way ANOVA with Bonferroni pairwise comparisons followed up with linear regression analysis.

Results: Grinding using the green band diamond bur ($p<0.001$) and red band diamond bur ($p=0.057$) decreased the flexural strength of Y-TZP (659 and 786 MPa respectively) and was subsequently reversed if followed by a polishing kit. With the exception of these groups (without ageing), all remaining groups had mean flexural strengths greater than 950 MPa with most groups having no statistically significant change in flexural strength after artificial ageing. The zirconia polishing kit had the least amount of t->m phase transformation even with artificial ageing and the control group started with no detectable monoclinic phase and showed the greatest t->m phase transformation after artificial ageing.

Conclusions: Surface adjustment with diamond burs is best followed up with polishing burs. Artificial ageing did not appear to cause a decrease in flexural strength. Surface monoclinic content of Y-TZP did not appear to relate to changes in flexural strength.

Poster 18

CALIBRATION OF A SOFTWARE PROGRAM TO ASSESS CERAMIC CROWN PREPARATIONS

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Purpose/Aim: The aim of this study was to set the parameters of the PrepCheck (v.1.1) software (Sirona Dental, Germany) to realistically assess the quality of ceramic crown preparations.

Materials and Methods: Based on evidence in the literature an assessment rubric for the evaluation of ceramic tooth preparations was created which allowed for grading of the preparations as Acceptable, Requires Modification or Unacceptable. Sixty preparations were made on typodont teeth for tooth numbers 11, 13, 15, 16, 36 (FDI system). For each tooth four preparations were made to meet all the requirements under the Acceptable Category, four with variations in taper, incisal / occlusal reduction and axial reduction to be categorized as Requires Modification and four had further variations made so that they fall under the Unacceptable Category. The 60 preparations were assessed by 5 faculty instructors at baseline and again after 2 weeks to assess intra- and inter-rater reliability. Once sufficient agreement had been reached, the software's parameters were adjusted and the preparations were scanned and compared with the categorical assessment from the instructors. This process was repeated to test whether the software had been successfully calibrated.

Results: The intra-rater agreement was substantial or better in all cases, with 2 raters having excellent intra-rater agreement. Two raters with port intra-rating were then excluded for the inter-rater reliability, Cohen's kappa was 0.71, corresponding to 'substantial' agreement on both rounds. The majority decision rating from these assessments accurately resembled the intended rating and was used to compare the ratings of the computer assessment. The parameters of the PrepCheck software were then adjusted to try to obtain congruence with the human assessments.

Conclusions: It was found that the default parameters of the software were unrealistic and not clinically based. They required considerable modification to assist in the development of clinically acceptable preparations. The software shows great promise but the parameters need to be modified to be able to assess preparations that are more realistic for the clinical situation.

Poster 19

THE ROLE OF DIGITIZATION IN RAPID REPRODUCTION OF OBTURATORS

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Case Presentation: Over aged obturators have effect on the oral function, aesthetics, and psychosocial activities of maxillectomy patients. An alternative rapid production of obturators is required in such case as the conventional fabrication is complicated and time consuming. Digitization of obturator can play an essential role to reproduce patient's specific obturator in shorter time. The purpose of this report was to reproduce patient's current obturator using digitization concept. A 89-year-old maxillectomy female patient of the maxillofacial prosthetics clinic has visited the clinic for regular checkup. She has been wearing her obturator for more than 5 years. Consequently, the existing obturator becomes unhygienic and needs to be replaced with a new obturator. Due to the patient's difficulty to attend the clinic regularly for treatment procedures, an alternative rapid reproduction of obturator was planned with less complicated treatment procedures. Therefore, the patient's obturator was digitized using Computed Tomography (CT) scan. The three-dimensional (3D) virtual model was created using 3D modeling software. The 3D Model was then printed in acrylonitrile butadiene styrene by using stereolithography. The 3D model was conventionally processed. The definitive obturator was inserted and evaluated regarding fitting, function, and aesthetics. The definitive obturator was successfully delivered and fitted to the patient's mouth at the second visit. However, minor adjustment was needed to improve the retention. The patient was satisfied with the result of oral function and aesthetics after received her new reproduced obturator. This case report confirms the effectiveness of digitization in reproduction of obturator and provide patient with satisfied oral function and aesthetics.

Poster 20

AN APPLICATION OF A NEWLY-DESIGNED ABUTMENT FOR SCREW-RETAINED IMPLANT PROSTHESIS

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Keywords: screw-retained implant prosthesis, HERI abutment, retrievability

Case Presentation: A screw-retained implant prosthesis such as a gold UCLA-type has several disadvantages of high cost, unaesthetic appearance, and peri-implantitis caused by subgingival calculus deposition. To facilitate the retrievability of implant prosthesis and to make up for the weakness of conventional implant prosthesis, HERI(Healthy, Esthetic, Retrievable Implant) abutment which is newly designed with titanium link was devised. HERI abutment which is zero-tapered and constituted with thin titanium wall has a great retention with restoration materials and it is able to enhance the strength by increasing the volume of dental ceramics. In this case, implant prosthesis is composed of a external hexagonal connection type implant fixture(Neobiotech Co. Seoul, Korea), HERI abutment(HERI Co. Seoul, Korea), and lithium disilicate glass-ceramic(IPS e.max Press, Ivoclar Vivadent Co. Schaan, Liechtenstein) or zirconia CAD/CAM block(Zenostar, Wieland Dental Co. Pforzheim, Germany). The purpose of this case is to present healthy, esthetic and retrievable implant prosthesis with HERI abutment.

Poster 21

CORRELATIONS BETWEEN DIFFERENT IMPLANT STABILITY PARAMETERS –A SAWBONE STUDY

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Keywords: insertion torque, periotest value, ISQ

Purpose/Aim: The aim of this study was to investigate, with implants of different macrodesigns, the correlations between implant final insertion torque, implant stability quotient, and periotest value in artificial bone blocks of different qualities.

Materials and Methods: 1. Four different sawbone blocks were fabricated by laminating or non-laminating a 1-mm 50 pounds per cubic foot (pcf) short fiber filled epoxy sheet on 10- or 20-pcf polyurethane foam test blocks. 2. Implants having three types of macrodesigns was used in this study: Nobelbiocare MK III (4.0 x 10 mm; ø x length), MK IV (4.0 x 10 mm) and NobelActive (4.3 x 10 mm) implants. 3. Implant site preparations were performed according to the manufacturer's soft-bone protocols: MK III and MK IV by step drilling with 2-mm, 2.4/2.8-mm, 3-mm drills in non-laminated blocks, and a counterbore drill was used in laminated sawbone blocks. The final drill for NobelActive implants was a 3.2-mm drill. 4. MK III, MK IV, NobelActive implants were inserted into sawbone blocks with a torque wrench and the final insertion torque (FIT) was recorded. 5. Implant stability quotient (ISQ) was recorded with Osstell. 6. Periotest value (PTV) was recorded by connecting implant with a 5-mm healing abutment. 7. For each stability, 36 values were obtained from (3 implant designs, 3 blocks for each kind of sawbone blocks). Pearson product-moment correlation analysis was performed to calculate the correlation between the parameters. The match-up among the parameters in the decision of immediate loading was analyzed (criteria: IT>35, ISQ>60, or PTV<0).

Results: 1. For each implant design, all three parameters were correlated with artificial block density. 2. For each implant design, all three parameters were correlated with each other; ISQ was positively correlated with FIT and PTV is negatively correlated with FIT and ISQ. 3. In soft bone blocks (10 pcf), all the three implant stability parameters (IT<20Ncm, ISQ<50, PTV>10) suggested immediate loading would not be possible, regardless of the implant design. 4. For the three correlations tested between the three parameters, MKIV showed the best coefficients of determination while the MKIII showed the worst. 5. In 26/36 implant placements, the three parameters were matched completely in the decision of immediate loading. In the other 10 trials, only 2 parameters indicated yes to immediate loading in 6 trials and only one parameter indicated yes in 4 trials.

Conclusions: FIT, ISQ, and PTV correlated to each other, but the implant design affected the strength of correlation. The parameters may not coincide with each other in making decision of immediate loading.

Poster 22

ALGINATE VS. POLYVINYLSILOXANE IMPRESSIONS- FIT OF CONVENTIONAL RDPS- A PILOT

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Keywords: RDP,impression material,clinical fit

Purpose/Aim: The impression procedure for metal frame removable dental prostheses (RDPs) with a custom tray combined with alginate impression material has some advantages (time, costs and patient burden) above that combined with an elastomer. The purpose of this pilot study was to analyze the clinical fit of RDPs based on alginate versus polyvinylsiloxane impression material.

Materials and Methods: This clinical prospective study was conducted within the dental school of Nijmegen. Fifth-year dental students made impressions with a custom tray combined with alginate (N=25) or polyvinylsiloxane (N=31) for eventually 53 conventional RDPs. In treatment session 'framework try-in' fit of the framework as a whole, and fit of clasps separately were evaluated by calibrated clinical supervisors before (first evaluation) and after possible adjustments (second evaluation). Scores for fit were: 0=bad; 1=moderate; 2=fairly good; 3=perfect. In session 'delivery of partial denture' (third evaluation) the fit as well as the denture base were evaluated. During post-insertion appointments some variables were evaluated related to the fit: number of post-insertion appointments needed, number of sore spots, number of adjustment to the denture base, and reported food impaction (yes/no). Chi-square tests (#Fisher Exact tests) or ##two-sided T-tests were used to compare the groups.

Results: In the alginategroup a significant higher mean number of impressions was needed to obtain a correct dental impression (1.88 ± 1.2) compared to the polyvinylsiloxanegroup (1.35 ± 0.9) (##P=.03). However, mean total time to obtain a correct impression was shorter for the alginategroup (20.6 ± 17.1 minutes) than for the polyvinylsiloxanegroup (37.9 ± 17.4 minutes) (##P<.001). Three frameworks did not fit according to clinical standards (score 0) and new impressions were made; 2 in the alginategroup and 1 in the polyvinylsiloxanegroup. No significant differences (#) were found for the fit of the metal framework as a whole between the groups on all three evaluation moments. At first evaluation, fit of the clasps seperately was significantly better in the polyvinylsiloxanegroup than in the alginategroup (##P=.02). At delivery session (third evaluation), no significant difference between the two groups for the fit of the denture base was found (#P=.88). No differences were found for the mean number of post-insertion appointments (alginategroup 1.48 ± 0.73 vs. polyvinylsiloxanegroup: 1.27 ± 0.58) (##P=.2). Also no significant differences were found for the total number of subjects with sore spots (alginategroup: 10 subjects with 13 sore spots vs. polyvinylsiloxanegroup: 11 subjects with 19 sore spots) (#P=.80) and number of adjustments of the denture bases (alginategroup: 5 vs. polyvinylsiloxane: 12). However, four patients in the alginategroup reported food impaction; no one in the polyvinylsiloxanegroup.

Conclusions: In this pilot study, fit of metal frame RDPs and evaluation of post-insertion appointments based on impressions with custom trays combined with alginate and polyvinylsiloxane were comparable.

Poster 23

ATTITUDES OF SHORTENED DENTAL ARCH PATIENTS TOWARDS THEIR DENTAL CONDITION

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Keywords: qualitative study, SDA, attitude

Purpose/Aim: For an effective participatory discussion between patient and dentist on the treatment plan it is imperative that the dentist takes into account the views and attitudes of the patients. The purpose of this qualitative study was to explore attitudes of patients with shortened dental arches towards absent posterior teeth and prosthetic replacements.

Materials and Methods: Sampling and data collection: respondents with a variety in types of shortened dental arches (uni- and bilateral shortened dental arches of different lengths) with and without tooth replacement were selected by means of purposive sampling. A trained interviewer conducted face-to-face semi-structured interviews with open ended questions. The topic guide used was discussed by and agreed upon by all involved researchers. Additionally collected data included age, gender, SES and number of present teeth and presence and type of dantal prosthesis. Data analysis: transcripts of the interviews were analyzed by the use of software program MAXQDA. Investigator triangulation was achieved by regular discussions amongst researches.

Results: Informational saturation occurred after inteviewing 4 females and 5 males (age ranging from 57 to 86 years). Three main attitudes towards the shortened dental arch condition were identified; (1) a neutral attitude resulting in 'without restraint acceptation of absent posterior teeth' (no demand for tooth replacement), (2) a negative attitude in which 'resistance against having absent posterior teeth' prevailed or (3) a negative attitude in which 'resistance against (needing a) tooth replacement' prevailed. Two important themes considering 'Resistance against having absent posterior teeth' were functional discomfort because of (assumed) functional problems and emotional discomfort because of a feeling not being intact. A negative attitude against having absent posterior teeth resulted for some respondents in a positive mindset towards tooth replacement but not in all cases. Reluctance to undergo treatment was an important reason to refuse tooth replacement

leading to secondary acceptance of absent posterior teeth. For respondents for whom the 'resistance against (needing a) tooth replacement' prevailed, two main themes were identified; (1) a feeling of being handicapped that was associated with (needing a) dental prostheses or (2) reluctance of having a foreign body in the mouth. A negative attitude towards tooth replacement always concerned removable dentures whereas fixed replacements were appraised equal to natural teeth. If a respondent decided to wear a removable dental prosthesis in spite of a negative attitude this was considered as secondary tooth replacement acceptance. Based on the outcomese a conceptual model was developed representing the attitudes of patients with shortened dental arches towards their dental condition.

Conclusions: In this qualitative study, three main attitudes towards the shortened dental arch condition were recognized resulting in direct or secondary acceptation of absent posterior teeth or demand for tooth replacement.

Poster 24

EVALUATION OF PREVENTIVE MEASURES BASED ON DENTURE REPAIR SURVEY

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Keywords: Denture fracture, Denture repair, Reinforcement

Purpose/Aim: In 1984 denture repair cases were examined in the clinic of Department of Prosthodontics, Gerodontology, and Oral Rehabilitation, Osaka University Dental Hospital and preventive measures against the fracture were set based on the results of the survey. However, recently the same survey has not been done. Therefore, we surveyed recent cases of denture repair in our clinic. The purpose of this study was to evaluate a preventive measure of denture fracture based on the clinical survey of denture fracture cases in 1984 and 2009. And the changes from 1984 to 2009 and the long-term effect of the strategy for preventing denture fracture were also examined.

Materials and Methods: This study included 128 participants who visited with a chief complaint of denture fracture and received denture repair treatment in the clinic of Department of Prosthodontics, Gerodontology, and Oral Rehabilitation, Osaka University Dental Hospital in 2009. The following data of denture repair cases were collected and analyzed; report, procedure of denture repair, position of denture base fracture, with or without reinforcement, period of using denture from insertion to the denture repair. And then the difference of the results between 1984 and 2009 were compared and the effect of the preventive measures were evaluated. Chi-square test was employed to compare the difference statistically. ($p=0.05$)

Results: In the 2009, number of denture fracture was 55.5% in all repair cases and the most frequent position of denture fracture was around the clasp and the metal in denture base. Number of denture with reinforcement was 45 % in all dentures. Average period from denture insertion to the denture repair was 37 months. Comparing the difference between 1984 and 2009, number of denture fracture decreased significantly. Number of denture with reinforcement increased significantly, and the average period from denture insertion to the denture repair became longer.

Conclusions: In the 2009, number of denture fracture was 55.5% in all denture repair cases. The number of denture repair decreased significantly from 1984 to 2009 and the period from denture insertion to the denture repair became longer. It is suggested that the reinforcement inserted in the denture as the preventive measure is effective to prevent the denture fracture and the patients can use their denture for longer period.

Poster 25

DEPRESSION, SOMATIZATION, AND SLEEP DISORDERS VERSUS TMD: POPULATION CASE-CONTROL STUDY

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Keywords: TMD, sleep, depression

Purpose/Aim: To carry out the first populational case-control study correlating temporomandibular disorders (TMD) with depression, somatization, and sleep disorders.

Materials and Methods: The Research Diagnostic Criteria for Temporomandibular Disorders (RDC/TMD) Axis II and the Sleep Assessment Questionnaire (SAQ®) were used for pain, sleep, depression and non-specific physical symptoms pain items excluded (somatization) assessment. The population comprised by individuals from both sexes, between 20 and 65 years of age, and users of the Brazilian Public Health System (SUS). The data analysis was performed with STATA 11.0, and the Pearson's Chi Square test and logistic regression were used for correlation assessment ($p < 0.05$).

Results: The final sample (N = 1,643) was comprised predominantly by men (67.7%), between 20 and 39 years of age, married (48.4%), Caucasian (70%), with an average monthly income between US$ 250.00 and US$ 1,500,00, and with high school education (31%). Using the Chronic Pain Grade (CPG) classification, 84 TMD cases (Grades III or IV, moderately or severely limiting pain) and 1,048 controls (Grade 0, no pain in the last 6 months) were selected. Highly statistically difference ($p<0.001$) between cases and controls were found in depression, somatization and sleep disorder levels. In the adjusted stratified analysis, severe levels of depression, somatization and sleep disorders increased the risk of developing TMD (odds ratio) in 25.70, 19.00, and 25.74 times, respectively.

Conclusions: This study demonstrates the importance of depression, somatization, and sleep disorder assessment in patients with TMD for the diagnosis and treatment planning.

Table I. Unadjusted and adjusted analysis using logistic regression (odds ratio - OR) for depression and somatization (Research Diagnostic Criteria - RDC/DTM, Axis II) as well as for sleep (Sleep Assessment Questionnaire - SAQ) between TMD cases (Chronic Pain Grade = 3 or 4, N = 84) versus controls (Chronic Pain Grade = 0, N = 1,048) extracted from the population of the City of Maringá (Brazil) users of the Brazilian Public Health System (SUS), N=1,643.

Variable	Unadjusted analysis			Adjusted analysis		
	OR	95% CI	P value	OR	95% CI	P Value
Sleep Assessement Questionnaire*			<0.001			< 0.001
Low (≤ P25%)	1			1		
Mild (>P25% - P50%)	0.93	(0.25 – 3.35)		1.13	(0.28 – 4.50)	
Moderate (>P50% - P75%)	3.91	(1.33 – 11.49)		4.49	(1.37 – 14.71)	
Severe (> P75%)	17.94	(6.35 – 50.65)		25.74	(7.73 – 85.61)	
Depression (including vegetative symptoms)*			<0.001			< 0.001
Normal (<0.535)	1			1		
Moderate (0.535 to <1.105)	2.94	(1.36 – 6.32)		4.02	(1.75 – 9.26)	
Severe (1.105+)	19.41	(9.37 – 40.21)		25.70	(10.82 – 61.02)	
Non-specific Physical Symptoms (pain items excluded)*			<0.001			< 0.001
Normal (<0.428)	1			1		
Moderate (0.428 to <0.857)	4.89	(2.21 – 10.78)		4.34	(1.89 – 9.97)	
Severe (0.857+)	19.84	(9.46 – 41.57)		19.00	(8.52 – 42.36)	

**Adjustment for ethnicity, marital status, family income and educational level.*

Poster 26

IMPLANT SUPPORTED PROSTHESES

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Keywords: implant-supported prostheses, PEKK, hybrid prosthesis

Case Presentation: The type of prosthetic restoration used in implant rehabilitation greatly contributes to the recovery of masticatory function as well as quality life in patients. Frameworks for implant-supported prostheses are typically made by casting metal or by milling either titanium or zirconia. Recently, non-metal materials, polymer-type materials, were suggested as framework materials. PolyEtherKetoneKetone (PEKK), one of the high-performance polymers, was recently introduced in the dental field with potential wide-ranging applications in the dental area. This case report describes the implant- and tooth-supported fixed prostheses created using a new high-performance polymer (Pekkton?) framework for a fully edentulous maxilla and partially edentulous mandible.

Poster 27

SELF-PERCEPTION OF UNDERGRADUATE DENTAL STUDENTS ABOUT PREPAREDNESS IN RESTORATIVE DENTISTRY

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Keywords: dental students, self-perceptions, prosthodontics

Purpose/Aim: This study aimed to investigate self-perceived preparedness in restorative dentistry of undergraduate students entering year four of a five-year dental curriculum, by evaluating the understanding of key design features of a complex restoration requiring higher-level skills. The teaching, learning, simulation and assessment of competencies for the complex task had occurred within the third year of the dental curriculum at the University of Otago, New Zealand.

Materials and Methods: All dental students entering fourth year, in 2012, 2013, 2014, were asked to complete a questionnaire, using a Lickert scale, that investigated knowledge and preparedness for restorative dentistry, at a fourth year level, and to recall design features required for a complex multi-surface cavity preparation. Using a short answer format, the questionnaire also investigated the understanding of retention and resistance form and factors leading to a successful cusp protection restoration. The survey instrument was delivered at a scheduled lecture. This study had ethics approval from the University of Otago, Human Ethics Committee: Category B.

Results: The response rate for this study was 95% from classes in 2012, 2013 and 2014 (N=85, 87 and 85 respectively). Quantitative and qualitative statistics were used to evaluate the results. The majority of students felt that their knowledge was sufficient to enter fourth year, however although feeling prepared, they were not confident about commencing the clinical procedures of more complex tasks. The overall understanding of retention and resistance form was poor as was the recollection of the design features required for a cuspal protection restoration.

Conclusions: Confidence was generally high for students entering the fourth year of the dental curriculum. Recollection and translation of knowledge from the conclusion of third year and the subsequent extended summer vacation was however limited. Because the recollection of knowledge and understanding of concepts of retention and resistance form of cavity design was consistently low, this has implications for the teaching and learning of prosthodontics at the fourth year level. A need has been identified for the consolidation of concepts at the beginning of the fourth year curriculum to improve confidence and competency of students with high-level prosthodontic related tasks.

Poster 28

FACIAL PROSTHESIS MADE BY DENTAL MATERIALS ON EXPOSED RECONSTRUCTION PLATE

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Keywords: mandiblectomy, maxillofacial rehabilitation, adams clasp

Case Presentation: Reconstruction plate is often used for mandibular reconstruction after tumor surgery. Plate exposure is the most common complication associated with mandibular reconstruction. The esthetic problem occurs in such patient and facial prosthesis covering the plate is indicated. Facial prosthesis is often made by silicon rubber material. Because of the difficulty in modification, facial prosthesis made by silicon material is not suited for adjustment. Also the retention of a prosthesis on movable tissue is challenging. In this case report, a facial prosthesis for a exposed reconstruction plate was made using dental clasp and acrylic resin to get enough retention and tolerance for adjustment. A 90 years old woman was referred to the Clinic for Maxillofacial Prosthetics with a chief complaint of her appearance. She had been performed a left mandiblectomy and reconstruction surgery using titanium reconstruction plate. One month after the surgery the plate started to be exposed and 13 cm of the plate was exposed in one year. Further surgery was not indicated because of her age and complications. Facial impression was taken using irreversible hydrocolloid impression material and a working cast was made. Adams clasp was bent to fit the plate with holes to make a retentive part. Facial part was made by mixing self-curing acrylic resin of three different shades (pink, ivory and clear). The retentive part and the facial part was tried and fit to the patient and connected to each other using acrylic resin. The extrinsic coloration was performed. According to the inflammation of the surrounding tissue or expanding of the exposure the prosthesis was adjusted by cutting or adding acrylic resin. Result: The color made by the dental material matched the skin color. The facial part didn't irritate the surrounding tissue owing to the frequent adjustment. The facial prosthesis was stable and easily worn by the patient. She could go out with the prosthesis without worrying about her appearance. A facial prosthesis on an exposed reconstruction plate made by using dental clasp and acrylic resin was effectively used for the esthetic rehabilitation of an elderly mandiblectomy patient.

Poster 29

ANTIMICROBIAL ACTIVITIES OF DENDROPANAX MORBIFERA EXTRACT FOR DENTURE CLEANER SOLUTION

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Keywords: Dendropanax morbifera extract, antimicrobial activity, denture cleaner

Purpose/Aim: The purpose of this study as a preceding research is to assess whether Dendropanax morbifera (D. morbifera) can be used for the development of natural mouthwash and denture cleaner, and to analyze the antimicrobial, antioxidant activity and cytotoxicity of D. morbifera extract.

Materials and Methods: The extract was obtained from branches of D. morbifera. The solvent fractions were acquired by fractionating D. morbifera extract using hexane, ethyl acetate, and butanol solvent. The composites for mouthwash and denture cleaner were produced by adding D. morbifera extract into saline or chlorohexidine solvent, and 4 types of composites were made. Among the analysis methods for antimicrobial proliferation-inhibiting activity, paper disc test was used to evaluate the antimicrobial and antifungal activity of D. morbifera extract, solvent fractions, and composites for mouthwash and denture cleanser against S. mutans and C. albicans. The analysis of antioxidant activity was carried out through DPPH radical scavenging assay. The cytotoxicity of D. morbifera extract was analyzed through MTT assay using human normal oral keratinocytes.

Results: D. morbifera extract showed antimicrobial activity against S. mutans and especially C. albicans. The solvent fractions of D. morbifera showed strong antimicrobial activity against S. mutans and C. albicans in n-hexane solvent fraction and butanol solvent fraction, respectively. The composites containing D. morbifera extract appeared to have larger

antimicrobial activity against S. mutans and C. albicans compared to the composites without D. morbifera extract. D. morbifera extract also showed outstanding antioxidant activity. Among solvent fractions of D. morbifera, butanol, ethyl acetate, and chloroform solvent fraction tended to have increased antioxidant activity as the concentration increased. There was almost no antioxidant activity of the composites using D. morbifera extract. D. morbifera extract showed high cell survival rate in cytotoxicity test.

Conclusions: As a result of this preceding study, D. morbifera extract turned out to have antimicrobial, antioxidant activity and cytophilicity. Based on these results, it is expected that D. morbifera is applicable as a ingredient for natural mouthwash and denture cleanser

Poster 30

INFLUENCE OF ABUTMENT ANGLE ON IMPLANT SUPPORTING REMOVABLE DENTAL PROSTHESIS

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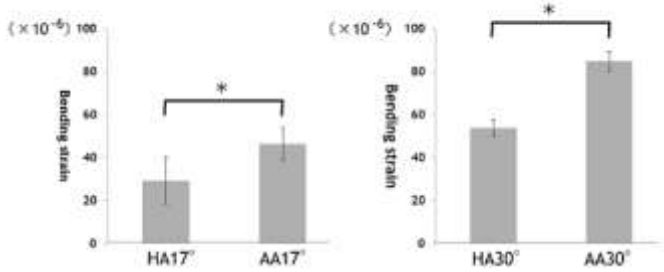
Keywords: implant, implant supporting removable dental prosthesis, strain

Purpose/Aim: It have been reported that a single implant supporting distal extension partial removable dental prosthesis (PRDP) can improve stability. In previous studies, we clarified that the inclined implant was strained more than implant perpendicular to the occlusal plane. In clinical cases, it is often necessary to incline the implant. In such cases, it is expected to be able to reduce strain of implant by changing abutment angle to perpendicular to the occlusal plane. However, there have been few mechanical reports about the effect of changing the angle. Therefore, the purpose of this study was to examine the effect of abutment angle of inclination on the strain of implant supporting the PRDP.

Materials and Methods: A unilateral mandibular distal extension model with simulated silicone mucosa and PRDP were fabricated using acrylic resin. Two strain gauges were attached at opposite sides of the implant surface (3.75-mm diameter × 10-mm length; Biomet 3i). This implant was installed in the second molar region as the gauges faced mesio-distally with two ways; inclined 17° mesially, and inclined 30° mesially to the occlusal plane. Three types abutments were used; A healing cap with 17° and 30° multi-unit abutments(4 mm height; Nobel Biocare), and a healing abutment (5 mm height; Biomet 3i). Following combinations were compared; 17° multi-unit abutment with healing cap on the 17° implant and healing abutment on the 17° implant. (AA17°, HA17°), 30° multi-unit abutment with healing cap on the 30° implant and healing abutment on the 30° implant. (AA30°,HA30°) An occlusal load of 49 N was applied using maxillary artificial denture teeth. Measurements were carried out 10 times in each combination. The bending strain was calculated and compared with the t-test (P=0.05) by using the statistical package R (version 3.02).

Results: The bending strain of AA17° was 29.5, HA17° was 46.5, AA30° was 54.0, HA30° was 84.9. When compared AA17° with HA17°, bending strain of AA17° was significantly smaller and compared AA30° with HA30°, AA30° was significantly smaller ($p<0.05$).

Conclusions: The bending strains of both 17°AA and 30°AA were smaller than HA. This may be because by correcting direction of the abutment to perpendicular to the occlusal plane, load directions come closer to the axial direction of the implant, the load position is closer to the center of the implant. Within the limitation of this study, it is concluded that the bending strain of the implant can be reduced when correcting the direction of the upper structure to perpendicular to the occlusal plane by using an angled abutment, even if implant is inclined.



Poster 31

THE EFFECTS OF BIOFEEDBACK ON SLEEP BRUXISM AND STRESS

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Keywords: Sleep bruxism, Biofeedback, Stress

Purpose/Aim: Sleep bruxism (SB) causes many dental problems such as tooth wear, muscular pain, implant failure and complications with dental prosthesis, no reliable treatment has been found so far. In this study, we used electromyogram biofeedback device SleepGurad, which can detect the SB and notice the patients with a gentle beep sound to stop the SB, wearing on forehead. The aim of this study was to reveal the effect of this biofeedback device against SB, psychological and physical stress and sleep quality.

Materials and Methods: 10 subjects (5 males and 5 females), who provided informed consent before participating, were participated in this study and crossover design was used. Sleep measurements were performed for three consecutive nights obtaining data of Baseline without SleepGuard (Base line), with SleepGuard beep sound (Group On) and without beep sound (Group Off), data from the final day were evaluated. Furthermore, to compare psychological and physical stress before and after sleep, assessments were made based on STAI-JYZ and the measurement of salivary chromogranin A (CgA) and Cortisol. To compare each parameter among three groups (Baseline, Group On and Group Off), Friedman's and Dunn's tests were used. The study protocol was approved by the Ethics Committee of Kyushu Dental University.

Results: The median values of masticatory muscle activity (MMA) events/hour with the bruxism beeping sound off and on were 19.4 and 9.7, respectively. Biofeedback led to a significant decrease in MMA events/hour ($P < 0.05$). No significant differences were observed in salivary CgA concentrations, the median values of STAI-JYZ and the median ratios of each sleep stage among the three groups. Although salivary cortisol concentrations tended to be higher in Group On (0.60 ± 0.33 μg/dL) than in Baseline (0.45 ± 0.19 μg/dL) and Group Off (0.43 ± 0.28 μg/dL) at the time of awakening, these differences were not significant. Whereas, Sleep Guard's beep sounds did not affect the percentage of sleep stages, salivary CgA level, and the Scores of STAI-JYZ.

Conclusions: Our results suggest that nighttime biofeedback therapy can inhibit SB and does not affect sleep quality and psychological stress, however it might increase physical stress.

Poster 32

THE EFFECT OF PALATAL COVERAGE ON MAXILLARY IMPLANT OVERDENTURE

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Keywords: maxillary implant overdenture

Purpose/Aim: to investigate the effect of palatal coverage on maxillary implant overdenture under vertical loading

Materials and Methods: An edentulous maxilla model and complete dentures were fabricated with polymethyl methacrylate resin. Six implants (3.75x10mm, Mark III, NobelBiocare, Sweden) were embedded at bilateral canine, second premolar and first molar areas connected with Locator® (Zest Anchors, USA) attachments were applied. Four miniature strain gauges(KFG-02-120-C1-11, Kyowa, Japan) were attached to the midline palatal, midline buccal, the palatal surface above the attachment(second premolar area), and left tuberosity on each denture to measure the bending strain on denture. In the other group, the maxillary complete denture without palatal coverage were placed on the same model for comparison. A

vertical static load of 100N was applied to the denture on one biting plate cross bilateral posterior teeth for 10 times each group.($P<0.05$)

Results: The largest strain was observed at the midline palatal area, followed by the midline buccal, above the attachment, and the tuberosity areas. There was no significant difference between the group with or without palatal coverage

Conclusions: Within the limitation of the study, the strain distribution in 6-implant-supported overdenture without palatal coverage was the same as overdenture with palatal coverage

Poster 33

CORDLESS VERSUS CORD TECHNIQUES OF GINGIVAL RETRACTION; A SYSTEMATIC REVIEW

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Keywords: gingival retraction, gingival displacement

Purpose/Aim: To primarily assess the efficacy of cordless versus cord techniques in achieving hemostasis control, gingival displacement and their influence on gingival/periodontal health. Additionally, subjective factors reported by the patient (pain, sensitivity, unpleasant taste, discomfort) and operator's experience to both techniques, were analyzed.

Materials and Methods: An electronic database search was conducted using 5 main databases through the publication year 1998 to December 2014 to identify any in-vivo studies comparing cords and cordless gingival retraction techniques.

Results: 7 potential studies were analyzed. Out of the 4 articles that reported achievement of hemostasis control, 3 of them comparing patients treated by an epi-gingival finish line, concluded that paste techniques were more efficient in controlling bleeding. Amount of sulcus dilatation was reported by 5 authors with contrasting evidence. Only 1 author reported an increased gingival displacement when paste systems were used. 2 reviewers did not observe any significant difference while 2 studies showed greater gingival displacement associated with cords, particularly in cases where the finish line was placed at a sub-gingival level. Of the 4 studies that assessed the influence of both techniques on the gingival/periodontal health, 3 studies noted less traumatic injury to soft tissues when gingival paste was used. Paste system, in general, was documented to be more comfortable to patients and user-friendly to the operator.

Conclusions: Due to heterogeneity of measurement variables across studies, this study precluded a meta-analytic approach. Although both techniques (cord/cordless) are reliable in achieving gingival retraction, some situations were identified wherein each of the techniques proved to be more efficient.

Poster 34

COMPUTER ASSISTED MANDIBULAR RECONSTRUCTION USING A CUSTOM-MADE TITAN MESH TRAY

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Keywords: Top-down Treatment, digital dentistry, Custom-made Titan Mesh Tray

Case Presentation: - Removable Denture based on the Top-down Treatment Technique - Objectives This report introduces a computer assisted mandibular reconstruction procedure, which utilizes a custom-made Ti-mesh tray with particulate

cancellous bone and marrow, and a removable denture. This procedure was based on a top-down treatment technique, and reviews the case of a representative patient with a mandibular continuity defect. Methods We fabricated a physical mandibular model using 3-D reconstructed data from computer tomography data. From this model, we converted a commercial Ti-mesh sheet into a custom-made Ti-mesh tray. Based from the 3-D data of X-ray computer tomography (CT), we reproduced an accurate configuration of the defective mandible and reproduced the accurate configuration of the defected mandible, on the physical model. Results The actual reconstructive surgery was completely performed within a comparably shorter time span than a normal operation. Also, a temporary removable denture was easily fabricated on the basis of the concept of top-down treatment leading to the prosthodontic treatment using dental implants. During the clenching of the mandible, high magnitudes of tensile stress occur on the third molar region extending to the condylar. Compressive stress was observed in the premolar and molar region, extending to the coronoid and condylar. To sustain the various stresses during jaw function, an adequate strength and appropriate configuration were required for the custom-made Ti-mesh tray. We used our original bending tools and a welding device to fabricate the tray. The patient was able to begin eating 10 days after reconstructive surgery and could resume normal diet within 3-months. These facts suggest that the present reconstructed mandible, from our custom-made Ti-mesh tray and PCBM, has enough strength to withstand the mechanical stress that occurs on the mandible during mastication, clenching, and mouth opening. Conclusions We find this technique to be optimal for reconstructing functional occlusion and to accurately restore the aesthetic appearance of the teeth, jaw, and face.

Poster 35

INHIBITION OF DENTURE PLAQUE ACCUMULATION BY MPC POLYMER COATING

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Keywords: MPC polymer, Denture plaque, PMMA

Purpose/Aim: One of significant clinical problems associated with acrylic resin dentures is the adhesion of dental plaque on dentures surfaces formed by oral microorganisms, which is called as denture plaque. Denture plaque-associated infection is regarded as a source of serious dental and medical complications in the elderly population. The polymer 2-methacryloyloxyethyl phosphorylcholine (MPC) has been applied to variety of medical devices to prevent infection. We have recently demonstrated that PMBPAz [poly (MPC-coBMA-coMPAz)] has potential to inhibit plaque accumulation on polymethyl methacrylate (PMMA) surface in vitro. The objective of this clinical study was to evaluate the effect of PMBPAz polymer coating on plaque accumulation on complete dentures.

Materials and Methods: Fourteen patients with a maxillary complete denture, participated into this study after giving informed consent. The denture of these patients was mechanically and chemically cleaned and then coated by PMBPAz twice. In order to coat the dentures, they were dipped in 0.5wt% PMBPAz solution, and then dried and irradiated with ultraviolet for 2 minutes. Denture plaque accumulation was evaluated by staining denture surface by methylene blue after letting the patients use the denture for 1 and 2 weeks. The same procedures except for the PMBPAz coating were repeated to evaluate PMBPAz uncoated surface as control and coating status was kept blind to the patients. The image of the stained denture surface was captured by a digital camera in a standardized manner. The percentage of the stained area, which was quantified as a pixel-based density using an image analyzing software (Adobe Photoshop), in whole denture area (percentage plaque index, PPI) was calculated for the mucosal and polished surfaces and compared between PMBPAz coated and uncoated dentures (t-test, $p<0.05$). The study protocol was approved by the Ethic Committee of Showa University (#2013-013).

Results: After 1 week, the averaged PPIs on the mucosal and polished surface of control dentures were 36.5±16.4% and 24.7±10.5%, respectively. Those of PMBPAz coated dentures significantly decreased to 12.9±7.6% and 13.0±6.7%, respectively ($p<0.0001$). Significant decreases in PPIs on the mucosal and polished surfaces by the PMBPAz coating were also found after 2 week usage of the dentures (33.7±17.7% to 14.0±9.9%,$p<0.001$, 23.7±15.2% to 15.1±9.7%,$p<0.01$, respectively). Averaged inhibition rates after 1 and 2 weeks were 60.8±21.0% and 56.5±25.9% on mucosal surface and 44.9±19.4% and 30.6±28.1% on polished surface, respectively.

Conclusions: These results suggest that the PMBPAz coating on complete dentures inhibits the accumulation of bacterial plaque, which lasts for 2 week clinical usage with higher effect on the mucosal denture surface.

Poster 36

PRESURGICAL ESTIMATION OF THE PRIMARY STABILITY OF SIMULTANEOUS IMPLANT PLACEMENT

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Keywords: Primary stability, Maxillary posterior region, Simultaneous implant placement

Purpose/Aim: Background: Since maxillary posterior region often exhibit insufficient bone quality for supporting dental implants, simultaneous implant placement with sinus elevation or sinus lift is often applied for this region. The residual alveolar bone height has been used as the clinical criterion for simultaneous implant placement to date. Although it has been reported that bone quality is related to the primary stability of implants using computer tomography (CT) data, it is not scientifically proven for the maxillary posterior site with insufficient residual alveolar bone height. Purpose: The aim of this study was to clarify the possibility of predicting the primary stability of implants preoperatively at the maxillary posterior site using bone quality and volume data evaluated by CT.

Materials and Methods: Materials and method: Porcine collum costas with 1- to 12-mm bone thickness were used in this study. After placing the surgical stent, the preoperative evaluation of the bone surrounding the implant socket was performed using helical CT. The simulation of implant placement procedures and calculation of the CT value were performed using a software (LANDmarkerTM Ver. 5.0, iLAND Solutions Inc., Osaka, Japan). Data analyses were done with the boundary CT value and product sum. The bone thickness was calculated as the residual alveolar bone height using a simulation software. Then, 80 tapered implants (f4.0×12.0mm, GC Aadva?R Tokyo Japan) were placed according to the manufacturer's instructions. The insertion torque value (ITV) was recorded as indicators of the primary implant stability. Spearman's correlation analysis and linear regression analysis were conducted for these data sets.

Results: Result: The relatively high correlation was found between ITV and CT value ($p<0.001$, $rs=0.766$), whereas the correlation coefficient was moderate between ITV and bone thickness ($p<0.001$, $rs=0.485$). Significant linear relationship was also observed between CT value and ITV ($p<0.001$, $R2=0.604$).

Conclusions: Conclusion: Evaluation of bone quality and volume with CT value of bone surrounding implants at maxillary posterior site could contribute to the treatment planning for implant restoration in clinical situations.

Poster 37

CONVERTING RADIOGRAPHIC GUIDE INTO TEMPORARY DENTURE IN A EMERGENCY CASE

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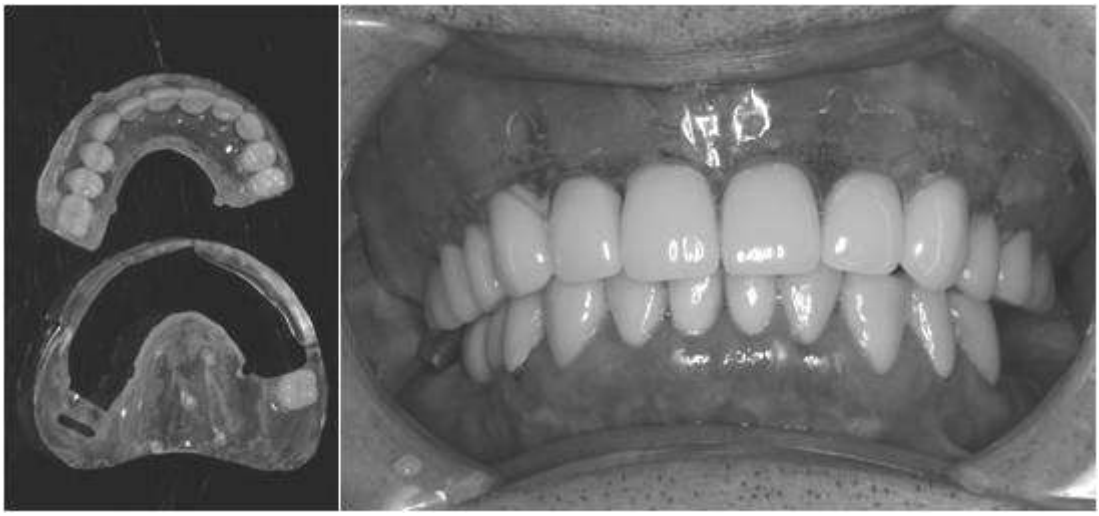
Keywords: immediate loading,implant, lack of initial fixation

Case Presentation: Purpose: For edentulous patient, number of the case which applying full mouth immediate loading implants are increasing. In some cases, we must insert implants right after teeth extraction. In such a case, sometimes initial fixation of the implants could not be obtained, so immediate loading prostheses could not be installed. Instead of immediate loading prostheses, overlay dentures are needed. Commonly, provisional restorations for immediate loading are prepared, nevertheless dentures are not prepared. We report a case which radiographic guide was remade to a temporary overlay denture. Case Information: 66 year male patient, whose upper teeth were hopeless by caries and periodontal diseases, was planned to receive immediate loading implants treatment right after teeth extraction. Under the local anesthesia with sedation, 8 remained teeth were extracted, and 4 Brånemark implants were inserted. However one of the implant was not got enough initial fixation torque. Consequently, we abandon to install immediate loading provisional restoration. For

emergency measures, temporary denture was installed. Before implant surgery, CT (computed tomography) was taken wearing radiographic guide which shaped like a transparent full denture divided into 2 pieces. To convert the radiographic guide into temporary denture, first combine 2 pieces into 1 piece using auto polymerized resin, second relined it with direct relining method, third adjust occlusion. Results: The radiographic guide was made to express final prostheses dentition and occlusion, accordingly the converted denture was showed relatively good result. Because of bloody wound and swelling of gum, the denture was not stable, therefore denture stabilizing material was instructed. It is impossible to fabricate full denture in an hour, however, instead of it converting radiographic guide into temporary denture is acceptable.



Poster 38

MEASURING OF OCCLUSAL VERTICAL DIMENSION USING INTERORAL GNATHOMETER

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Keywords: edentulous jaws, interalveolar height, lower part of the face

Case Presentation: The violation of the generally accepted rules of the diagnosis of the orthopedic treatment, the improper use of the diagnostic and therapeutic resources, prosthetic materials and the technology of fixed prosthesis entails leads to the dissatisfaction of the patients with the quality of treatment and the emergence of complaints from them. The thoughtless use of a primitive system of diagnosis often leads to abortive aesthetic and functional results of the prosthesis. The aim of our research is to achieve the optimum results of the rehabilitation in patients with complete loss of teeth on the upper and lower jaws using BPS-system gnathometer. The use of the intraoral recording devices allowed us to record the trajectory of motion of the lower jaw in three mutually perpendicular planes as a "gothic arch", and to pinpoint the central position of the mandible. The following extract from the case demonstrates the benefits of our way of prosthetics, which, firstly, allows to adequately restore the distance between the teethridge and the lower part of the face, to achieve the smile aesthetics. Secondly, this type of prosthesis ensured the optimum tone of the masticatory muscles, confirmed by subjective and objective factors.

Poster 39

EFFECT OF POLISHING METHOD ON SURFACE ROUGHNESS AND BACTERIAL ADHESION

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Purpose/Aim: The purpose of this study was to evaluate the effect of various polishing methods on surface roughness of zirconia-porcelain veneer and to correlate the findings with early bacterial adhesion.

Materials and Methods: The study specimens were either glazed (control group), glazed after fine polishing (glazed group), or polished with Exa Cerapol (Cerapol group) or with Shofu porcelain adjustment kit (Shofu group) (n=20). Surface roughness was measured with profilometer and SEM. After artificial saliva coating, the specimens were incubated in Streptococcus mitis suspension for 4 hours at 37°C. Adherent bacteria were quantified from SEM images. Streptococcal viability was assessed with LIVE/DEAD staining kit and fluorescent microscope.

Results: There were significant differences in surface roughness by polishing method and surface material. Relatively smooth surfaces were found in zirconia surfaces and glazed porcelain surfaces. There were significant differences in bacterial adhesion by polishing method and surface material. Cerapol group showed minimal bacterial adhesion with more dead cells when compared to other groups. A positive correlation between surface roughness and bacterial adhesion was found in glazed porcelain surface and a negative correlation in zirconia surface of Cerapol group, both with no statistical significance.

Conclusions: Within the limitations of in vitro study, no significant correlation between surface roughness and bacterial adhesion was found. Other factors, such as surface material composition, surface free energy or surface polarity, must be considered.

Poster 40

PREVALENCE OF TEMPOROMANDIBULAR DISORDERS IN COMPLETELY EDENTULOUS PATIENTS

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Keywords: Temporomandibular disorder (TMD),edentulism,complete denture

Purpose/Aim: To assess the prevalence of TMDs in healthy asymptomatic completely edentulous patients

Materials and Methods: Four hundred completely edentulous subjects who did not complaint of any temporomandibular joint dysfunction and were denture bearers with varied denture wearing span were examined for the presence of signs and symptoms of TMDs.

Results: The total prevalence of TMD in the group was 60.5 % (58.75 % in males and 63.12 % in females). More number of females reported signs and symptoms of TMD. More number of patients reported with two signs of TMD. The most common finding was limitation on mouth opening and least common finding was joint noises (crepitus and clicking). The occurrence of findings was not statistically related to edentulous span.

Conclusions: Signs and symptoms of temporomandibular disorder were found in 60.5 % of healthy asymptomatic completely edentulous patients . The gender difference was not statistically significant.

Poster 41

IMMEDIATE LOADING OF TWO-IMPLANT MANDIBULAR OVERDENTURES: 3-YEAR PROSPECTIVE STUDY

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Keywords: implant, overdenture, ball attachment

Purpose/Aim: The aim of this 3-year pilot prospective study was to evaluate the implant survival rate, marginal bone loss, and patient reported outcomes before and after the immediate loading of two-implant mandibular overdentures with ball attachments.

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 (Procera, Nobel Biocare), and the surgical guides (Nobel Guide, Nobel Biocare) were fabricated for each patient. Flapless surgery was performed with this surgical guide, and two implants (Speedy Groovy, Nobel Biocare) (n=38 implants) were placed in canine positions. At the operation day, removable overdenture supported with two ball attachments (Ball abutment and Gold cap, Nobel Biocare) was delivered. The survival of each implant was evaluated clinically and radiographically. The panoramic radiographs were taken immediately after surgery and at 1, 2, and 3 years after placement for the record of the marginal bone loss. All participants answered questionnaires for the patient reported outcomes, the Japanese version of the Oral Health Impact Profile for edentulous (OHIP-EDENT-J), the Patients' Denture Assessment (PDA), and a general satisfaction before implant placement, 1, 6, 12, 24, and 36 months after surgery. The cumulative survival rate was calculated. The Tukey HSD post-hoc test was used to evaluate changes in the marginal bone loss and the patient reported outcomes.

Results: 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 3 years was 94.7% (36/38). There is no significant difference in the OHIP-EDENT-J during observation period. The general satisfaction and PDA increased from 1 month after surgery. The mesial bone loss is significantly higher than distal bone loss in 3 years follow-up.

Conclusions: In this 3-year pilot prospective study, the immediate loading of two-implants mandibular overdentures with ball attachments resulted in favorable implant survival and patient reported outcomes.

Poster 42

IMPLANT PROSTHETIC REHABILITATION WITH VASCULARISED ILIAC GRAFT: A CLINICAL REPORT

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Case Presentation: Resection of the mandible for ameloblastoma can result in gross functional and aesthetic deformity. In spite of technological advances, reconstruction of mandibular defects remains one of the most challenging procedures in head and neck surgery. Conventional methods like alloplastic implants and bone grafting have a high rate of failure. The advent of microvascular techniques for mandibular reconstruction has revolutionised the management of these patients. 38-year-old women presented with a large mandibular continuity defect after resection of an ameloblastoma. For reconstruction,

vascularised iliac crest grafting procedure was performed. Following the iliac bone grafting surgery occlusal discrepancy was detected and the patient was referred for orthodontic treatment. 12 months after the surgery, 5 dental implants were placed. After a 6-month osseointegration period, a partial screw-retained fixed dental prosthesis was fabricated. Prosthodontics planning and treatment considerations are discussed.

Poster 43

ENAMEL ANTAGONIST WEAR OF NEW HYBRID CERAMIC

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Keywords: hybrid ceramic, nano-filler technology, enamel antagonist

Purpose/Aim: Hybrid ceramic for a CAD/CAM system, CERASMART (GC), adopted our own nano-filler technology was developed. CERASMART shows a high mechanical strength, wear resistance and high gloss retention due to highly loaded and homogeneously dispersed nano-filler. This time, our new lab system (GRD2 LB (Light Body) / HB (Heavy body)) were developed which was light-cured type of hybrid ceramic. New hybrid ceramic overcome weaknesses of MFR due to adopting nano-filler technology and demonstrated high wear resistance, but not yet enamel antagonist wear. So, the purpose of this study was to evaluate the wear value of enamel antagonist against new hybrid ceramic and other lab composites after two-body wear.

Materials and Methods: GRD2 LB/HB (new hybrid ceramic), GRADIA (GC), CERAMAGE (Shofu), Signum ceramis (Heraeus Kulzer), crea.lign (Bredent), crea. lign paste (Bredent), and SR nexco paste (Ivoclar/Vivadent) as lab composites were examined in this study. Each material was filled into metal (contact area 2.1 mm diameter) mold in order to make specimens and cured according to the manufacturers' instructions. All specimens were stored in 37 °C water for 24 hours. After contact surface of specimens was wet ground with #1000-grit SiC paper, specimens were performed two-body wear test (n=4). Bovine enamel antagonist was mirror-polished with #4000-grit SiC paper. Two-body wear test was performed with original wear test machine for 200,000 cycles (load 0.84 MPa). Water was applied to contact area. Wear value of bovine enamel antagonist was measured by using 3D Measurement Macroscope (VR-3100, KEYENCE). The results were analyzed by one-way ANOVA ($p<0.05$).

Results: GRD2 LB / HB showed significantly lower wear value of enamel antagonist compared to other lab composites, and it was no significant difference between GRD2 LB and HB (Figure).

Conclusions: These results suggested that using new hybrid ceramic, GRD2 LB/HB, with nano-filler was low enamel antagonist wear in comparison with other lab composites with micro-filler.

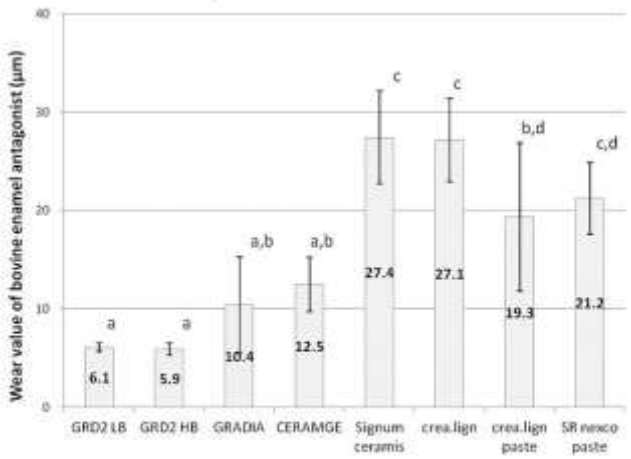

Figure. Wear value of enamel antagonist
*Same superscript indicates no statistically significant difference

Poster 44

INFLUENCE OF DIFFERENT IMPLANT OPERATIVE PROCEDURES

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Keywords: Cone Beam CT, Immediate implant place, peri-implant tissue

Purpose/Aim: Recently, in order to preserve the buccal peri-implant tissue, guided bone regeneration and soft tissue augmentation have been performed with implant placement. However, the quantitative method for evaluating morphological changes of buccal alveolar bone and peri-implant soft tissues after implant placement has not been established. To prospectively evaluate morphological changes in the horizontal and vertical dimensions of the buccal alveolar bone and peri-implant soft tissues over a 1-year period after implant prosthesis by using Cone Beam Computed Tomography (CBCT).

Materials and Methods: Thirty-four patients that participate in a clinical prospective study and received implant prosthesis with butt joint (BJ), conical connection (CC) placed were enrolled in this study. They were divided into four groups: Delayed placement at healed site with BJ implant (DP-BJ) group, delayed placement at healed site with CC implant (DP-CC) group, site development and placement with CC implant simultaneously at healed site (SD-CC) group, and immediate placement with CC implant and peri-implant tissue augmentation at extraction socket (IP-CC) group. CBCT scans taken immediately (T1) and 1 year after prosthesis placement (T2) were evaluated. Dimensions of buccal alveolar bone and soft tissues were evaluated on the cross-sectional CBCT reconstructions. Vertical dimensional heights of alveolar bone (BH) and soft tissue (GH) were defined as the perpendicular distances from the implant platform to the most coronal point of the buccal alveolar bone and soft tissue. Horizontal dimensional thickness of alveolar bone (BW0 and BW2) and soft tissue (GW0 and GW2) were measured at 0 and 2 mm apical to the implant platform. Measurements were prospectively made and changes between T1 and T2 were calculated. The measurement changes among four groupes were statistically compared using a Steel-Dwass test. Correlation analysis was used to investigate the influence of the initial horizontal thickness at the platform on the vertical dimensional measurement changes (T1-T2). The statistical significance level was set at a = 0.05.

Results: The vertical and horizontal loss of buccal bone and soft tissue around implants with CC (DP-CC, SD-CC, IP-CC) were lower than that around implants with butt joint. Statistically significant negative correlations were observed between the initial horizontal bone thickness and the changes in vertical bone height (rs=0.585, p<?.05), between the initial horizontal bone thickness and the changes in vertical soft tissue height (rs=0.378, p<?.05), and between the initial horizontal soft tissue thickness and the changes in vertical soft tissue height (rs=0.627, p<?.05).

Conclusions: Regardless of the presence or absence of bone and soft tissue augmentation, implants with a conical connection may effectively preserve peri-implant alveolar bone and soft tissues. The thickness of peri-implant soft tissue rather than initial buccal alveolar bone effect changes of peri-implant gingival margin.

Poster 45

STUDY ON PRECISION OF INTRAORAL AND EXTRAORAL DIGITAL SCANNERS

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Keywords: CAD/CAM, intraoral scanner, precision

Purpose/Aim: The field of CAD/CAM systems has rapidly advanced and revolutionized dental restoration manufacturing. The compatibility of restorations in CAD/CAM systems improves the precision of digital scanners, CAD/CAM software, and processing equipment. Digital scanner imaging has been conducted using the following three procedures: plaster model scanning, silicon impression scanning, and direct oral cavity scanning. Few studies have been conducted to compare

precision among these digital imaging procedures. The objective of the present study was to compare the precision of intraoral digital scanning with TRIOS (3 Shape) and extraoral model scanning with D700 (3 Shape) to that of their original model.

Materials and Methods: Six reference points were set in an original edentulous maxillary epoxy model. A working plaster model for the indirect method was manufactured using a silicon impression material according to routine procedures. Five digital impressions each were obtained for the plaster model using an extraoral scanner (D700) and for the original model using an intraoral digital scanner (TRIOS). Virtual image models generated by each procedure were displayed to determine the distances among the six reference points using Rhinoceros software for comparison with those of the original and plaster models.

Results: The working plaster model for the indirect method precisely reproduced the original model. The distances among the reference points, determined with the extraoral and intraoral scanners, were longer than those of the indirect working or original model. As the distances among the reference points in the original model became longer, the differences (gaps) in the distances among the reference points, determined with the intraoral and extraoral scanners, became larger. Intraoral scanning with TRIOS generated longer distances among the reference points than those of the original model, with the longest and shortest distances being about 10 and 80 μm, respectively, and significant differences being noted for all the reference points. The comparison of the distances among the reference points between the intraoral and extraoral scanners demonstrated significant differences, with the largest variation noted for the intraoral scanner.

Conclusions: Intraoral scanning with TRIOS generated slightly longer distances among the reference points than those of the original model. However, these differences were within the acceptable range for manufacturing prosthetic devices. The precision of the plaster model for the indirect method should also be considered to discuss the precision of the extraoral scanner. Clinically applicable precision was demonstrated for both intraoral and extraoral scanners.

Poster 46

RESTORATION OF REDUCED POSTERIOR DENTAL ARCHES: A CLINICAL TRIAL

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Keywords: Shortened dental arch, clinical trial, functional satisfaction

Purpose/Aim: To determine whether the daily functional ability, patient satisfaction and the quality of life of partially dentate adult patients with reduced posterior dental arches will be satisfied without having all missing teeth replaced with a removable prosthesis, as compared to having the use of such a prosthesis

Materials and Methods: Patients with 3-5 occluding units or 'restored-to-3 occluding unit' status were randomized into one of 2 treatment approaches: a removable prosthesis (Group A) or no removable prosthesis (Group B). Allocation concealment was ensured using sealed envelopes for each intervention and this was administered by a research assistant. The study sample was selected by sequential analysis and the analysis was completed in stages until saturation by a statistician. Subjective and objective outcomes, function, survival of remaining teeth and prostheses were evaluated 3 months post intervention. Oral functional satisfaction was determined using the Oral Impacts on Daily Performance (OIDP). A global Visual Analogue Scale (VAS) was also completed for each patient to correlate the results to that of the OIDP. Statistical analysis included primary and secondary outcomes reporting and adjustment for confounding, and it was completed by 'intention-to-treat' analysis. Missing, excluded or withdrawn subjects have also been reported.

Results: Preliminary results of an ongoing clinical trial of patients with appropriate inclusion criteria are analysed and interpreted to determine the saturation points. Sample size will be calculated when saturation is reached (sequential analysis). Age range of included patients was 28-55 years, and the gender for the first group was spread equally. Patients classified according to level of education (school or tertiary education) indicated that 70% had left school and only 30% had a tertiary education. Income level categories (high, middle and low) showed that 50% were in the low or middle income category, with 80% working in the public sector. One patient was unhappy with the allocation process (to receive the intervention of no denture) and requested a change in treatment (and eventually left the study), and another patient who received a denture was unhappy with its functional benefit and was thus not satisfied with the treatment at all. For primary outcomes, 80% of

patients were satisfied and able to function with their allocated intervention (denture or no denture). For secondary outcomes (3 months post intervention), there were no reports of tooth loss, caries formation or periodontal breakdown and with the exception of 2 patients, 80% regarded their respective interventions as successful.

Conclusions: Patient with reduced posterior dental arches reported greater perceived success of treatment (satisfaction, function and quality of life) compared to those with a complete dental arch extended with a chrome cobalt removable prosthesis.

Poster 47

STANDARDIZING EVALUATION CRITERIA ON TREATMENT OUTCOMES OF MANDIBULAR IMPLANT OVERDENTURES

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Keywords: Overlay denture, Dental Implants, Outcome assessment

Purpose/Aim: The aim of this review was to analyze the evaluation criteria on mandibular implant overdentures through a systematic review and suggest standardized evaluation criteria.

Materials and Methods: A systematic literature search was conducted by PubMed search strategy and hand-searching of relevant journals from included studies considering inclusion and exclusion criteria. Randomized clinical trials (RCT) and clinical trial studies comparing attachment systems on mandibular implant overdentures until December, 2011 were selected. Twenty nine studies were finally selected and the data about evaluation methods were collected.

Results: Evaluation criteria could be classified into 4 groups (implant survival, peri-implant tissue evaluation, prosthetic evaluation, and patient satisfaction). Among 29 studies, 21 studies presented implant survival rate, while any studies reporting implant failure did not present cumulative implant survival rate. Seventeen studies evaluating peri-implant tissue status presented following items as evaluation criteria; marginal bone level (14), plaque Index (13), probing depth (8), bleeding index (8), attachment gingiva level (8), gingival index (6), amount of keratinized gingiva (1). Eighteen studies evaluating prosthetic maintenance and complication also presented following items as evaluation criteria; loose matrix (17), female detachment (15), denture fracture (15), denture relining (14), abutment fracture (14), abutment screw loosening (11), and occlusal adjustment (9). Atypical questionnaire (9), Visual analog scales (VAS) (4), and Oral Health Impact Profile (OHIP) (1) were used as the format of criteria to evaluate patients satisfaction in 14 studies.

Conclusions: For evaluation of implant overdenture, it is necessary to include cumulative survival rate for implant evaluation. It is suggested that peri-implant tissue evaluation criteria include marginal bone level, plaque index, bleeding index, probing depth, and attached gingiva level. It is also suggested that prosthetic evaluation criteria include loose matrix, female detachment, denture fracture, denture relining, abutment fracture, abutment screw loosening, and occlusal adjustment. Finally standardized criteria like OHIP-EDENT or VAS are required for patient satisfaction.

Poster 48

USING MAGNETIC ATTACHMENT WITH STRESSBREAKER OVERDENTURE FOR 10 YEARS

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Keywords: overdenture, stressbreaker, magnet

Case Presentation: Overdenture is often selected as an alternative when a few existing residual teeth are inadequate as an abutment for a fixed prostheses or a partial denture. Overdenture has the advantage of improving the stability and retention of the denture but the abutment may be easily affected by caries or periodontal disease and the thin denture can be easily broken. Recently, attachment retained overdenture is mainly used as it provides additional retention and stability by using an attachment. It can be divided into 4 types: bar, stud, magnetic, and telescopic. The magnetic attachment overdenture has a high vertical retention but a low horizontal retention, thus, exerting a less disruptive force to the abutment or implant and shows less abrasion or damage compared to other mechanical retainers. Yet, when corrosion starts, the magnetic attachment quickly loses its magnetic force resulting in a decrease in retention. It also quickly losses its retention when the magnet and keeper are dislocated or when the gap between them gets wider. Moreover, the magnet itself is low in strength that may result in denture fracture, the most common problem all overdentures face. Denture fractures in overdenture is caused by the thin denture base as the attachment is inserted, but it may also be caused by the difference in detrusion between soft tissue and hard tissue, and between an implant and a natural tooth. To compensate this shortcoming, a magnetic attachment with a silicone ball inserted in the magnet was developed as we report a successful case using this specific type of magnetic attachment overdenture.

Poster 49

FUNCTIONAL AND ESTHETIC REHABILITATION USING HYBRID CAD/CAM POLYMER BLOCK

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Keywords: ceramic, CAD/CAM, polymer

Case Presentation: In recent years, CAD/CAM technology has been developed remarkably in dental prosthodontics. Various software solutions, materials and tools for prosthesis design are available in dental CAD/CAM field. Tooth colored restorations with the increased interest are developed in various ways, and it replaces metal restorations. It has been invented the block based composite resin in addition to current ceramic block. Composite resin block have been used in the various fields and broaden the range of its use in current CAD/CAM dental prosthesis. CAD/CAM materials based hybrid polymer which is polymerized under industrially standardized condition have esthetic features, entirely uniform structure, high fracture resistance and higher dimensional stability. Thus, it can be used for the provisional restoration and even permanent construction. Because of those superior properties of the CAD/CAM resin block, it is possible to use for long-term period. There are specific examples such as change of vertical dimension, reconstruction of anterior guidance, evaluation of esthetic features and phonetics, wait for the healing of adjacent soft tissues, uncertain prognosis of abutment tooth, and crown restoration during orthodontic treatment. In the case of anterior esthetic reconstruction, hybrid polymer block can be used core materials and veneered esthetic indirect composite materials. The aim of this report was to present several restorative cases used hybrid polymer CAD/CAM block which is made from resin matrix with ceramic filler and introduce the process of restoration fabrication, esthetic and functional results and other applications.

Poster 50

COMPARISON OF MANDIBULR COMPLETE DENTURE BY CONVENTIONAL VS SUCTION-EFFECTIVE TECHNIQUE

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Keywords: suction-effective technique

Case Presentation: Comparison of features of mandibular complete dentures taken with two different impression techniques (Conventional tech. Vs. Suction-Effective tech.) : case report Kim, Joohyoung * / Lee, Kyuho / Paek, Janghyun / Noh, Kwantae / Kwon, Kung-Rock School Of Dentistry, Kyung Hee University Department Of Prosthodontics Seoul, Korea (South) Introduction : Conventional border molding method with impression compound has been used to take an impression for complete denture. It was designed by Dr. Boucher and is a practitioner-centered technique based on the understanding of anatomical structures; while taking an impression, practitioner handles patients to remain their mouth open. Recently, a different impression taking method to achieve better adsorption for mandibular dentures has been introduced. It aims to totally seal the gap between mandibular denture and underlying soft tissues and a big difference is that it is rather patient-centered; while patient does one's functional mandibular movement with mouth closed, impression is taken.
Case Report: The present case is about 82-years-old woman in need of denture re-make after denture loss. Impressions were taken with two different impression techniques (that is, a conventional open-mouth technique with modeling compound and a different closed-mouth approach to obtain adsorption). First, to take a conventional impression, snap impression with CDG tray was taken and with this, individual tray was made. Border molding was carefully done with impression compound on the individual tray and final impression was taken with regular body rubber impression material (GC). For closed-mouth impression method with effective adsorption, snap impression was taken with Frame Cut Back tray (YDM) and a syringe for the use of low-concentration alginate mix. With this, individual tray was made and wax-rim was attached to it. Border molding was done with heavy body rubber impression material on the individual tray and final impression was taken with light body rubber impression material. At the same time, intermaxillary relationship was recorded. After all this procedure, two final dentures were completed through wax-dentures. To observe the difference of the two distinct impression techniques in terms of impression surface and mandibular border, both impression body and model of two methods were compared and analyzed.
Conclusion: Impression surfaces and border shapes of mandibular complete dentures taken with two impression techniques were different. Practitioner need to make a choice between two impression taking techniques through adequate diagnosis.

Poster 51

BONE AND SOFT TISSUE FORMATION BY BMP AND FGF-2

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Keywords: FGF, BMP, BCP

Purpose/Aim: The purpose of this study is to compare and evaluate, through histomorphometric assessment, the bone and soft tissue formation of BMP-2 containing Biphasic calcium phosphate covered by FGF-2 soaked collagen membrane.

Materials and Methods: Six mongrel dogs were divided into FGF-2 soaked membrane group and non-FGF2 soaked membrane group. The Maxillae molars in each dog were extracted. 8 weeks after extraction, 2-wall defects of 5*5*5mm were formed and BMP-2 containing Biphasic Calcium Phosphate were implanted. Collagen membranes either soaked with FGF-2 or just saline were prepared, and each grafts were covered with collagen membrane according to the condition of each group. After 4 and 12 weeks, the dogs were sacrificed.

Results: There was more bone formation in FGF2 soaked membrane group than non-FGF2 soaked membrane group. Additionally, better vascularization and soft tissue healing was observed in FGF-2 soaked membrane group.

Conclusions: BMP-2 containing Biphasic calcium phosphate covered by FGF-2 soaked collagen membrane shows good bone formation. FGF-2 induces bone formation, vascularization and soft tissue healing.

Poster 52

EMERGENCE PROFILE REGENERATION WITH CAD/CAM ABUTMENT AND SOFT TISSUE GRAFT

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Case Presentation: Fixed restoration using implants for patients with posterior partial edentulism is generalized technique. In the past, when the function of prosthetic implants was emphasized, it was considered satisfactory clinically to obtain osseointegration only, even if metal color of the abutment was exposed without any keratinized gingiva around posterior implants. However, as patient demands increase, the functional and esthetic implant restoration to achieve similar results to lost natural teeth is becoming an important issue. It is inevitable to use customized CAD/CAM abutments rather than ready-made abutments for the creation of implant prosthesis which closely resembles natural teeth. The use of CAD/CAM abutment made it possible to obtain natural emergency profiles for posterior implant prostheses, ensuring more comfortable, efficient management of oral hygiene. However, keratinized gingiva with sufficient width and height for a natural emergence profile is required in order to use a large diameter CAD/CAM abutment which ensures stability and esthetics of hard/soft tissue around the implants.

Poster 53

NOVEL SELF-INFLATING TISSUE EXPANDER FOR VERTICAL AUGMENTATION

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Keywords: Tissue Expander, Dental Implant

Purpose/Aim: To achieve tension-free wound closure at the grafted site and thus avoid exposure or total loss of the bone graft, securing sufficient volume of soft tissue is essential. The aim of this study was to investigate the feasibility of novel self-inflating tissue expander for the subsequent bone augmentation with regard to clinical and histological outcomes and complications.

Materials and Methods: Tissue expanders (Osstem, Seoul, Korea) were implanted at edentulous ridge of 11 mongrel (12-14 months, avg 30kg), of which, 8 were sacrificed after 4-weeks for further analysis. Other 3 underwent bone graft and were sacrificed after 6 weeks. Tissue expanders have two types of 1-screw or 2-screw fixation type, and were randomly chosen. Clinical aspects of gingival expansion and any adverse responses were weekly recorded. After euthanasia, bone biopsies were investigated with micro-CT and vertical bone gain were analyzed. Using either MT or HE stained histological section, inflammatory reaction, remodeling process, capsular formation, gingival thickness, and amount of final expansion were investigated.

Results: Every self-inflating tissue expander showed gradual expansion of soft tissue without exposure of expander. According to each expander size (0.7 ml, 1.2 ml, 2.1 ml), histological diameter measurements demonstrated the increased expander diameter of 6.61mm, 8.14mm, and 9.04mm, respectively. There was no difference of thickness of gingival tissue

above expander compared to control. Histological inflammatory reaction was not observed, while fibrous capsule surrounding expander was found in 3 animals. At bone augmentation, primary wound closure was easily achieved and the incidence of graft exposure was not observed. After 6 weeks of healing, average vertical bone gain was 4.3mm and histomorphometrical BV/TV was 62.32% showing satisfactory bone remodeling.

Conclusions: The novel self-inflating tissue expander showed sufficient volume gain of soft tissue with minimal adverse reactions. Also 2-screw type and various size of expansion would provide wide range of clinical applicability. After subsequent vertical bone augmentation, this treatment modalities would provide enough gain of well-structure vertical bone for successful implant with minimal complications.

Poster 54

EFFECT OF THE COMBINATION OF BCP WITH BMP-2 AND FGF-2

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Keywords: BCP,BMP-2,FGF-2

Purpose/Aim: There have been many effort to achieve regeneration effect of periodontal treatments. However, there is no identified appropriate methods for the successful periodontal tissue regeneration, yet. The objective of this experiment was to test the effect of the combination of Biphasic Calcium Phosphate (BCP) with BMP-2 and FGF-2, compared to BMP solely used, at 4weeks and 8weeks postsurgically, in intra-bony one--wall defect around tooth in Mongrel dogs.

Materials and Methods: In six male mongrel dogs, aged 18-24months, without any periodontal disease, weighing 15-20kg were used. Intra-bony one-wall defects(5x4x4mm) on mesial aspect of mandibular 1st molar were made, bilaterally, followed by root planning on exposed roots, under general anesthesia. One side defect was conditioned with BMP-2 with FGF-2, while the other side defect was conditioned with BMP. The dogs were euthanized at 4weeks and 8weeks, post surgery. Radiographic and histomorphometric analysis were carried out, measuring newly formed bone volume and height, length of cementum, connective tissue, osteoclast count.

Results: On control group(BMP), there were statistically significantly higher formation of new bone at 4 weeks, compared to experimental group(BMP + FGF). On the other hand, at 8 weeks group, there were significantly higher formation of new bone on experimental group(BMP + FGF), compared to control group(BMP).

Conclusions: Within the limitation of this study, BMP-2 showed higher ability of bone formation on early stage of healing process, which decreases over time. FGF might has suppressive effect on BMP-2 at early healing stage. However, after the early action of BMP-2, FGF-2 contributes to higher morphogenic effect at late healing process.

Poster 55

EFFECT OF CYCLIC LOADING ON INTERNALLY-CONNECTED ITI® IMPLANT ABUTMENT

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Keywords: cyclic loading, ITI, implant

Purpose/Aim: The purpose of this study was to compare the screw loosening of several interchangeable abutments in ITI® internal connected implants after cyclic loading.

Materials and Methods: Four different abutment groups (n=7 in each group) with ITI SLA® implants were assessed: ITI® solid abutment (group 1), Southern Implants solid abutment (group 2), Implant Direct solid abutment (group 3), Blue Sky Bio solid abutment (group 4). The implant was rigidly held in special holding zig to ensure fixation. Abutments were connected to manufactures' recommended torque with torque controller. The hemispherical loading members were fabricated for the load cell of a universal testing machine to evenly distribute the force on the specimens and to fulfill the ISO 14801:2007 standard. A cyclic loading of 25 N at 30 angles to the long axis was applied on the implants for a duty of 1/2 million cycles. Prior to the loading, tightening torque values (TTV) were measured. After cyclic loading, removal torque values (RTVs) were measured with a digital torque gauge. The data were analyzed with one way ANOVA and the significance level was set at $p<.05$.

Results: The mean RTVs after cyclic loading were 34 ± 1.1 Ncm (ITI®), 25 ± 1.5 Ncm (Southern Implants), 23.9 ± 2.1 Ncm (Implant Direct), and 27.9 ± 1.3 Ncm (Blue Sky Bio) respectively. RTVs of each group were statistically different in the order of group 1 > group 4 > group 2 and 3. ($p<.05$) The mean reduction rates were -2.9 ± 3.2 % (ITI®), -21.9 ± 4.8 % (Southern Implants), -20.2 ± 7.2 % (Implant Direct), -6.9 ± 4.3 % (Blue Sky Bio) after half million cycles respectively. Reduction rates of group 1 and 4 were statistically lower than those of group 2 and 3. ($p<.01$) The standard deviation of ITI® group was lower than Blue Sky Bio group.

Conclusions: The RTV of original Straumann® abutment was higher than those of copy abutments. The reduction rate of ITI and Blue Sky Bio abutment was lower than those of other copy abutments.

Poster 56

PROGNOSES OF NEW COMPLETE DENTURES FROM PATIENTS' DENTURE ASSESSMENT (PDA)

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Keywords: complete denture, questionnaire, edentulous

Purpose/Aim: Complete denture rehabilitations for patients who needs frequent post-delivery adjustments of dentures and prolonged treatment periods tend to indicate poor prognoses.The prognoses of complete denture rehabilitations from patients' assessments of existing dentures by edentulous patients may help dentists. The objective of the study were to determine prognostic factors affecting frequent post-delivery adjustments of new complete dentures using patients' assessments of existing complete dentures.

Materials and Methods: A total of 125 edentulous participants (56 men, 69 women; mean age, 76.4 years) who required new complete dentures evaluated their existing dentures using Patients' Denture Assessment (PDA), a questionnaire regarding self-assessment of dentures composed of 22 question items containing six subscales of "Function", "Lower denture", "Upper denture", "Expectation", "Aesthetic and speech" and "Importance". Moreover, numbers of post-delivery adjustments of new dentures were recorded. Logistic regression analysis was performed to identify significant factors for frequent adjustments of new dentures with five subscales except for "Importance" of PDA, levels of mandibular ridge resorption and age as independent variables.

Results: Regression analysis showed that "Function" (OR=0.72, P=0,000), "Aesthetic and speech" (OR=1.24, P=0.03) and levels of mandibular ridge resorption (OR=1.57, P=0.05) were significant variables for post-delivery adjustments of new complete dentures. Edentulous patients whose existing dentures were lower scores for "Function" covering evaluations of pain, swallowing, mastication and jaw fatigues and higher scores for "Aesthetic and speech" covering evaluations of appearance and talking and whose levels of mandibular ridge resorption were higher had significant associations with more frequent post-delivery adjustments of new dentures. The results of the study suggested that in the case of an existing denture with satisfactory aesthetic and speech, but difficulty swallowing and mastication, post-delivery adjustments of a new denture required a longer treatment period.

Conclusions: The results suggested that patients' assessments of existing dentures using PDA might allow prediction of prognosis of complete denture rehabilitations. In addition, "Function" and "Aesthetic and speech" of PDA and levels of mandibular ridge resorption were significantly prognostic factors affecting frequent post-delivery adjustments of new complete dentures.

Poster 57

A INVESTIGATION OF RISK FACTORS ASSOCIATED WITH TOOTH SURFACE LOSS

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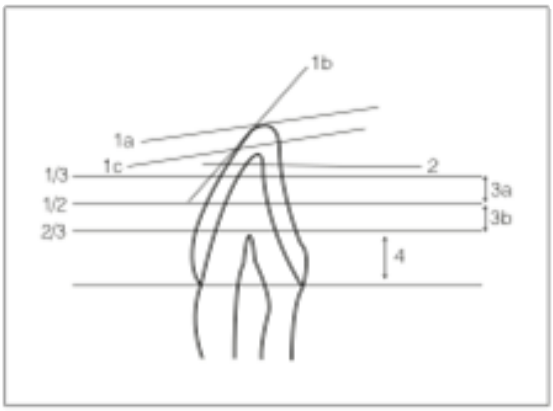
Keywords: tooth surface loss, saliva pH and flow, medical history

Purpose/Aim: This case control study assessed the possible association between medical history, diet, psychological profile and saliva pH and flow [Delongis 1982, Johansson 1993] with the incidence of severe tooth surface loss.

Materials and Methods: A total of 80 subjects (40 cases and 40 age and gender-matched controls) aged 25-85 years were recruited. Cases were subjects with severe, and controls with mild tooth surface loss. Inclusion criteria: a. Absence of complex medical conditions and medications influencing the salivary system. b. Absence of xerostomia and Sjogrens syndrome c. Absence of excessive alcohol intake (>12 glasses/day) d. Absence of heavy smoking (>1 pack/day) e. Presence of a minimum of 20 teeth f. Age 25-85 years The mean age of the subjects was 54.2 (SD 9.5) years with 54% being male. In each group, there were 19 females and 21 males. Anterior teeth (13-23) were used for grading tooth wear as per Wetselaar's index. Participants with severe TSL were categorised as grade 3-4 and controls as 0-1c. The assessment required participants to complete questionnaires on medical history, diet history, and psychological profile. An intra-oral examination followed to assess the extent of TSL and saliva was tested for flow and collected for pH assessment

Results: Conditional logistic regression analysis estimated the odds of severe tooth surface loss to be 15.4 times higher for those with cardiovascular disease and 16 times for gastro-intestinal disturbances. The odds of having severe TSL is 15.4 times higher in those with cardio-vascular problems (95% CI, p=0.002), 19 times with recreational drug use (95% CI, p=0.004), 16 times with gastro-intestinal problems (95% CI, p=0.007), 12 times with musculo-skeletal problems (95% CI, p=0.017), 3.5 times with prescribed medications (95% CI, p=0.027). There was no statistically significant association between diet and the presence of severe TSL. Severe TSL had a significant association with higher scores for the 3 dimensions of health, finances and self as well as a higher total daily hassles score.

Conclusions: Data confirmed significant associations between TSL and cardiovascular, gastro-intestinal and musculoskeletal disorders, and that stress levels in subjects with severe TSL were higher. Saliva pH was found to be an important factor in tooth wear and is influenced by a patients' medical background.



Poster 58

THE EFFECT OF MASTICATION ON GLP-1 IN DIABETIC MICE

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Keywords: GLP-1, mastication, diabetes

Purpose/Aim: GLP-1 is synthesized in the enteroendocrine L cells of the intestine and has a function called incretin effect to lower levels of glucose in the blood. Secretion of GLP-1 is regulated by parasympathetic nerve, blood glucose level, and mechanical stimulus by digested food. The incretin effect exerts not only healthy models but also diabetes models. In this study, we built the hypothesis that mastication by solid feed fed promotes GLP-1 by parasympathetic nerve, and we examined mastication affect blood glucose level and secretion of GLP-1 in diabetic mice.

Materials and Methods: To make diabetic mice, 4 weeks C57BL/6J mice were breeding for 12 weeks by the high fat diet. Then, we checked casual blood glucose levels and glucose tolerance test. And then mice were starved for 24 hours and divided into two groups: the solid feed group and the liquid feed group. After they fed same calorie of solid or liquid food (10 kcal/kg), blood glucose levels were measured and collected the blood from heart into the tube containing the inhibitor of dipeptidyl peptidase-4 that cleavages and inactivates GLP-1 at 30 and 90 minutes from the start of feed. The blood was centrifuged for 10 minutes at 10,000 rpm. GLP-1 level in serum was measured by enzyme immune assay. The data of blood glucose level and GLP-1 level were analyzed using the Mann-whitney's U-test. In statistical analyses, $p<0.05$ was considered statistically significant.

Results: In diabetic mice that we made, casual blood glucose levels were 252.3±60.1 mg/dl, and at glucose tolerance test(2g/kg), blood glucose levels were 205?30.3 mg/dl at 120 minutes. And after they fed solid or liquid feed, blood glucose levels in the both groups were approximately equal level at any time. Active GLP-1 levels in the solid feed group increased at 30 minutes whereas that in the liquid feed group decreased at 30 minutes.

Conclusions: In this study, it is suggests that mastication affects the secretion of GLP-1 in diabetic mice.

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ESTHETIC RESTORATION OF MALPOSITIONED ANTERIOR TEETH BY TOOTH SHAPE

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Case Presentation: In esthetic treatments, it is important to consider the arrangement of teeth and the relation between the teeth and soft tissues. A precise diagnosis and establishing an appropriate treatment plan is essential in an esthetic treatment of anterior maxillary teeth. For a fixed prosthesis to meet esthetic expectations It is crucial to achieve symmetry and adequate proportions of the gingival contour around the crowns. To achieve an esthetic improvement and creating a favorable environment for gingival healing of a physiologic gingival contour, gingivectomy, surgical osteoectomy and forced eruption can be applied to the appropriate site. In this case report, malposition and ankylosis of the remaining teeth made it hard to get an esthetic appearance. Gingivectomy, Surgical osteoectomy and provisional restoration insertion were performed before the final prosthesis fabrication to reform the gingival form.

Poster 60

MANDIBULAR FIXED BONE-ANCHORED PROSTHESIS: A 22-YEAR FOLLOW-UP CASE REPORT

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Keywords: Mandibular edentulism, Dental implant, Fixed bone anchored bridge

Case Presentation: According to the original Branemark protocol, the treatment concept of the mandibular edentulous patient for a fixed prosthesis is that 5-6 implants are placed between mental foramens and then a fixed bone anchored bridge with bilateral distal cantilever is fabricated. In case of treating an edentulous patient with bone anchored fixed bridge, their survival rate depends on treatment modality, opposing dentition, anterior-posterior position of the implants, and parafunction. The aim of this study is to report complications observed for a period of 20 years, and provide a solution to eventual fracture of most posterior implants. In this case report, a 39-year old man with edentulous mandible was restored with a bone anchored fixed bridge 22 years ago. There were repeated minor technical complications (resin tooth fracture, and abutment screw loosening), and then a major complication (implant fixture fracture) occurred. Additional implants were placed and the prosthesis was remade. Without additional surgical procedures fixed bone anchored bridge can be an option when there is low quantity and poor quality of bone on posterior area. But biomechanical features of distal cantilever have to be considered and applied to prosthodontic treatment.

Poster 61

GUIDE TEMPLATE WITH HANDPIECE SLEEVE TO LOCATE ABUTMENT SCREW POSITION

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Keywords: guide template, abutment screw, handpiece sleeve

Case Presentation: The existing techniques for drilling a screw-access hole in cement-retained restorations are limited by inaccurate drill guidance and ineffective cooling of the drilling area. An approach for fabricating a guide template to provide screw retrievability using computer-aided design and computer-aided manufacturing (CAD/CAM) is described. A handpiece sleeve was made by 3-dimensional (3D) printing and incorporated into a vacuum-formed template. The handpiece sleeve not only guides the head of the handpiece accurately but also enables the cooling water to reach the area of drilling directly.

Poster 62

ORAL REHABILITATION OF A PATIENT WITH MEDICATION-RELATED OSTEONECROSIS OF JAW

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Keywords: MRONJ, osteonecrosis, implant

Case Presentation: Oral rehabilitation is important for the patient with severe alveolar bone loss to enjoy a better quality of life. Especially, implant prosthodontics offers multitude of benefits for the edentulous patients in aspects of retention, support and others. The aim of this clinical report was to show the functionally and esthetically satisfying oral rehabilitation of a patient with medication-related osteonecrosis of the jaw (MRONJ) and severely alveolar bone resorption using implant-supported prosthesis. A 73-year-old female patient was transferred from a local dental clinic because the extraction wound failed to heal after the extraction of mandibular left teeth (#32,33,34). The patient complained of severe pain and showed delayed healing of the extraction wound and pus discharge, along with exposure of alveolar bone. She had been taking oral risedronate sodium (Actonel), a kind of bisphosphonates, 35 mg once a week for 2 years owing to mild osteoporosis and had stopped taking oral bisphosphonates two months before tooth extraction in local clinic. With clinical and radiological assessment, she was clinically diagnosed with MRONJ. She also showed fully edentulous state of maxilla with severely alveolar bone resorption, especially anterior region. After consultation with the patient, we decided on treatment plan to include surgical resection of necrotic bone with conservative treatments such as antimicrobial rinses, antibiotic medication, and implant placement with iliac bone graft. Implant location was planned to place the posterior region on edentulous maxilla and tooth-missing area of mandible. Considering previous experience of loss of retention, defect size, economic concern, the final prostheses were designed to implant-retained overdenture in maxilla and hybrid-type implant prosthesis in mandible. One year after surgical resection on osteonecrotic site, iliac bone graft was performed. And then, temporary removable partial denture was delivered, and relined several times. One year after bone graft, implants were placed in mandible (#33, 34, 36, 43) and maxilla (#14, 16, 24, 26) using 2-stage surgical procedure. After an osseointegration period of 6 months, the second surgery was done with connection of transmucosal healing abutments, and computed tomography (CT) scan was obtained. Postoperative healing progressed uneventfully and no pathologic findings were observed on CT scan. For the fabrication of mandibular hybrid denture, titanium framework was milled by CAD/CAM system and artificial resin teeth were arranged on framework. Maxillary implant-retained overdenture was fabricated using a hader bar. One year after the implant installation, the final prosthesis was delivered to the patient. During follow-up period of 15 month after delivery, there were no abnormal findings around implants, and the patient was satisfied esthetically, and functionally.

Poster 63

IMPLANT ASSISTED REMOVABLE PARTIAL DENTURE: A 3-YEAR FOLLOW-UP CASE REPORT

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Keywords: Implant assisted RPD

Case Presentation: Problem Implant supported fixed partial dentures are preferred to conventional removable partial dentures or implant supported overdentures for the restoration of fully edentulous arches opposed by natural dentition of a partially edentulous arch. Implant placement in all edentulous areas is sometimes restrained by anatomic and/or financial limits, or the patients' unwillingness to have extensive surgical procedures. However, it is a new challenge to use implants as abutments for removable partial dentures. Hypothesis Removable partial dentures used in combination with fixed implant prostheses can rehabilitate the esthetics and masticatory function of the fully edentulous arch opposed by natural dentition of

a partially edentulous arch. Methods A 56-year-old female patient who has a fully edentulous maxilla opposed by partially edentulous mandible was treated in this case study. The mandible restored by implant-supported fixed partial dentures was expected to function more properly than removable partial denture. Due to severe posterior ridge resorption, the patient needed additional surgical procedures such as sinus augmentation with a lateral approach, for full restoration by implant-supported fixed partial dentures. However, the patient wanted to avoid extensive surgical intervention and the high cost of treatments. Also, the patient did not need a lip and facial support with a denture flange. A treatment option for the maxilla was the removable partial denture in combination with four anterior fixed implant prostheses (Implant Assisted Removable Partial Denture). Results The patient was satisfied with the overall appearance as well as masticatory function when removable partial dentures were used in combination with anterior fixed implant prostheses even after 3 years of function. Conclusion Removable partial dentures in combination with anterior fixed implant prostheses can be proposed as a viable and cost effective treatment option for the restoration of a fully edentulous arch.

Poster 64

OSTEOGENIC ACTIVITY OF IMPLANT SURFACES WITH GOLD NANO PARTICLES

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Keywords: gold nano particles, adipose-derived stem cells, osteogenic differentiation

Purpose/Aim: The aim of this study was to examine whether GNPs for surface treatment of titanium implant could induce osseo-integration.

Materials and Methods: In this study, we modified titanium surface by GNPs. Procedure of titanium surface treatment was characterized by XPS, SEM, AFM and water contact angle measurement. Adipose-derived stem cells (ADSCs) response in vitro to this treatment has been evaluated. The lack of cytotoxicity was confirmed by establishing viability of ADSCs using cell conting kit-8(CCK-8) and Live/Dead cell assay. Osteogenic differentiation of ADSCs was confirmed by alkaline phosphatase (ALP) activity, alizarin red staining, calcium deposition assay and Real-time PCR (markers: Col I, Runx2, OCN, BSP) experiments.

Results: Titanium surface with GNPs had no significant toxicity on ADSCs. The results of all experiments showed that titanium surface with GNPs promoted the differentiation of ADSCs toward osteoblasts more than control group.

Conclusions: Our Titanium surface with GNPs could lead to a substantial improvement in osteogenic differentiation.

Poster 65

REVERSE ENGINEERING BASED EVALUATION FOR IMPRESSION ACCURACIES IN ANGULATED IMPLANTS

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Keywords: implant, impression, angulation

Purpose/Aim: The purpose of this study was a reverse engineering based evaluation of the impression accuracies in relation to the angulation between implants (parallel, mesio-distal divergence, and bucco-lingual divergence) and the impression coping types (pick-up, transfer, and hybrid).

Materials and Methods: Three master models with 2 holes of 3 different angulations (parallel, mesio-distally divergent, and bucco-lingually divergent) were fabricated to simulate the various conditions of implant angulation. Impression copings were then connected to the master models for impressions using 3 types of impression copings (transfer, pick-up, and hybrid) for a total of 9 test groups (n = 10 in each group). A three-dimensional digital model scanner and a reverse engineering software were used to measure angular and distance distortions between the master and test models. For the multiple comparisons of the effects of angulations and impression coping types, one-way ANOVA and Duncan's post-hoc test was used ($p < 0.05$).

Results: Statistical analysis showed that: (1) for the evaluation of angular deviations, there were no statistically significant differences between the impression coping types with all three angulated implant models ($p < 0.05$). Also, all of the error rates of angulation were below the ISO standard (1.5%). (2) for the evaluation of linear distance deviations, There were statistically significant differences between the pick-up and the transfer groups with mesio-distal and bucco-lingual divergence models ($p < 0.05$). Pick-up coping groups (Groups MD-p, BL-p) shows less error rates then transfer coping groups (Groups MD-t, BL-t). However, in the parallel groups , there were no significant differences between the impression coping types (PA-p, PA-t, and PA-h) ($p < 0.05$). The error rates for the hybrid coping types showed no statistically significant differences between pick-up groups and transfer groups ($p < 0.05$).

Conclusions: For angular accuracy aspect, any types of impression copings do not affect the impression accuracies. For distance accuracy aspect, Mesio-lingual and Bucco-lingual divergences can be a variable that influences the impression accuracies between pick-up and transfer copings. Hybrid impression copings have the convenience of use because of the closed tray technique that is employed, and their reproducibility is similar to that of pick-up impression copings.

Poster 66

SOLUTION FOR SINUS RUPTURE BY USING PRP (PLATELET RICH PLASMA)

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Keywords: sinus rupture solution

Case Presentation: The sinus rupture and perforation can occur frequently while implanting on maxillary posterior area. There are several treatments for them, such as suturing, using a resorbable collagen membrane, and delayed approach, depending on the degree of rupture and perforation. Suturing requires a lot of difficult techniques. And though the resorbable collagen membrane has been used mostly for treating the sinus rupture, it is difficult to spread. Also, the delayed approach is a kind of retry when having any difficulties after the former treatments, which needs to wait until the sinus membrane rupture has completely healed. It can be a heavy burden for the patient as well as the dentist. Therefore, this researcher has used PRP(Platelet Rich Plasma) since 1995, which solves the problem of severe membrane rupture in sinus and allows to make the bone grafts performed safely. That is, this treatment method can solve sinus membrane rupture easily because PRP with strong fibrin net work and growth factor can agglomerate together with bone graft material to form one mass. This can prevent bones from dispersing into patient's ostium, despite the rupture in sinus. Also, it can help the sinus membrane to be regenerated and finally solve the problem of sinus membrane rupture relatively easily. In addition, this treatment can reduce he stress while performing sinus bone grafts. So, it is considered desirable to introduce the procedure and benefits of this treatment in detail.

Poster 67

COMPLETE DENTURES FOR A PATIENT WITH UNSTABLE MANDIBULAR MOVEMENT

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Keywords: treatment denture

Case Presentation: Many edentulous patients show irregular mandibular movements and unstable centric relation due to improper and elongated use of denture. It is important to analyze patients' mandibular movements and take their centric relation before fabricating final prosthesis. Utilizing treatment denture with flat occlusal table, as Abe et al claimed, is one of the best methods for the analysis of centric relation and unique condylar path angle before making final prosthesis. This case shows the complete denture using treatment denture with flat occlusal table for an edentulous patient with irregular mandibular movement and unstable centric relation. A 49-year-old female visited for prosthetic restoration of her multiple missing teeth. The fracture of the abutment due to the secondary caries caused the loss of maxillary and mandibular dentures only except the maxillary second molar portion. The panoramic showed the alveolar bone of the mandible having irregular pattern and severe resorption caused by the irregular movement of the mandible. After the final impressions of the maxilla and the mandible were taken using individual trays, centric relation was taken with gothic arch tracer. To make the treatment denture, the functional cusps of the artificially made maxillary posterior resin teeth were reduced, and metal functional cusps with Ni-Cr were fabricated by lost wax technique, and bonded by resin cement. To mark the mandibular movement path, flat occlusal table of the mandibular posterior teeth was fabricated with the mixture of direct resin (SNAP, Parkwell, Edgewood, USA) and baby powder (Johnson's baby powder, Johnson & Johnson baby products company, USA) whose main ingredient is talcum power. Under the articulator (Kavo protar evo 7) with mean 30 degree of sagittal condylar path angle and mean 15 degree of lateral condylar path angle, treatment denture teeth were arranged in lingualized occlusion. To reconfirm the position and the retention of the denture, dynamic impression using tissue conditioner was performed. Based on the marked area, induced by the opposing maxillary posterior teeth in the occlusal table, interference area was adjusted. During the five week period of repetitive occlusal adjustment and tissue conditioner exchange, reproducible centric relation and patient's unique condylar path angle were confirmed. Eventually patient did not have any discomfort. Current state of occlusion was marked and transferred to articulator, and after that, the master cast was produced. According to the marked record on the flat occlusal table of the treatment denture, sagittal condylar path angle was set to be 25 degree and left and right condylar path angle was set to be 12, 13 degree each. Then the final denture was fabricated by arranging artificial teeth with lingualized occlusion. The complete dentures were fabricated; occlusal contacts were adjusted, and the complete denture delivered to the patient. The patient was placed on a 6-month recall. The 3-year evaluation of the esthetics and function of the restorations showed no evidence of temporomandibular joint problems.

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BONDING STRENGTH MEASUREMENT OF TISSUE CONDITIONER USING ATBC AND TAH

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Keywords: tissue conditioner, tensile bonding strength

Purpose/Aim: To evaluate the initial bonding strength of new type tissue conditioner (NTU-TC) using plasticizers of acetyl tributyl citrate(ATBC) and hyperbranched polymer (TAH)

Materials and Methods: The initial bonding strength of NTU-TC connected to PMMA resin denture base (n=5, Lucitone 199, Dentsply) were assessed by tensile bonding strength method. In the control group, 2 different tissue conditioners

(Lynal, Dentsply; Soft liner,GC) were evaluated in the same method for comparison. The failure mode of these materials were also assessed. Significant different was less than .05

Results: The highest tensile bonding strength was found in Lynal (mean=11.88 kgf) group, following by NTU-TC(mean=5.13 kgf) and GC(mean=4.86 kgf). About the fracture surface, the adhesive failure were found both in NTU-TC and Lynal groups. Otherwise, cohesive failure was noted in GC group

Conclusions: Within the limitations of this study, the results suggest that tissue conditioner using plasticizers of ATBC and TAH can provide sufficient tensile bonding strength as well as conventional types

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THE EFFECTIVENESS OF MULTIMEDIA PATIENT EDUCATION ON ALGINATE IMPRESSION TAKING

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Keywords: Interactive multimedia, Alginate impression, Understanding level

Purpose/Aim: An oral impression of distinct integrity is crucial in prosthodontic treatment. Among the impression materials, alginate is the most common selection, which is also an irritant of nauseating reaction by the patients. Understanding the impression taking procedure and how to cooperate with the dentist appropriately is helpful to gain a high quality oral impression.The present study was aimed to compare the efficacy of three differentways for delivering impression taking information on the patients' understanding and cooperation.

Materials and Methods: A randomized, controlled prospective trial was carried out on 120 patients by the same dentist and assistant in Dept.of Prosthodontics, Stomatology Hospital of Xi'an Jiaotong University College of Medicine. The patients were divided into three groups randomly as follow: the video group delivered information of the whole oral impression taking process with live movies and voiceover; the audio group delivered the same information in verbal form only, and the picture group showed static graphic information of key points only. Patients were randomly allocated into video, audio or picture groups to understand what they need to coordinate with the dentist. The understanding level was assessed by questionnaire and performance of cooperation quantitatively. Statistical tests were done through the SPSS 19 software, and p=0.05 was set as significant difference in advance.

Results: The mean scores results of video, audio and picture group were found to be 5.375, 2.975, 4.375 out of 10(in questionnaire) and 5.113, 3.475, 3.988 out of 6(in performance), respectively. Kruskal-Wallis test followed by all pairwise multiple comparisons was used to compare the differences among groups. The results revealed that the scores of video group was significantly higher than the other two groups in both questionnaire and performance ($p<0.05$). Comparing to the audio group, the picture group was significantly higher in questionnaire scores ($p<0.05$), while no statistical significance was found in cooperation performance ($p=0.147$).

Conclusions: According to the quantitative analysis of the current study, multimedia of video-based method is powerful effective in helping the patients' understanding and cooperation, which should be considered as a helpful supplement to traditional communication between dentist and patients during clinical treatment.

Poster 70

MCI PATIENTS PRESENT LESS CHEWING EFFICIENCY IMPAIRMENT THAN DEMENTIA PATIENTS

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Keywords: Mild Cognitive Impairment,dementia,chewing efficiency

Purpose/Aim: It is well documented that subjects with dementia present a lower number of teeth and impaired chewing function when compared to cognitively healthy persons of the same age. Mild Cognitive Impairment (MCI) is considered a precursor state of dementia with an annual conversion rate of approximately 10%. The objective of this cross-sectional study was to test the hypothesis that the chewing efficiency of patients with MCI is similar to those diagnosed with dementia.

Materials and Methods: A total of 83 patients were recruited in this study. Cognitive state was evaluated by a battery of comprehensive neuropsychological tests and subsequently divided into three groups (n=83; Healthy=18, MCI=41, Dementia=23). The mean age and standard deviation for healthy, MCI and dementia groups were 74.5±6.9, 76.8±6.7 and 81.8±6.9 years, respectively. Patients with dementia were significantly older than both healthy (p=0.003) and MCI (p=0.019) groups, whereas MCI and healthy groups were of similar age (p=0.686). Oral health status was examined clinically and a color-mixing test using a bi-colored chewing gum was used to evaluate chewing efficiency. After 20 chewing cycles, the gum was subjectively assessed (SA) visually and graded on a scale of 1 to 5. Subsequently, the specimen were flattened to a thickness of 1mm and digitized for electronic analysis (UF).

Results: The average number of teeth was 19.1±2.06, 18.7±1.65 and 4.6±1.80 for healthy, MCI and dementia groups, respectively (Kruskall-Wallis:p=0.0001). The subjective assessment of the gums for the MCI patients evinced a chewing efficiency similar to the healthy group, but was higher than the dementia group (SA: Healthy=3.61±0.118; MCI=3.39±0.125; Dementia=2.26±0.211; Kruskall-Wallis: Healthy versus MCI: p=0.2436, Healthy versus Dementia: p<0.0001, MCI versus Dementia: p=<0.0001). These findings were confirmed by the subsequent electronic analysis of the degree of color mixture (UF: Healthy=0.038±0.0074; MCI=0.050±0.0090; Dementia=0.098±0.0116; Kruskall-Wallis: Healthy versus MCI: p=0.4316, Healthy versus Dementia: p=0.0004, MCI versus Dementia: p=0.0001).

Conclusions: Patients with MCI do not present the same impairment of chewing efficiency as that of patients with dementia, thus the null hypothesis has to be rejected. The number of teeth present in these patients is also significantly higher than patients with dementia. Based on the findings of this study, we can conclude that the MCI group had an oral health status and chewing function similar to cognitively healthy individuals.

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FINITE ELEMENT ANALYSIS OF ZIRCONIA ALL-CERAMIC CROWNS ON STRESS DISTRIBUTION

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Keywords: zirconia,all-ceramic crown,finite element analysis

Purpose/Aim: Fracture of veneering ceramics is problematic in clinical zirconia all-ceramic restorations. One of the important factors in the strength of all-ceramic crown is a design for the crown preparation. The purpose of this study was to evaluate the influence of different cervical margin forms and abutment materials on stress distribution of zirconia all-ceramic crowns using three-dimensional finite element analysis.

Materials and Methods: Three-dimensional models of two types of zirconia all-ceramic premolar crowns (yttria-stabilized zirconia framework with veneering ceramic and monolithic zirconia ceramic) were used in the analysis. Cervical margin forms of crown abutments were prepared with three different curvature radiuses (CR): CR=0 (shoulder margin: R0), CR=0.5 mm (R0.5) and 1.0 mm (R1.0) (rounded shoulder margins). Two types of abutment material, dentin and brass were used. A force of 1 N was loaded at the occlusal central surface perpendicularly to the contact surface. Stress analysis was performed using a linear static analysis to calculate the stress distribution that was generated in the crowns and abutment.

Results: In the case of the brass abutment, stress distribution at the shoulder area became equalized with increasing curvature radius. Although it was similarly equalized in the case of the zirconia framework with veneering ceramic, the maximum principal stress at the shoulder area was increased. In the case of the dentin abutment, values of the curvature radiuses affected the stress distribution at the shoulder area. The lowest maximum principal stress was observed when the dentin abutment with the R0.5 cervical margin form was used in a monolithic zirconia crown model.

Conclusions: In the crown preparation for zirconia all-ceramic crowns, rounded shoulder with R0.5 may decrease a maximum principal stress at the shoulder area regardless of the crown abutment material. Therefore, it can be expected that such a cervical margin form would decrease the risk of fracture in zirconia all-ceramic crowns.

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IMMEDIATELY LOADED MANDIBULAR TWO-IMPLANT OVERDENTURES: COST-ANALYSIS

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Keywords: Immediately loaded, implants overdentures, cost

Purpose/Aim: The aim of this study was to compare time and costs spent by the prosthodontist for maintenance, between immediately and conventionally loaded mandibular two-implant overdentures retained by magnetic attachments.

Materials and Methods: Nineteen participants with edentulous mandibles were randomly assigned into either an immediate loading group or conventional loading group. Each participant received two implants in the interforaminal region with flapless surgery. In the immediate group, each implant were connected keepers and loaded with mandibular overdentures on the same day as implant placement. In the conventional group, the implants were connected to healing abutments. The inner aspects of the denture base around the healing abutments were relieved. 3 months after surgery, the healing abutments were replaced with keepers and loaded with overdentures. Time and costs spent by the prosthodontist for maintenance, including both scheduled and unscheduled visits, were recorded for each patient from implants placement to 1 year follow-up. Costs included only direct costs (the cost of labor, materials and medications) and were calculated at Japanese yen (\). Time and costs were evaluated at 3, 6 months and 1 year after surgery. To compare the two groups, t test was performed using SPSS 16.0. The study protocol was approved by the Ethics Committee at Tokyo Medical and Dental University and registered with the UMIN Center.

Results: The participants were randomly allocated into the immediate group (n = 10) and the conventional group (n = 9). One patient in the conventional group withdrew 1 month after implants placement because of implant failure. A mean total time was 372 minutes on the immediate group and 244 minutes on the conventional groups for maintenance during 1-year follow-up. There is significantly difference between the groups (p=0.04). The time for maintenance during the first 3 month after surgery is especially more than that of the conventional group (p=0.01). A mean total costs of the immediate group was \35432 and \23553 for the conventional group, and the between group difference was significant (p=0.01).

Conclusions: The immediate loading of two implants retained magnetic attachment mandibular complete denture probably needs more time and costs for maintenance.

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REHABILITATION OF A MAXILLARY DEFECT USING A FREE FIBULAR FLAP

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Keywords: free fibular flap, implant supported prosthesis, detachable obturator

Case Presentation: This case report serves to illustrate the surgical and prosthodontic management of an oncology patient. Diagnosis of an osteosarcomaof the maxilla was confirmed both clinically and histologically. The proposed treatment plan included a diagnostic phase, surgical resection, harvesting and placement of a free fibular flap with immediate implant placement, , chemotherapy and possible radiation, delayed placement of a provisional prosthesis following completion of chemotherapy and radiation , and placement of a definitive prosthesis. Virtual planning and rapid prototyping were used for the proposed resection surgery, immediate implant placement and fabrication of surgical guides. Surgical complications reported were loss of two implants and formation of a palatal fistula. Following the surgical phase, chemotherapy commenced but no radiation therapy was administered. After one year an acrylic provisional prosthesis was fabricated and placed. The definitive prosthesis was fixed on all four remaining implants, and comprised a titanium framework with porcelain veneering, and a detachable obturator.

Poster 74

EFFECTIVE ANALYSIS TO PREVENT DEMENTIA FOCUSING ON INDIVIDUAL ORAL SENSIBILITY

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Keywords: oral stimulation, brain activity, individual sensibility

Purpose/Aim: It is often described that mastication promotes brain activity. However gnathological sensation in the masticatory movements has to be considered to comprehend its relationship with brain activity. Sensory information from the dental mechanoreceptor of the periodontal ligament and residual mucosa, especially the thickness, hardness, and tactile sensation; contributes to the cognition of food bolus texture and the control of mastication. Although a large number of studies have been reported on the sensory-threshold of the teeth and oral cavity, the sensibility varies in individuals and have not been based on quantitative psychophysical measurements. Moreover, the relationship between the individual sensibility and brain activity is also unclear. We proposed a hypothesis that individual sensibility against oral stimulation is related to the activity of the prefrontal cortex, which is closely related with dementia. The purpose of this study was to investigate the individual sensibility for thickness, hardness and tactile sensation with psychophysical measurements; and to clarify the relationship between individual sensibility and brain activity for effective oral stimulation to prevent dementia.

Materials and Methods: We enrolled 5 young dentate volunteers without missing teeth. Three tooth-related sensory tests: thickness, hardness, and tactile sensation, were performed in both first molars on the left side using steel plates (10 mm×10mm with 1.0-5.0 mm thickness), silicone blocks (7 mm×7 mm, thickness of 3 mm) with hardness of degree 5-80°, and von frey filaments with 0.04-26.0 g. The psychophysical measurement test was based on a magnitude estimation method by ascending and descending series and the individual sensibility was evaluated by the Weber-Fechner low and Stevens' low. Cerebral blood flows in the prefrontal cortex were measured using a wearable near infrared spectroscopy (HITACHI, Tokyo, Japan).

Results: The mean individual sensibility of thickness by Weber-Fechner low was 2.12±0.37 for ascending series and 2.38±0.21 for descending series. Thickness by Stevens' low was 0.81±0.08 for ascending series and 0.77±0.04 for descending series. Both individual sensibilities of thickness were significantly higher than those of the hardness and tactile

sensitivities. A significant correlation was observed between the individual sensibility of thickness by Weber-Fechner low and the cerebral blood flow on the right side of area 46 of the prefrontal cortex.

Conclusions: Oral stimuli focusing on sensation thickness would be effective in preventing dementia through the activation of the prefrontal cortex.

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TRANSLUCENCY AND AGING RESISTANCE OF SILICA-DOPED DENTAL ZIRCONIA

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Keywords: zirconia, translucency, contrast ratio

Purpose/Aim: High-translucent yttria stabilized tetragonal zirconia (Y-TZP) with less content of alumina than conventional Y-TZP is becoming popular in dentistry in order to realize full-contour zirconia restorations.Although decreasing the amount of alumina addition can increase the translucency, high-translucent Y-TZP may degrade in a humid and low temperature environment such as the oral cavity.The aim of this study was to compare the translucency and degradation of a new silica-doped Y-TZP material with a commercially available conventional and high-translucent Y-TZP.

Materials and Methods: Four types of Y-TZP specimens were used in this study: commercially available conventional Y-TZP (inCoris ZI, Sirona), high-translucent Y-TZP (inCoris TZI, Sirona) and, experimental silica (0.12 wt%) doped Y-TZP contained a low level of alumina with two different sintering temperatures (1,450 ℃, 1,500 ℃ for 2 hours). Commercially available Y-TZP (inCoris ZI and inCoris TZI) were sintered at 1500 ℃ for 2 hours. Contrast ratio and translucent parameter were measured using a spectrophotometer (cm2600d, KONICA MINORTA), with varying thickness of specimens (0.5 mm,1.0 mm,1.5 mm,2.0 mm).Wavelength-based transmittance was measured using a spectrophotometer (cm-5, KONICA MINOLTA). Scanning electron microscopy (FE-SEM; Hitachi S-4800) was used to characterize the microstructure of the specimens.The grain size was measured on FE-SEM micrographs using IMAGE-J software according to the Planimetric method. Then, four types of Y-TZP specimens were subjected to an accelerated aging test up to 40 hours at 134 ℃ and 2 atm. The tetragonal phase to monoclinic phase transformation was evaluated by X-ray diffraction before and after aging test.

Results: Silica-doped Y-TZP (1,500 ℃) and inCorisTZI showed a similar trend in translucency.Silica-doped Y-TZP (1,450 ℃) had much lower translucency than the other 3 specimens.The grain size of silica-doped Y-TZP(1,500 ℃) was bigger than that of silica-doped 3Y-TZP (1,450 ℃).Before aging test,four types of Y-TZP specimens exhibited similar XRD patterns. After aging, inCorisTZI revealed high amount of monoclinic phase.This result suggests that the hydrothermal stability is lowered as the amount of alumina decrease. Silica-doped 3Y-TZP (1,500 ℃) has high-translucency and aging-resistant.

Conclusions: The experimental 0.12 wt% silica doped Y-TZP sintered at 1,500 ℃ showed high-translucency and superior hydrothermal stability.

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EFFECT OF MDP PRIMER ON BOND STRENGTH TO CE-TZP/AL2O3 CERAMICS

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Keywords: Self-adhesive resin cement, Ce-TZP/Al2O3, Bond strength

Purpose/Aim: Recent years, the combination of using zirconia restorations bonded with self-adhesive resin cement has been widespread in dentistry, because of this reliable mechanical properties and requires lesser experience (easy handling). The purpose of this study was to evaluate the effect of MDP-containing primer treatment on the shear bond strength of self-adhesive resin cement to Ce-TZP/Al2O3 nano composite (Ce-TZP).

Materials and Methods: Ninety blocks (10×10×20 mm, 10×10×10 mm) of the Ce-TZP were polished with 600 grit abrasive paper. Ultrasonic was applied in cleaning with acetone for 15 min, distilled water for 15 min. Depending on the surface treatment and the adhesive conditions, the 90 Ce-TZP blocks were randomly divided into nine groups: there are self-adhesive resin cement alone (LinkAce (GC¬¬, LA): Clearfil® SA cement plus automix (Kuraray, SA): RelyXTM Unicem2 Automix (3M, RX)) were applied onto Ce-TZP blocks surfaces. Self-adhesive resin cements (LA, SA, RX) were applied following treatment with MDP containing primer (Clearfil® ceramic primer (Kuraray, CP) or ScotchbondTM Universal (3M, SU)). Conventional adhesive resin cements (LINKMAX (GC, LM): Panavia F2.0 (Kuraray, PF): (RelyXTM Ultimate (3M, RU)) were applied following treatment with MDP-containing primer (CP) or (SU). The photo polymerized method followed the manufacturers' instructions for each resin cement. After water storage at 37? for 24 h, the specimens were submitted to a shear bond strength (SBS) test at a crosshead speed of 1.0 mm/min. Specimens were loaded to failure in a universal testing machine, and the data were analyzed with one-way ANOVA (a=.05).

Results: The highest bond strength for all conditions was achieved at CP+SA (25.4 ± 5.4MPa), whereas the lowest bond strength value was recorded in RX (9.4 ± 3.0MPa). Statistic significant differences were also detected between the CP+SA and SA, SU+RX and RX (P<.05), with higher bond strength means for the CP+SA and SU+RX.

Conclusions: This study showed that combination of MDP containing primer and self-adhesive resin cement can improve the bond strength of the zirconia restoration.

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FEA ON RETENTION FORCES OF MAXILLARY COMPLETE DENTURES IN PATIENTS

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Keywords: complete denture, retention forces , FEA

Purpose/Aim: Retention and stability are essential for successful complete denture treatment. Many studies have been performed to evaluate the retention force of dentures. However, the mechanism of occurrence of retention forces is yet to be ascertained. The purpose of this study was to elucidate the mechanism of retention force occurrence on the maxillary complete denture. The retention force of complete denture measured in each subject was compared with the results of three-dimensional finite element analysis (FEA) for each subject.

Materials and Methods: The study comprised of six patients with maxillary complete dentures who were previously evaluated the denture retention force. (3 men and 3 women; mean age, 75.5 years) To eliminate the effect of saliva on the retention force for each measurement, in the previous study, artificial saliva was sprayed on the mucosal surface of the denture base to act as a mediating fluid. A replica denture for each subject was manufactured using scanning Resin ®. The replica dentures were scanned using cone-beam computed tomography (CT), and three-dimensional FEA models with the denture and mucosa and jig to cover the denture were created using an FEA software program. The mucosal thickness was maintained at 2 mm from the denture mucosal surface. The jig was maintained at a thickness of 3 mm. The load site and direction were set in a manner similar to that in the previous study. The pulling load was performed at the central point of the posterior border (P), inter section point of the line joining the right and left first molar central fovea (C), and the left first molar central fovea (MF).The pushing load was performed at the central point of the central incisor edge (IE), and right first premolar buccal cusp (PC).The load force was set 10 N. The maximum principal stress on the distal border of the mucosa was compared to the denture retention force measured in a previous study.

Results: Stress distribution generated at the distal border of the mucosa; this was similar in all the subjects. The maximum principal stress was the highest in P, and lowest in MF. IM, PC, and C showed a similar value. The stress value tended to be high at the measurement site where the retention force was low.

Conclusions: The results of this study demonstrated a relationship between the stress and retention force of maxillary complete denture. Therefore, denture retention force might be estimated using the FEA model.

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SPECIFIC ACID-TREATED SURFACE TOPOGRAPHY ALTER HYDROPHILICITY AND OSTEOGENIC CELLULAR RESPONSES

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Keywords: surface modification, cellular responses, RhoA

Purpose/Aim: Modification of implant surface topography and roughness has been regarded as one of the most influential factors in the formation of osseointegration. Surface topography has been reported to be recognized as mechanical loading by bone cells. Upon stimulation, cells on implant surfaces activate RhoA pathway, a member of the Rho-family of GTPases. Adherent cell activities also have been reported to be regulated, in part, by RhoA and some previous papers demonstrated the interactions between cellular functions and RhoA activity under the control of different topographic cues. More recently, modified surface chemistry or hydrophilicity as the property of dental implants has been demonstrated to achieve superior osseointegration. The present study investigated the effect of modified surface topography by different acids on the alteration of hydrofilicity and osteogenic cellular responses to titanium substrate and RhoA activation.

Materials and Methods: Three kinds of surface topography were prepared using commercially pure grade IV titanium disks. Smooth surfaces (S) were polished and passivated with 30 % HNO3. To modify surface topography, polished distks were treated with HCl (H1) or H2O2 and H2SO4 (H2) following grit blasting. Surface characteristics were analyzed with SEM, laser microscope for roughness measurement and wettability tester. Cell spreading, RhoA activity and osteogenic differentiation were examined with or without RhoA inhibitor, C3.

Results: Each treated-disk demonstrated discriminative surface topography. The highest roughness and the highest wettability were detected in H1 and H2 surface, respectively. After seeding mesenchymal stem cells, H1 and H2 adherent cells developed multiple projections compared to S adherent cells. RhoA activation as the responsiveness to surface treatment was in a surface roughness-dependent. RhoA inhibitor, C3, suppressed RhoA activation significantly and induced remarkable projections on every surface. H2 surfaces showed the highest osteogenic markers' expression. When C3 was applied to differentiating cells, the expression of osteogenic markers was enhanced in S adherent cells, but not H1and H2 adherent cells.

Conclusions: Acid treatment for surface modification can alter not only surface topography but also hydrophilicity and consequently, regulate cellular responses to modified substrate and RhoA activity. This study suggests predominant surface characteristics and –related molecular mechanism for superior osseointegration.

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COMBINED APPLICATION OF SOFT TISSUE AUGMENTATION TECHNIQUES FOR EMERGENCE PROFILE

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Case Presentation: Before a fixed partial denture (FPD) is undertaken, edentulous ridge's contour and topography should be carefully examined. Excessive alveolar bone loss sometimes occurs in the anterior region as a result of traumatic tooth extraction, advanced periodontal disease and so forth. Loss of alveolar ridge contour may lead to unesthetic emergence profile of upper anterior FPD. Emergence profile is very important for the natural looking restoration in the esthetic zone. Therefore ridge augmentation is required in order to obtain natural emergence profile of the FPD. Reconstructive procedures for the deformed alveolar ridge evolve hard tissue graft and soft tissue graft. Types of soft tissue grafts are roll flap technique, pouch graft, onlay epithelialized grafts, interpositional graft technique, and combined onlay interpositional graft. Roll flap technique was introduced by Abrams in 1980. This method is recommended for the Seibert Class I ridge defect and is usually used for single tooth defects. Interpositional graft introduced by Sebeirt is a technique that increases not only the vertical direction but also the buccolingual direction of ridge because graft is not fully embedded in the recipient site. However, this technique has limitation such as the possibility of reoperation when amount of ridge correction is unsatisfied. In order to overcome this limitation, this case presents a new combined technique using roll flap and interpositional graft procedure at the same time to maximize ridge augmentation and reduce the number of surgery.

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PROSTHODONTIC REHABILITATION OF A MAXILLECTOMY PATIENT WITH AN IMPLANT-RETAINED OVERDENTURE

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Keywords: maxillectomy, implant, mastication

Case Presentation: Case Report: A 65-year-old male patient had undergone chemotherapy, radiotherapy (50 Gy) and right maxillectomy due to squamous cell carcinoma (T4aN0). In 2007, the defect was reconstructed with rectus abdominis flap. Two central incisors and left canine were the only teeth remained in the maxillary jaw after surgical resection. The left canine was extracted because of severe caries. In 2009, maxillary overdenture was fabricated over the two central incisors using O-ring attachments (OP anchor attachment) despite of poor periodontal condition. After two years, central incisors were extracted due to severe mobility and the patient used denture adhesive to retain the maxillary denture. The patient complained poor retention and fitness of the denture and therefore we planned to place three dental implants in the non-defect side. In 2013, the patient agreed the treatment plan and three dental implants (Branemark Mk III) were placed. In 2014, an implant retained overdenture was fabricated with stud attachments (Locater). Patient's perceived chewing ability and masticatory performance were evaluated and compared before and after implant treatment. Patient's perceived chewing ability was rated using a food intake questionnaire and masticatory score (MS) was obtained. Masticatory performance (MP) was estimated by measuring glucose extracted from Gummy jelly. MS was increased from 56% to 70%. MP was increased from 98 to 156 mg/dl. This research was approved by Ethical Committee at Tokyo Medical and Dental University (Approval No. 865). This work was supported by a JSPS Grand-in-Aid for Young Scientists (B) (25861828). Dental implants were not placed in the defect side because the bone quantity was inadequate and flap reconstruction was undergone. Sinus floor elevation was not applied because of the radiotherapy. Conclusion: Perceived chewing ability and masticatory performance might be improved in maxillectomy patients by using dental implants with stud attachments.

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STRESS EFFECT OF SECOND MOLAR REPLACEMENT WITH PARTIAL OVERDENTURE PROSTHESIS

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Keywords: partial overdenture prosthesis, implant, bending moment

Purpose/Aim: This study was to investigate the stress effect of second molar replacement on the development of bending moments in a mandibular partial overdenture prosthesis (PODP).

Materials and Methods: Two theoretical test models of unilateral mandibular PODPs were constructed to represent the base of, as follows: Model 1: first and second premolars and molars (P1, P2, M1, and M2); Model 2: P1, P2, and M1. The base was supported by the canine at one end and received an implant at the distal marginal ridge of P1 (D/P), D/P2, D/M1, or D/M2, or central fossa of M1 (C/M1) or C/M2. The occlusal loadings were concentrated to calculate the stress resultants developed in the base, by using the free-body diagram.

Results: The shear forces and bending moments were higher in Model 1 than in Model 2, except when the implant located at C/M2. The highest forces and moments were found with the implant located at D/P1 in both models. While, the implant location has shifted to develop the lowest moment at D/M1 in Model 1, and at C/M1 in Model 2. The moment of the highest values was 70.6% lower, and the lowest values by 54.9% in Model 2, than in Model 1.

Conclusions: Within the limits of this theoretical study, the forces and moments greatly decreased by eliminating the M2 in designing a mandibular PODP. While, the range of moment reduction was highly sensitive to the location of implant support.

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PROSTHODONTIC RESTORATION OF A YOUNG PATIENT WITH RUSSELL-SILVER SYNDROME

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Case Presentation: Introduction: Russell-Silver syndrome is a genetic disorder characterized by intrauterine and/or postnatal growth restriction, abnormality and distinctive physical asymmetry. Patient with the syndrome rarely shows the sign of mental problem. Therefore, specific caution performing oral examination or preventative treatment is not required. Symptoms involved with Russell-Silver syndrome can affect social life negatively. The fact that patient has a similar appearance and function with peers is important in terms of psychological development. Case presentation: Seven-year-old Russell-Silver syndrome patient was referred from Department of Pediatric Dentistry for prosthodontic reconstruction. Due to severe caries on primary dentition, most of teeth are extracted. Considering the eruption of permanent teeth, however, root rest extraction was postponed. Due to small size of dental arch, cooperation of the patient, adaptation of denture, difficulties were expected in making final prosthesis. Interim removable overlay denture was fabricated and the patient was instructed to wear the denture for 2 months. Definitive denture was made to reconstruct the arch, shape of gingiva, contour of primary dentition. The patient and his parents were satisfied with masticatory function and esthetics of denture. Discussion & Conclusion: Overdenture using remaining primary teeth can be optimal treatment for Russell-Silver syndrome patients. It is important for young Russell-Silver syndrome patient to visit hospital periodically after treatment. Because the repair and replacement of the prosthesis is required as the patient grows up, 3-6 months interval is recommended. After the permanent teeth erupt, relief of the denture will be necessary. When eruptions of permanent teeth are complete according to the extent of growth, implant supported prosthesis or removable partial denture will be considered.

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SURFACE CHARACTERISTICS OF BIOACTIVE GLASS INFILTRATED ZIRCONIA WITH ACID ETCHING

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Keywords: zirconia

Purpose/Aim: This study is to investigate the surface characteristics of bio-active glass infiltrated zirconia after acid etching in different etching conditions.

Materials and Methods: 4g of zirconia powder(KZ-3YF Al less, KCM, Japan) was packed as a disk and pre-sintered. New compositions of bio-active glass(SiO2-Al2O3-Na2O-MgO-BaO-CaO-Nb2O5-TiO2-Fe2O3) was prepared. The glass was spin coated on pre-sintered zirconia disk and sintered completely. After the final sinter, two kinds of glass infiltrated Zirconia specimens that had different percentage of Fe2O3 (A1 and A2) were made. Zirliner(IPS e.max zirliner, Ivoclar Vivadent AG, Schaan, Liechtenstein) and dental porcelain(IPS e.max Ceram Ivoclar Vivadent AG, Schaan, Liechtenstein) were applied to sintered zirconia disks. The specimens were classified into 5 groups: zirconia, zirliner, porcelain, glass A1, glass A2. Each group was subdivided into 8 sub-groups by etching time and hydrofluoric acid(HF) concentration: 1 minute, 2 minute, 10 minute and 1 hour and HF 10%, HF 20% . Surface roughness(Ra) was measured on each specimen by profilometer (DIAVITE DH-7? , DIAVITE) and the surfaces were observed by scanning electron microscopy(JSM-7500F+EDS(Oxford), JEOL, Japan). Compositional analysis was carried out using EDX(JSM-7500F+EDS(Oxford), JEOL, Japan). Mean Ra values were statistically analyzed by One-way ANOVA analysis ($p<0.05$). Tukey multiple comparison test and Kruskal-Wallis test were used for post hoc analysis.

Results: In zirconia group, there was no significant difference on surface roughness under various etching condition($p>0.05$) and the highest was 0.2±0.02μm. In zirliner group, Ra was the highest at 10minute(HF 10%, 2.37±0.27μm) and lowest at 1hour (HF 20%, 0.17±0.04μm). In porcelain group, Ra increased according to the etching time both in HF 10% and 20% and the highest was at 1hour (HF 20%, 7.46±0.50μm). In glass A1 and A2 group, Ra also increased according to the etching time and the highest was at 1hr: A1 group, 3.57±0.34μm(HF 20%), A2 group, 2.60±0.75μm(HF 20%). SEM images of zirliner groups showed increase in porosity and surface roughness according to the etching time but only few zirliner particles could be seen after I hour. It seems like that zirliner was dissolved completely after 1 hour. The porcelain showed more porous and sharp structure by increasing the etching time. Glass infiltrated Zirconia (A1 and A2) also showed increase in porosity according to the time. A large number of round zirconia particles were observed after glass removed.

Conclusions: Within the limitation of this study, the surface roughness of glass infiltrated zirconia can be controlled by etching time and the concentration of hydrofluoric acid. It was possible to make more than several micrometers surface roughness on zirconia by glass infiltration and acid-etching.

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THE SINGLE MANDIBULAR IMPLANT – DENTISTS´ POINT OF VIEW

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Keywords: single mandibular implant, edentulous mandible

Purpose/Aim: The concept of a single mandibular implant in the edentulous mandible placed under an existing complete denture has been shown to enhance patient´s oral health related quality of life and prosthesis satisfaction, but little evidence is given on the dentists´ point of view regarding this treatment option. This survey aimed to get an insight into the dentists´ assessment of this treatment concept.

Materials and Methods: Dentists from nine German universities, who were familiar with this treatment concept, were asked to complete a questionnaire dealing with the intervention, the aftercare and the suitability of this concept for every day practice.

Results: The participating dentists regarded the implantation as equal (89%) or easier (11%) compared to an implant placement in another region and all dentists preferred the conventional loading protocol to the immediate loading considering the connection of the implant to the denture base. The most frequent prosthodontic maintenance intervention was activation or exchange of the female part of the ball matrix. Most dentists regarded the concept as partly suitable for every day practice (87%) and the overall satisfaction was equal (14%) or lower (86%) compared to other implant concepts especially due to the frequent need for activation. Dentists highlighted this concept as a good alternative, when two or more implants were financially not affordable.

Conclusions: The concept of the single mandibular implant in the edentulous mandible seems to be partly suitable for every day practice from the dentists´ point of view. It was judged as a viable treatment option, when patients cannot afford two or more implants.

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A COMPLEX IMPLANTO-PROSTHODONTIC REHABILITATION OF A PATIENT WITH CEREBRAL PALSY

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Keywords: cerebral palsy, implants, fixed prosthodontic rehabilitation

Case Presentation: Cerebral palsy (CP) is a group of permanent movement disorders caused by abnormal development or damage to the parts of brain that control movement, balance, and posture. The most common problems include poor coordination, stiff/weak muscles, tremors, and involuntary movements. Our patient with CP (probably due to insufficient amount of oxigen as an unexpected twin at birth) was a normally inteligent person. He came to a dental office asking treatment with his parents. He could not use his hands normally and had insufficient oral hygiene. At the first visit we registered that almost all lateral teeth had been already extracted, his mouth was full of caries, plaque, calculus and

gingivitis. He had Class III jaw relationship and no posterior antagonistic contacts. After instructions about proper maintaince of oral hygiene, he first received calculus, plaque and caries removal treatment, endodontic treatment and fillings. As his oral hygiene improved sufficiently we proceeded with an implant-prosthodontic rehabilitation. After analysis of the casts mounted in an articulator we established a treatment plan. As some of his teeth were without sound tooth structure under gingival margin, we made direct cast post and cores (cemented with glass ionomer). After delivery of provisional acrylic crowns, implants were inserted in posterior alveolar ridges. Due to small amount of available bone a split ridge technique was made and artificial bone with membrane was placed. Implants were left submerged. After six month healing abutments were screwed, teeth preparations finished, and final impression obtained with transfer abutments and open tray. Due to difficulties in obtaining mandibular impression (saliva, tremor) we made two mandibular impressions and 2 casts and provisionally determined jaw relationship. The techician first finished mandibular metal ceramic fixed partial dentures (FPD). After that we determinated final jaw relationship and maxillary FPDs were finished and cemented. The last step was the delivery of a FPD on two implants in the right posterior mandibular region in already established jaw relationship. Everything was really difficult to perform due to patient's tremor and involuntary continous head movements. All treatments were done for free. MIS (Israel) donated C1 implants and abutments.

ACRYLIC REINFORCEMENT WITH OFF THE SHELF PERFORATED METAL PLATES

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Keywords: full denture, strength, adhesion

Purpose/Aim: Measure the reinforcement effect of off the shelf perforated metal plates on two different PMMA resins.

Materials and Methods: Preformed Dentaurum grid strengthener (DGS) maxilla, (CrNi stainless steel, thickness 0.4 mm, gold plated; Dentaurum, Germany) were pressed to flat sheets, treated with Monobond Plus (Ivoclar Vivadent, Liechtenstein) and embedded into two different denture resins (Ivobase Hybrid (IH) and Ivobase High Impact (IHI), Ivoclar Vivadent), using injection molding denture processing technique (Ivomat, Ivoclar Vivadent) producing plates of 2.5 mm thickness with the metal plate 0.5 mm from the bottom. Plates of same thickness without metal reinforcement were used as a control (C). Using a Isomet 1000 diamond saw (Buhler, USA) the plates were cut into 2.5 mm ±6% thick beams (50 mm x 10 mm), yielding 12 specimens/group. Beams were subjected to a 3-point bending strength test in an Instron (Model 1125/5500R) at 5mm/min and the flexural strength and modulus were calculated. Data were analyzed with a 2-way ANOVA (resin x reinforcement) and Tukey's Studentized Range (HSD) Test (SAS, 9.4, Cary, USA).

Results: Numeric results are shown in the Table below. For both flexural strength and modulus, resin and reinforcement had a significant effect. The High Impact resin had significantly lower strength and modulus, using the DGS increased the flexural strength by 22-94% and the modulus by 51-74%. This effect was stronger for the HIH resin.

Conclusions: The method used was able to demonstrate the effect of the DGS, which was also supported by the adhesive used to bond the grid to the resin. However, the influence of aging on the bonded interface was not simulated in this experiment and should be done in further projects. The High Impact resin is much more flexible than the Hybrid resin, which means that under mastication it may be deformed. Using the DGS with IHI resin, the same strength as IH is reached, however due to the higher modulus reached, higher forces are required to obtain deformation. As a whole, IHI with a bonded DGS should yield dentures which are superior to standard, not reinforced dentures. If this effect still holds in the true shape of a mandibular denture should be investigated in the future, before clinical studies would be indicated. Acknowledgements: Ivoclar Vivadent has provided the Ivomat unit and the denture materials. Part of this research was done as accomplishment for Dr. Santos's specialist degree.

Flexural strength (MPa)

¤	C¤	DGS¤	¤
IH¤	78.8 ± 5.9¤	96.2 ± 14.3¤	¤
IHI¤	40.4 ± 7.0¤	78.5 ± 10.9¤	¤

p < 0.0001 for rows and columns

Flexural modulus (MPa)

¤	C¤	DGS¤	¤
IH¤	2261.7 ± 261.4¤	3424.6 ± 779.4¤	¤
IHI¤	1373.7 ± 232.1¤	2390.8 ± 317.9¤	¤

p < 0.0001 for rows and columns

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SMILE CHARACTERS IN YOUNG ADULTS FROM JAPAN AND SWITZERLAND

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Keywords: smiling, aesthetic, young adult

Purpose/Aim: The establishment of an attractive smile is one of the universal goals of esthetic dentistry. Therefore, understanding common smile characters is important. However, smile characters differ between individuals. The purpose of this study was to compare smile characters in different young adults from Japan and Switzerland.

Materials and Methods: We enrolled 121 Japanese young adult volunteers (72 males, 49 females, mean age; 23.9 ± 3.9 years) as participants of the Japanese group and 98 Swiss young adult volunteers (38 males, 60 females, mean age; 25.6 ± 3.6 years) as participants of the Swiss group. All participants were informed about the purpose and procedures of the study and obtained given informed consent. All experiments were performed in accordance with the Edinburgh Revision of the Helsinki Declaration. Standardized photographs of a full smile of each young adult were taken and used to rate scores based on the category by Dong et al. in six elements of smile characters as follows; upper lip position, upper lip curvature, maxillary anterior incisal curvature, relationship between maxillary anterior teeth and lower lip, tooth width and tooth length displayed while smiling. Mann-Whitney U tests were performed to compare scores of each element of smile characters between the Japanese group and the Swiss group (a=0.05).

Results: There were significant differences between the Japanese group and the Swiss group in four of six elements; upper lip curvature (P=0.045), maxillary anterior incisal curvature (P=0.001), tooth width (P=0.000) and tooth length (P=0.017) displayed while smiling On the other hand, there is no significant difference in the other elements. Swiss participants tended to have more upward upper lip and maxillary anterior incisal curvatures than Japanese participants. Additionally, Swiss participants also tended to have a wider and shorter range of tooth display while smiling than Japanese participants.

Conclusions: It is concluded that smile characters differ in young adults from Japan and Switzerland in terms of upper lip and maxillary anterior incisal curvatures, as well as the range of tooth display while smiling.

Poster 88

INFLUENCE OF MONOLITHIC ZIRCONIA THICKNESS ON POLYMERIZATION OF DUAL-CURE CEMENTS

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Keywords: monolithic zirconia, resin cement, microhardness

Purpose/Aim: The aim of this study was to investigate the influence of thickness of the monolithic zirconia material on polymerization efficiency of dual-cure resin cements.

Materials and Methods: Four ceramic discs (4.0 mm diameter) with thicknesses of 0.5, 1, 1.5 and 2 mm were prepared in the Zirkonzahn CAD/CAM system using monolithic zirconia blanks (Prettau 16 mm, Zirkonzahn, Italy). Two dual-cure resin cements were used: Panavia F 2.0 (Kuraray, Japan) and DuoLink Universal (Bisco, USA). For each resin cement, ten samples were prepared for each thickness using a teflon mold (4.0-mm diameter, 6.0-mm height), and 80 resin cement samples were obtained. Light activation was performed for 20 seconds, using a light emitting diode (LED) curing device (Elipar S10, 3M ESPE, USA) with irradiance of 1200 mW/cm2. Vickers hardness measurements were conducted with a 50-g

load applied for 15 seconds. The indentations were made in the cross sectional area at four depths, and the mean values were recorded as Vickers hardness number (VHN). Results were statistically analyzed with two-way ANOVA and LSD test ($p < 0.05$).

Results: A statistically significant decrease in VHN were observed with increasing depth and thickness of the monolithic zirconia discs for each resin cement group ($p < 0.05$). Panavia F 2.0 samples displayed significantly higher decrease in hardness compared to DuoLink Universal samples for each thickness ($p < 0.001$).

Conclusions: Dual-cure resin cements can be used for cementation of monolithic zirconia restorations, however under thicker restorations light attenuation may affect the polymerization negatively.

Poster 89

VERIFICATION OF IMPLANT PLACEMENT IN THE EDENTULOUS POSTERIOR MANDIBLE

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Keywords: implants, offset, FEA

Purpose/Aim: Proper placement of dental implants is important to ensure their long-term stability. In recent years, a number of studies using biomechanical methods have been performed to explore the relationship between implant placement and stress around dental implants. Geometric analysis, three-dimensional finite element analysis (FEA), and model experiments have been performed to verify the effect of multiple implant placements on the edentulous posterior mandible. However, studies incorporating multiple analyses under the same conditions have not been reported. The aim of this study was to evaluate the reduction of load distribution around the peri-implant bone caused by offset placement in the edentulous posterior mandible, using strain-gauge methods and FEA.

Materials and Methods: Three implants were embedded in an artificial mandibular bone. The implants were embedded at the place of first premolar (no. 34), second premolar (no. 35), and first molars (no. 36). The superstructure was fabricated with titanium, and three load points (buccal, central, and lingual) were set to the occlusal surface of the first molar. Three placement models were fabricated: straight line, buccal offset, and lingual offset. In the offset models, the central implant (no. 35) was embedded outside the line by 1 mm on the buccal or lingual side. Four strain-gauges were bonded on the surface of artificial bone around the no. 36 implant. Each placement had three models that were scanned using micro-computed tomography, and FEA models were created using FEA software. A 100-N vertical load was applied at each of the three load points on the real and FEA models. The displacement of the implant and strain distribution around the peri-implant bone were measured and compared between the experimental and FEA models.

Results: 1. In both the experimental and FEA models, displacement of the implant under load was smaller at the central load point than that at the buccal and lingual load points. 2. The displacement of the implant under load showed the same tendency among the three placement models. 3. Among the three placement models, the strain at the load side was larger than that at the other sides. 4. Strain distribution around the peri-implant bone showed a similar tendency among the three placement models

Conclusions: In posterior mandible edentulous cases, the effect of offset placement to the load distribution around the peri-implant bone would be small.

Poster 90

PROSTHETIC TREATMENT ON LARGE SIZED DEFECTS OF ANTERIOR MANDIBLE

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Keywords: Mandible, Implant, Defect

Case Presentation: Restoring large sized defects of the mandible mid-portion due to operation of osseous-diseases is a challenging field in prosthodontics because of its difficulty in restoring function and esthetics. When considering the fact that the patient's young age, fixed type prosthodontics is considered firsthand; however, even when using implants, lip support, hygiene control, and reducing complications from implants calls for removable type prosthodontics. Especially for cases in which the patient has previously received soft tissue graft, the most desirable prosthodontic treatment plan should be chosen so as not to impair the patient's esthetics, function, and hygiene control. Selection of implantation sites and prosthodontic treatment types is critical when establishing such plans. In particular, utilizing titanium bar removable dentures after implantation in 2-4 areas is favorable in gaining hygiene and adequate support, and such treatment can be chosen as a solution in restoring considerable alveolar defects. The case report covers 2 male patients in their late twenties of whom present severe alveolar bone loss(except for some molar areas) both vertically and horizontally due to osseous disease in the mid portion of the mandible. The patients have previously received soft tissue graft, and are not considered as an indication of conventional dentures. In this study, utilizing CAD/CAM allowed for a more precise and yet easy fabrication of titanium bar. The bar retained denture shared similarities with fixed type prosthodontics in terms of function, and showed excellent results considering hygiene control and esthetics.

Poster 91

TREATMENT OUTCOMES OF MANDIBULAR MINI-IMPLANTS SUPPORTED OVERDENTURES : SYSTEMATIC REVIEW

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Keywords: mini-implant, overdentures, implant surported

Purpose/Aim: This systematic review aimed to evaluate the treatment outcomes of mandibular Mini-implant supported overdentures in terms of (1) implant survival rate, (2) peri-implant tissue condition, (3) prosthetic complication, and (4) patient satisfaction.

Materials and Methods: Pertinent literature was identified using a MEDLINE and EMBASE search strategy and hand-searching of relevant journals in English only until April 30, 2015. Inclusion and exclusion criteria were applied to the titles and abstracts and subsequently to the full text of included references. The 12 studies reported mini-implant survival rate, marginal bone levels or loss, prosthesis maintenance, and patient satisfaction of Mandibular mini-implants supported overdentures.

Results: Of the 12 studies, 4 were randomized controlled trial, 6 prospective studies, and 2 retrospective studies. The range of follow up period of implant is 1-6 years and only 4 studies were over 3 years. The mini-implant survival rate ranged 93.8-100%. The mean marginal bone resorption showed 0.4-1.2mm after 1 year of loading, and only 2 studies reported about prosthetic complication. Most studies showed improvement of patient satisfaction after mini-implant placement.

Conclusions: Within the limitations of this systematic review, the mandibular mini-implant supported overdentures showed predictable results regarding implant survival rate, marginal bone resorption, and patient satisfaction in short-term follow up period.

Poster 92

REHABILITATION OF A PATIENT WITH SEVERE RIDGE RESORPTION AND PERI-IMPLANTITIS

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Case Presentation: Implant-retained overdenture is considered as a promising treatment for mandibular edentulism, especially in severely resorbed residual ridge condition. However, it could not be a permanent solution without periodic maintenance therapy. The patient in this report received prosthetic treatment with mandibular overdenture using bar attachment with 4 implants 7 years ago. However, after that, she did not receive adequate maintenance treatment. As a result, she had severe wear in artificial teeth of dentures and peri-implantitis combined with generalized mucosal inflammation, which compromised esthetics as well as function. Additionally, residual ridge resorption was so severe that even the vulnerable implants were necessary for retention and stability of a removable prosthesis. This report presented the treatment process to rehabilitate the severe atrophy of edentulous ridge including supportive therapy of inflammation control in mucosa and peri-implant tissue.

Poster 93

IMPACT OF THE CROWN-ROOT RATIO ON SURVIVAL OF ABUTMENT TEETH

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Keywords: crown-root ratio, abutment teeth, prognosis

Purpose/Aim: Crown-root ratio (CRR) is commonly recorded when planning prosthodontic procedures. However, there is a lack of longitudinal clinical data evaluating the association between CRR and tooth survival. The aim of this longitudinal practice-based study was to assess the impact of CRR on the survival of abutment teeth for removable partial dentures (RPDs).

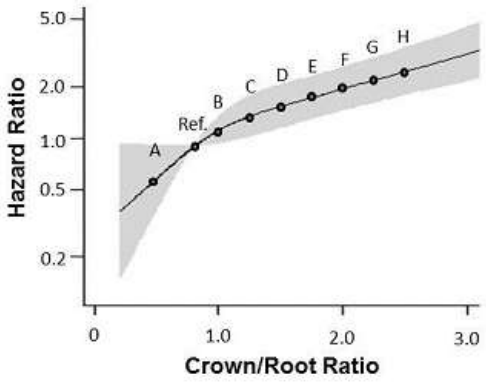
Materials and Methods: Data were collected from 147 patients provided with RPDs at Osaka University Dental Hospital, Japan. 236 clasp-retained RPDs and 856 abutment teeth were analysed. Survival of abutment teeth was assessed using Kaplan-Meier methods and Cox's proportional hazard modelling. The fitted proportional hazard model was used to assess the prognostic significance of initial CRR value with adjustments for the impact of other risk factors. Specifically, the factors adjusted in multivariate analysis were age, gender, frequency of periodontal maintenance programmes, occlusal support, type of abutment tooth, endodontic status, and probing pocket depth. Abutment teeth were divided into five risk groups according to CRR: A (<= 0.75), B (0.76-1.00), C (1.01-1.25), D (1.26-1.50) and E (>= 1.51).

Results: The 7-year survival rate was 89.1% for group A, 85.9% for group B, 86.5% for group C, 76.9% for group D and 46.7% for group E. After adjusting other factors, the HR was 1.33 for group B ($p = 0.171$), 1.01 for group C ($p = 0.972$), 2.15 for group D ($p = 0.014$), and 3.11 for group E ($p < 0.001$), compared with group A. Moreover the relationship between risk of tooth loss and CRR after adjusting for other factors were illustrated, and the HR increased with increasing CRR and could be estimated accurately at any CRR value (Figure 1) .

Conclusions: This longitudinal practice-based cohort study confirmed the fact that the higher CRR was linked to higher risk of abutment tooth loss among RPD wearers. But the survival outcomes of abutment teeth of RPDs in group A (CRR <= 0.75, median; 0.60), group B (CRR: 0.76-1.00, median; 0.88) and group C (CRR: 1.01-1.25, median; 1.12) were similar and had

preferable outcomes. Moreover, from our study, the specific risk of abutment teeth depending on CRR value could be estimated after adjusting other risk factors. These results can help guide clinical decision-making on the use of teeth with compromised bone support as abutment teeth for removable prostheses.

Figure 1. Relationship of crown-root ratio with hazard of tooth loss.



CRR	HR
A = 0.50	0.58
Ref. = 0.80	1.00
B = 1.00	1.13
C = 1.25	1.35
D = 1.50	1.53
E = 1.75	1.72
F = 2.00	1.95
G = 2.25	2.21
H = 2.50	2.46

Estimates are from the fitted proportional hazard model where log hazard is a smoothing-spline function in CRR. The shadow shows corresponding 95% confidence intervals. The vertical axis is in logarithmic scale. CRR: crown/root ratio, HR: hazard ratio

Poster 94

INTENTIONAL TOOTH WEAR TO COPE WITH EXCESSIVE OCCLUSAL FORCE

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Keywords: excessive occlusal force, intentional tooth wear, occlusal surface

Case Presentation: Purpose: Excessive occlusal force could cause various complications such as tooth wear, breakage of teeth and/or dental prosthesis and orofacial dysfunction. This case report describes the favorable clinical outcome of a patient whose excessive occlusal force could be distributed by intentionally utilizing the artificial tooth wear of a complete denture. Patient: A 71-year-old male complained of masticatory disturbance with an unfitted maxillary denture. He had severe maxillary alveolar ridge resorption, extreme mandibular tooth wear and hypertrophy of bilateral masseter muscles. Mandibular periodontal tissue showed no signs and symptoms of chronic periodontitis. Outlines of the case: A maxillary complete denture and mandibular provisional restorations were provided simultaneously. Vertical dimension was increased by utilizing freeway space and facial appearance. No complication was observed such as temporomandibular disorders after increasing the vertical dimension. Composite resin for maxillary teeth and acrylic resin for mandibular provisional restorations were fabricated, respectively. Since the height of mandibular anterior abutment teeth was extremely short because of tooth wear, vertical grooves were prepared to increase retention of composite resin for abutment build-up. Mandibular provisional restorations were severely worn within only 2 weeks although we had anticipated it because of the presence of excessive occlusal force. This severe wear resulted in concave mandibular occlusal plane and smooth bilateral balanced occlusion. The molar occlusal surfaces of provisional restorations were transferred to metal crowns. Mandibular anterior teeth were restored with resin facing metal crowns. A new maxillary complete denture was constructed and bilateral lingualized occlusion was provided. Impression of the molar occlusal surfaces of the maxillary denture was taken with transparent silicone impression material. Every time the maxillary lingual cusps were worn down and the buccal cusps started to contact to mandibular teeth, occlusal surfaces were reconstructed with composite resin using the silicone occlusal

core. Discussion: After a maxillary complete denture and mandibular provisional restorations were provided, the denture has been keeping stable condition for 3 years and the patient is satisfied with the ability of mastication. The problems happened only on the denture: wear of maxillary composite resin teeth and a partial crack in the palatal area of the denture. The patient visits to reconstruct the occlusal surfaces of the maxillary denture every two months. The reconstruction takes only 10 minutes with silicone occlusal core material. Abnormality of basal seat mucosa has not been found and no mandibular residual tooth has been further lost even by the excessive occlusal force. The residual teeth and alveolar ridge are likely to be conserved by the intentional tooth wear. Conclusion: Intentional tooth wear could distribute the severe occlusal force and prevent residual teeth and alveolar ridge from damage in this case.

Poster 95

EFFECTS OF ORAL MOISTURIZERS ON RETENTION FORCES OF COMPLETE DENTURES

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Keywords: Complete denture, Retention forces, Oral moisturizers

Purpose/Aim: In the ultra-aged society of Japan, the number of patients having xerostomia and severe residual ridge resorption is steadily increasing. Consequently, there is an increase in number of intractable cases requiring complete dentures. The retention of maxillary complete denture is difficult to keep. Therefore, a denture stabilizer is sometimes used. However, denture stabilizers are difficult to remove and serve as possible hotbeds of bacteria. Therefore, oral moisturizers are recommended instead of denture stabilizers. Our previous studies suggested that the viscosity of the oral moisturizer has the effect of the retention force on a model which was prepared by taking an impression of an edentulous upper jaw model. This study sought to clarify the effect of viscosity of oral moisturizers and residual ridge form on the retention force of maxillary complete dentures.

Materials and Methods: Thirty-three maxillary edentulous subjects participated in this study. Three types of oral moisturizers with different viscosities were used: gel (high viscosity), liquid (middle viscosity) and spray (low viscosity) types. Three types of oral moisturizer were interposed between the basal surface of the denture and basal seat mucosa. The central incisor was loaded 45°upward toward the occlusal plane. The force required to dislodge the denture was considered as the retention force. Impressions of the polished surface and the mucosal surface of maxillary complete denture were used to create replica dentures from silicon impression material, and a tray resin was poured into the impressions. Replica dentures were used to evaluate relative position of anterior residual ridge and form of the molar residual ridge. The retention forces were compared with the form of the molar residual ridge and relative position relationship of the anterior residual ridge. The Friedman test was used for statistical analysis, Post hoc test: multiple comparisons and Spearman's rank correlation coefficient were calculated.

Results: The gel type of oral moisturizer showed significantly large retention than the liquid and spray types. ($p < 0.05$) No correlation was found between the retention force of the denture and height and shape of the molar-tooth part of the residual ridge. As the ratio of distance of the central incisor to the anterior residual ridge in the distance of the central incisor to the posterior denture border was larger, retention force was smaller ($r = -0.352$, $p < 0.01$).

Conclusions: The results of this study indicate that the retention force of dentures is affected by the viscosity of the oral moisturizer used and the relative position of the anterior residual ridge.

Poster 96

SUCCESS AND SURVIVAL OF 3-UNIT FIXED DENTAL PROSTHESES

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Keywords: Fixed dental prosthesis, complications, survival

Purpose/Aim: The aim of this retrospective study was to determine the probability of success and survival as well as the incidence of biological and technical complications associated with 3 unit fixed dental prostheses (FDPs).

Materials and Methods: All patients treated with 3 unit FDPs at the National Dental Centre, Singapore in the previous five to eight years were identified through electronic records and contacted to return for a clinical examination by a single prosthodontist. A total of 126 patients with one hundred and fifty (150) 3-unit FDPs were examined following which a satisfaction survey was also conducted.

Results: One hundred and eighteen (118) FDPs were free from complication; requiring no intervention, nineteen (19) remained in-situ but suffered some complication, while thirteen(13) were deemed failures and had to be removed. Mean time in function of the FDPs was 6.1 years. Of the 19 FDPs with complications, 2 were affected by caries, 1 was affected with progressive periodontal disease, 5 had loss of vitality of the abutments, 1 suffered retention loss and 10 showed ceramic fracture which required some intervention. The was an increased risk for FDP failure and complications when both abutment teeth were non-vital. The 5-year probability of FDP success (free of complication) was between 82.2% (95% Confidence Interval(CI): 75.7,87.0) and 83.8% (95% CI: 77.8, 88.2) while the 5-year probability of survival was 93.1% (95% CI: 88.4, 95.9). The 5 year incidence of caries was 3.9% (95% CI:1.9, 7.9), the risk for loss of abutment vitality was 3.4% (95% CI: 1.5, 7.3) and risk for ceramic fractures requiring intervention was 6.2% (95%CI:3.5, 10.8)

Conclusions: The 5-year survival and complication free rates for 3-unit FDP highlight the good prognoses for this treatment option. While the survival rates are high, there are biological and technical complications that arise over time, however, these are not frequent. Caution should be exercised when incorporating non-vital abutments into the FDPs

Poster 97

PATIENTS' SATISFACTION WITH IMPLANT THERAPY AFTER 5 YEARS IN FUNCTION

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Keywords: implant dentistry, patient satisfaction

Purpose/Aim: To analyze patients' perception of implant therapy in partial edentulism, 5 years after receiving implant-supported reconstructions

Materials and Methods: All patients who had received dental implants at the National Dental Centre, Singapore 3.1–8.8 years earlier (mean: 5.2 years) were invited to participate in a retrospective study on the outcomes of implant treatment. Patients who responded were examined clinically, and asked to answer a questionnaire with 13 statements on their subjective perception of implant treatment. 2 statements utilized categorical response fields, while the remaining 11 used visual analogue scales (VAS)

Results: 206 patients, with 329 implants, agreed to participate. 82% of the implants were reconstructed with single crowns, and 18% were reconstructed with splinted crowns or fixed partial dentures. The corresponding 5-year survival rates were 98.4% (95% CI: 96.2, 99.3) and 92.5% (95% CI: 73.1, 98.1) respectively. The first statement addressing function and

chewing comfort yielded high patient satisfaction (78% satisfied, mean VAS: 83.6 ± 14.4). Comparing chewing comfort for teeth and implants, respectively, responses were divided, with 51% perceiving no difference between the two, 24% preferring teeth and 25% favoring implants. Most patients were satisfied with the phonetic function (81%, mean VAS: 85.9 ±16.3) and esthetic outcome (82%, mean VAS: 85.2 ±14.5). Two in three patients (62%, mean VAS: 78.5 ±17.5) were able to cleanse the implant reconstruction well, and 58% (mean VAS: 59.0 ±21.7) found it easier to clean their implants as compared to teeth. Majority of the patients (69%) reported no difference comparing the time taken to clean implants and teeth. Patients were generally unsure if the tissues around their implants or teeth bled more (59%, mean VAS: 52.9 ±26.9), with 17% indicating more bleeding around implants and 24% indicating more bleeding around teeth. Pertaining to expectations, most patients were satisfied with the treatment (71%, mean VAS: 81.2 ±17.1), and the majority were willing to undergo the same treatment again, if required (75%, mean VAS: 79.2 ±23.6). A large percentage (81%, mean VAS: 85.1 ±15.2) of patients would recommend such treatment to friends, if indicated. Only slightly over one-third (38%, mean VAS: 63.5 ±26.3) of the patients felt certain that the cost of the treatment was justified.

Conclusions: In this cohort of partially edentulous patients, the large majority was satisfied with the functional and aesthetic outcomes of implant treatment, and felt that the treatment met their expectations. However, a sizable number of patients reported difficulty in cleansing implant reconstruction(s), with one-quarter of them taking longer to clean their implants than their natural teeth. Two-thirds of the patients did not feel that the treatment cost was justified.

Poster 98

EFFECT OF SELF-ADHESIVE CEMENTS ON ENDOGENOUS PROTEOLYTIC ACTIVITY OF DENTIN

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Keywords: Adhesion, self adhesive resin cement, dentin protease activity

Purpose/Aim: Reliable adhesion to tooth structure is crucial for the long term success of the restorations. Endogenous matrix metalloproteinases (MMPs) and cysteine cathepsins (CC) were shown to be responsible for two distinct degradation pathways resulting in the progressive degradation of the adhesive interfaces over time. Self-adhesive cements are commonly preferred in clinical applications due to ease of use. Limited data are available on whether self-adhesive cements may also increase the endogenous protease activity in dentin. Therefore, the aim of this study was to determine the effect of self-adhesive resin cements on total protease activity as well as MMP-mediated or CC-mediated degradation in dentin.

Materials and Methods: Dentin beams (1x2x6 mm; n=10/group) were sectioned from the superficial dentin and completely demineralized with EDTA. After initial dry mass assessment, the beams were distributed to six different groups: 1) 37% phosphoric acid (PA) for 15 s, 2) RelyX Unicem (3M ESPE), 3) Panavia SA (Kuraray), 4) BisCem (Bisco), 5) SpeedCEM (Ivoclar Vivadent) for 1 min and 6)EDTA-demineralized beams without treatment (control). The beams were rinsed free of the cements in subsequent acetone rinses and beams were incubated in individually capped polyethylene tubes in 1 mL zinc and calcium containing complete media (CM) for 3 weeks. Aliquots of CM were used to analyze solubilized telopeptide fragments using ICTP as indicator of MMP-mediated collagen degradation and CTX for cathepsin-mediated degradation using ELISA kits. Additional demineralized beams (n=5/group) were used to measure the influence of acid treatment or self-adhesive resin cements on total MMP activity of EDTA-demineralized dentin using generic MMP assay. Data were analyzed by ANOVA (a=0.05).

Results: The total MMP activity, dry mass loss, ICTP release and CTX release were significantly different among test groups ($p<0.05$). The highest increase in total MMP activity was 89% (37%PA) group compared to control (22%). The mean highest dry mass loss was 13.6%±4.4 in the 37%PA treated group and the lowest dry mass loss was 1.56%±0.33 in SpeedCEM group. The ICTP release over the incubation period (ng/mg dry dentin) was significantly higher ($p<0.05$) than CTX release (pg/mg dry dentin) in all groups.

Conclusions: Self-adhesive resin cements can activate endogenous protease activity at the adhesive interfaces.

Poster 99

THE EFFECT OF TOO MUCH CARING: A PRELIMINARY STUDY

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Keywords: burnout, non-psychotic psychiatric morbidity, chronic care

Background: Burnout is a term which was originally used to describe the malfunction of a jet or rocket engine (Felton, 1998). The term was adapted to human beings in the 1970s, and is said to be a distinct work-related stress syndrome (Asai et al, 2007), and can manifest in exhaustion of physical and emotional strength. Studies have reported that cancer clinicians exhibit higher levels of burnout (Ramirez et al, 1995; Meier et al, 2001; Catt et al, 2005). None of these studies reported on prosthodontists and what effect their role in caring for the cancer patient (pre-surgery throughout to the maintenance phase) may be, especially as head and neck cancers present unique challenges that lead to an altered body image and body function.

Aim: To determine the presence of burnout and psychiatric morbidity among prosthodontists who provide a service to cancer patients in a maxillofacial prosthetics clinic.

Materials and Methods: All specialist clinicians employed in the Department of Oral Rehabilitation at the University of the Witwatersrand were asked to complete two questionnaires. The sample comprised those involved in the care of head and neck cancer patients and those who are not: the latter group served as control. The questionnaires were the Maslach Burnout Inventory (MBI) and the General Health Questionnaire (GHQ-12) and followed a focus group discussion to determine the stressful and satisfying aspects of the work which could be included in the questions. MBI assesses the three components of burnout (emotional exhaustion, depersonalization, and personal accomplishment), and GHQ-12 was designed to screen for non-psychotic psychiatric morbidity. Both were scored on a Likert scale.

Results: Based on the GHQ-12, the prevalence of psychiatric morbidity was 29%, a score similar to that reported in other studies (Ramirez et al 1995; Catt et al, 2005). For the 3 components of burnout, the clinicians dealing with cancer patients showed increased scores for exhaustion and depersonalisation and decreased scores for personal accomplishment.

Poster 100

SATISFACTION OF MINI-IMPLANT RETAINED MANDIBULAR OVERDENTURE - A PROSPECTIVE STUDY

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Keywords: mini dental implant, implant retained overdenture, denture satisfaction

Purpose/Aim: In the edentulous ridge with extreme bone resorption, it is difficulty to place the standard diameter implant to improve the clinical efficacy of removable prosthesis. The purpose of this study was to evaluate the clinical performance and satisfaction of participants with mandibular mini-implant retained overdenture (IOD).

Materials and Methods: 15 participants in study group and 16 in control group were included in this study at National Taiwan University. Initially, new mandibular single denture was fabrication for both control and study group, and data was collected about using the old denture and using the new denture after 1 and 3 months. Then the participant of the study group would receive four mini-implant (Diameter 2.1 mm; Length:10 or 13 mm)(MDI, 3M ESPE) 15 participants at National Taiwan University, who received maxillary complete denture and mandibular IOD, were enrolled in this study. Four mini-implant (Diameter: 2.1 mm; Length: 10 or 13 mm)(MDI, 3M ESPE) were placed in mental foramens area in each participant. Control data were obtained from the 16 participants who received conventional maxillary and mandibular

complete denture. Visual analog scale questionnaire on participant satisfaction and oral health impact profile for edentulous (OHIP) were used to assess effect of the quality of life and health status among these participants. Additionally, the periodontal condition, including inflammation, or pain, and prosthetic parameters, including the stability, reline, or fracture of dentures, were also recorded.

Results: Results: The participant satisfaction related to denture and OHIP were improved significantly, in comparison with the data from control group and at the baseline in IOD group. Peri-implantitis were found around 2 implants in 2 participants but no implant was lost during functional use. 2 prostheses were fracture due to insufficient clearance of the anatagonistic teeth.

Conclusions: IOD supported by mini-implants provide a viable treatment option in the edentulous ridge with extreme bone resorption.

Poster 101

EFFECTS OF PORCELAIN FIRING ON ALLOYS' DIMENSIONAL STABILITY AND CHARACTERISTICS

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Keywords: DMLS, dental alloys, SEM

Purpose/Aim: The aim of this study was to evaluate the effects of multiple porcelain firings on dimensional stability and surface structure of Co-Cr, Ni-Cr and Ti dental alloys, fabricated with casting and direct metal laser sintering DMLS. Metal ceramic restorations have been in use on a wide basis for fabrication of fixed partial dentures (FPDs) using Nickel-Chromium (Ni- Cr) and Cobalt- Chromium (Co-Cr) alloys. On the other hand, usage of titanium (Ti) and its alloys in manufacturing of prosthetic superstructures have risen. Besides casting, alloys may be converted into FPD frameworks by machining or Direct Metal Laser Sintering (DMLS) methods. With DMLS, which is an additive manufacturing method, fabrication time is shortened and individual mistakes are eliminated.

Materials and Methods: 40 samples, 10mm in diameter and 0.5mm thick were prepared. Four study groups were established according to the fabrication method; conventional casting with Co-Cr, DMLS with Co-Cr, conventional casting with Ni-Cr and DMSL with Ti-6Al-4V (Ti-L). The dimensional measurements were made before and after each firing sequence and results were analyzed statistically, evaluation of the surface characteristics was performed with a Scanning Electron Microscope.

Results: Significant differences were found between the thicknesses of the Co-Cr and titanium samples fabricated with DMLS method while no significance was seen on the other parameters.

Conclusions: Especially the decrease in thicknesses of the DMLS fabricated samples was believed to originate from the approaching of the material layers to each other by each firing session. SEM images were found to be supporting this conclusion.

Poster 102

EFFECT OF A COMMERCIAL FLUORESCENCE LIQUID ON 3Y-TZP SURFACE MICROSTRUCTURE

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Keywords: fluorescence, 3Y-TZP, microstructure

Purpose/Aim: 3Y-TZP (3% mol yttrium-stabilized tetragonal zirconia poly-crystal) ceramics can be stained to mimic the color or fluorescence of natural teeth. The effect of staining methods and liquids on the 3Y-TZP ceramics is not clear. The purpose of this study was to evaluate the effect of a commercial fluorescence liquid on surface microstructure of 3Y-TZP ceramics.

Materials and Methods: Nine 3Y-TZP ceramic discs were fabricated (ZIRCONIA PRETTAU®, Zirkonzahn GmbH, Germany). They were divided into 3 groups: the undyed control group (C), the dip-coating group (D), and the brush-coating group (B). A commercial fluorescence liquid (COLOUR LIQUID PRETTAU® FLUORESZENZ, Zirkonzahn GmbH, Germany) was dip-coating (10 mins) or brush-coating on the ceramic discs before sintering process accordingly. The crystallographic shapes of all discs were measured by X-ray powder diffractometer (XRD). Surface structural and chemical differences were evaluated by scanning electron microscopy (SEM) and energy dispersive analysis (EDS). The mean grain size was calculated by the circular intercept method (Abram's Three-Circle Procedure). One-way ANOVA was used as statistical analysis.The level of significance was set at a=.05.

Results: XRD showed all groups were composed mainly of t-ZrO2, and a small quantity of m-ZrO2 content. Different shading methods made the distribution of coloring pigment, homogeneity of grain size, and mean grain size microstructure distinct under SEM. The dip-coating group had a significantly larger grain size than the control group and the brush-coating group ($p < 0.05$).

Conclusions: 1. Shading with a commercial fluorescence liquid by prolong dipping may enlarge grain size of 3Y-TZP and lead to uneven grain size. 2. Shading with a commercial fluorescence liquid by brushing probably is a better method than shading by dipping because it can maintain more even and adequate grain size of 3Y-TZP.

Poster 103

INTERFACIAL FRACTURE TOUGHNESS OF RESIN CEMENTS BONDED TO GLAZED ZIRCONIA

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Keywords: zirconia, interfacial fracture toughness, glaze

Purpose/Aim: The current recommended protocol for bonding zirconia restorations to teeth involves the use of an adhesive system containing phosphate monomers. This study evaluated the effect of using an etched and silanized glazed porcelain layer on the interfacial fracture toughness between a zirconia ceramic and a resin cement, one a conventional resin cement and the other with a phosphate monomer primer.

Materials and Methods: Forty rectangular-shaped zirconia ceramic specimens (length: 20mm; width: 7mm; thickness 2mm) were planed and squared under irrigation using 1000-grit silicon carbide abrasive paper. The specimens were sintered according to manufacturer instruction and air abraded with 100µm Al2O3. 20 Specimens were coated with VITA Akzent Glaze Spray (VITA Zahnfabrik; Bad Sackingen, Germany) and fired according to manufacturer instruction. The glazed specimens were then etched with 9.5% HF acid for 180 seconds and silanized with Monobond-S (Ivoclar Vivadent; Schaan,

Liechtenstein). These were divided into two groups of ten specimens each; one group for each adhesive to be used. The un-glazed discs were divided into similar groups. The specimen groups were bonded with Variolink II and Multilink-Automix (Ivoclar Vivadent) on a chevron shaped bond surface created by using a custom-made cut-out sticker made of ± 50 micron non-stick polymeric transparent PVC film (Grafiprint; Houthalen, Belgium). Prior to application of the stickers for the Multilink Auto-mix groups, the surfaces were treated with Metal/Zirconia Primer according to the manufacturer instructions. Specimens were kept in distilled water at 37 °C for 24 hours prior to interfacial fracture toughness testing on an Instron universal testing machine. The de-bonded specimens were examined under optical microscope to determine the mode of failures. Data were analysed using analysis of variance and Dunnett-T3 post-hoc tests with SPSS with a statistical significance set at 5%.

Results: The use of a glazed zirconia surface significantly improved the mean fracture toughness value in the Variolink II group ($p < 0.05$), however there was no significant change ($p > 0.05$) in the mean fracture toughness value with the Multilink-Automix Metal/Zzirconia Primer group. In comparison, the mean fracture toughness value of Multilink-Automix metal/zirconia primer group was significantly higher in the unglazed group ($p < 0.05$). Fractographic analysis showed predominantly cohesive failure for the glazed groups and adhesive failure in the non-glazed groups.

Conclusions: The interfacial fracture toughness for glazed zirconia bonded to Variolink II resin cement was superior to air-abraded zirconia that had been surface treated with a phosphate monomer primer bonded to Multilink Automix resin cement. The addition of phosphate monomer on a silanized glaze layer reduces the coupling effect of silane.

Poster 104

SYNTHESIS AND CHARACTERIZATION OF A POLYIMIDE-EPOXY COMPOSITE FOR DENTAL APPLICATION

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Keywords: polymer composites, polyimide, epoxy

Purpose/Aim: Epoxy resin has been used in dental restorations, but its high crosslink density leads to its intrinsic brittleness, which might lead to its breakage during functioning. This research made an effort in reinforcing epoxy with low molecular weight polyimide, aiming at increasing its strength but without sacrificing its toughness. The product of the polyimide-epoxy composite might be applied in dental field in the future.

Materials and Methods: Epoxy (Epon 828) was reinforced with self-made low molecular weight polyimide. 4,4'-Oxydiphthalic anhydride (ODPA), 4,4'-Oxydianiline (ODA), p-Phenylenediamine (PPD) and 5-Norbornene-2,3-dicarboxylic Anhydride (NA) was used to synthesize polyimide, and the product was blended with epoxy in different proportion. The characteristics of the cured PI/EP composites were characterized by 3 point bending test and scanning electron microscopy.

Results: The flexural strength of PI/EP composite could be as high as 141.03±9.93MPa, which was 25.86% higher than that of the control group (112.05±8.81MPa) ($P<0.05$). Meanwhile its rupture elongation (2.06±0.24mm) was 33.77% higher than that of the control group (1.54±0.24mm) ($P<0.05$), without any significant difference in flexural modulus ($P>0.05$).

Conclusions: Blending polyimide with epoxy in proper proportion could be a workable way to strengthen epoxy for dental application.

Poster 105

INFLUENCE OF PRIMER ON SHARE TEST BETWEEN ZIRCONIA AND CERAMICS

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Keywords: Y-TZP, veneering porcelain, shear bond strength

Purpose/Aim: All-ceramic restorations (ACR) are used for high esthetic reasons. Veneering porcelain chipping is one major problem. Different approaches were investigated to reduce chipping such as surface modifications on zirconia frameworks using sandblasting. The aim of this study was to investigate the effect of a primer on the shear bond strength (SBS) between zirconia core and veneering porcelain.

Materials and Methods: Twenty rectangular specimens of Y-TZP zirconia (NACERA Pearl 1, DOCERAM, Dortmund, Germany) were made by CAD/CAM system. Ten specimens were modified by application of a primer (Luxor Zirkonoxyd-Primer, Xplus3, Echzell, Germany) before sintering (wP). The other ten specimens underwent no modification before sintering (woP). After sintering all specimens were sandblasted (2 bars, Al2O3) and veneered with porcelain (VM9, Vita Zahnfabrik, Bad Säckingen, Germany) using a special metal jig with a hole of 5 mm in diameter. All specimens were subjected to SBS test according to ISO 10477, using a universal testing machine (Z010, Zwick, Germany). Subsequently, fracture mode was analyzed by stereo-microscope (Wild, Heerbrugg + Software: Image Pro Plus). Data were analyzed by oneway-ANOVA and Tukey-test ($p<0.05$).

Results: In SBS results, no significant difference between group wP (24.18 ± 5.15 MPa) and woP (23.70 ± 4.12 MPa) was found. However, a difference in fracture behavior could be detected. Within group woP, mainly mixed fracture mode was observed (adhesive: 1, mix: 7, cohesive: 2). Whereas group wP showed adhesive and mixed fracture mode (adhesive: 5, mix: 4, cohesive: 1).

Conclusions: Despite the fact that SBS was the same, the fracture mode was different with and without primer. This demonstrates the possibility of a primer to influence the crack propagation at the interface of zirconia/veneering porcelain system.

Poster 106

OVERDENTURES IN A PATIENT WITH PARKINSON'S DISEASE

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Keywords: overdenture, Parkinson

Case Presentation: It is primary objective of clinicians to achieve satisfactory stability and retention of the denture and to recover patient's esthetics and masticatory efficiency in treating edentulous patients. Especially patients with systemic disorder such as Parkinson's disease which leads to debilitating involuntary movements in the mandible and postural instability, fabrication of overdenture on retained root and implant supported overdenture may enhance denture's stability and provide functional advantages. In this case, a patient with Parkinson's disease was treated with the magnetic attachment for the maxilla and the implant retained overdenture for the mandible. A 55-years-old male patient visited the hospital due to the discomfort of his current denture. He exhibited involuntary movements in the mandible, wished a new denture with

reinforced stability and retention strength, and promised financial commitment. Patient lacked precise movement for insertion of the prosthesis. Considering the maxillary canines' periodontal status, if lateral forces directly exert on abutment teeth, it will show poor prognosis. With comprehensive denture consultation, to preserve abutment teeth with long-term prognosis, magnet retained overdenture was selected for the maxilla. Implant supported overdenture with locator attachments on the edentulous mandible was designed considering 22mm space available between the alveolar ridges. Overdentures were made through custom impression trays border molded with silicone. After undergoing two weeks periods of settling down, magnetic attachment upper overdenture and Locator attachment lower overdenture were applied to the patient. This case report presents an edentulous patient with Parkinson's disease treated with the magnetic attachment on the retained root in the maxilla and the implant retained overdenture using two Locator attachments in the mandible. In terms of reinforced stability and retention of the denture, a satisfactory result was obtained.

Poster 107

VENEERS FOR DENTINOGENESIS IMPERFECTA, A CASE REPORT OF REHABILITATION

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Keywords: oral rehabilitation, occlusal veneer, dentinogenesis imperfecta

Case Presentation: Dentinogenesis imperfecta (DI) is an inherited disorder affecting dentin. Defective dentin formation results in discolored teeth that are prone to attrition and fracture. Mutation in dentin sialophosphoprotein (DSPP) has been found to cause the dentin disorders DI - I and II (shields II and III). Early diagnosis and treatment of DI is recommended as it may prevent or intercept deterioration of the teeth and occlusion and improve esthetics. Here, we report a case with characteristic clinical, radiological and histological features of DI-I, which is further diagnosed by gene sequencing result of Polymerase Chain Reaction (PCR) as opalescent dentin. Severe attrition and deterioration are presented with the accompany of Vertical Occlusal Dimension (VOD) loss in this case. And condylar processes are protruded symmetrically while no Temporomandibular Joint Disorder (TMD) was observed. In order to implement a minimally invasive treatment as the patient demanded and to ensure the long-lasting effect of our prosthetics, we tested the bonding strength of the patient's teeth first as the basis for the adhesive treatment. Micro tensile tests for the enamel and dentin from the patient's wisdom teeth was carried out individually, whose results provided a solid proof and a specific conduction for the ceramic prosthetics in this case. To achieve an esthetic outcome, crown lengthening was implemented after wearing occlusal splint for three months. Provisional prosthetics delivered a visional overall effect and proved our object attainable. Final result was satisfactory and more than half a year's observation reveals no collapse or debonding of the prosthetics. Although the traditional belief that dentinogenesis imperfecta might hinder successful adhesive treatment because of its disorganized dentin structure or fragile enamel-dentinal junction, our one-case study explored the possibility of unconventional treatment audaciously and scientifically. Based on the statistics in this case report, it is worth trying treating with the ceramic onlays when we come across teeth defect cases of opalescent dentin with adequate axial restraining force. Nonetheless, we still call for further observation and prudent patient selection before a wide range application.

Poster 108

TRANSITIONAL-RESTORATION OF MISSING ANTERIOR TEETH IN GROWING-PATIENT USING MINI-IMPLANTS

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Keywords: missing anterior teeth, growing patient

Case Presentation: Besides functional aspect, esthetic and comfort factors have to be considered for prosthodontic treatment of multiple missing anterior teeth. Maxillary anterior teeth receive more horizontal force than posterior teeth. And in maximum intercuspal position, a provisional prosthesis is overloaded due to leverage effect. A maxillary anterior provisional prosthesis should establish proper anterior guidance during mandibular functional movements. However, this may contribute to falling out of a provisional prosthesis. Also, an anterior provisional prosthesis requires esthetic element for patient's harmonious social activities. Final prosthodontic restoration of a growing patient has many problems, such as inability to adjust to surrounding tissue growth, so a transitional restoration stage is necessary. During this interval, removable and fixed prostheses can be used. A removable prosthesis (temporary denture) has many benefits, such as cheap price, easy fabrication and manipulation and so on. However, a temporary denture is prone to falling out because it is hard to get retention. Also, a temporary denture cannot guide soft tissue's contour to favorable state during a healing period. On the contrary, a fixed prosthesis can guide healing of soft tissue to a desirable state, resulting in a final prosthesis with ideal contour. In general, this final product is esthetically superior and has excellent retention, which prevents restoration from falling out. Although a fixed prosthesis with mini-implants requires additional surgery, it can be applied to cases without abutment teeth and provides good retention. This case report was presented in that a fixed prosthesis with mini-implants provided satisfactory results in function as well as esthetics in the 16-year-old patient who missed multiple anterior teeth due to trauma, and it was maintained without significant problems over the past year.

Poster 109

MEASURES STRENGTHENING BOND AT ZIRCONIA CORE-FELDSPATHIC VENEER INTERFACE

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Keywords: Microtensile bond strength, core-veneer interface, adhesive failure

Purpose/Aim: The purpose of this study was to evaluate whether a digital veneering system (DVS) strengthened the bond between a zirconia core and ceramic veneer by measuring the microtensile bond strength (MTBS) at the interface.

Materials and Methods: Group 1 (negative control) specimens were prepared using an untreated Lava zirconia core and Lava Ceram porcelain. Zirconia cores for groups 2 (positive control), 3, and 4 were sandblasted, treated with a coloring agent, and treated with a modifier, respectively. Lava DVS glass ceramic was used for group 5. Veneered zirconia discs were cut into stick-shaped bars with dimensions of 1 × 1 × 8 mm3 (n = 18 per group). MTBS tests were performed using a universal testing machine. Fractured surfaces were classified using a stereomicroscope. Indeterminable samples were further investigated with scanning electron microscopy and energy dispersive spectroscopy.

Results: Groups 1, 2, 3, 4, and 5 exhibited mean (SD) bond strengths of 28.1 (7.3), 27.8 (6.3), 30.0 (10.2), 32.9 (8.1), and 37.8 (8.1) MPa, respectively. The bond strength of group 5 was significantly greater than those of the negative and positive controls ($p < 0.05$). Most specimens showed cohesive failures, i.e., failures within the veneering ceramic.

Conclusions: Lava DVS may enhance the bond strength between a zirconia core and veneering porcelain, which indicates that this system would decrease the adhesive failure complications that frequently occur at the zirconia core-veneer interface.

Poster 110

FUNCTIONAL AND ESTHETICAL FULL MOUTH REHABILITATION WITH IMPLANT SUPPORTED PROSTHESES

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Keywords: dental implants, CAD-CAM, full mouth rehabilitation

Case Presentation: Background: Implant prosthesis is favorable treatment option which produces similar mastication force as natural teeth providing patient with high satisfaction and preventing severe alveolar bone loss. In addition, it is considered as an excellent alternative treatment option for the patient having trouble with using removable denture. Aim: The aim of this clinical report was to show the functionally and esthetically satisfying full mouth rehabilitation with implant supported all-ceramic and porcelain-fused-to-gold prosthesis. Methods: A 56 year-old female patient, complaining fracture of the prosthesis on the maxillary anterior teeth and discomfort with the mandibular removable partial denture. She wanted to remake the removable denture as fixed prosthesis with implants. Both maxillary posterior teeth were lost and removable partial denture on mandible was severely worn which allowing decrease in vertical dimension. As a result of clinical and radiological examination, it was decided to preserve all the remaining teeth. As well, vertical dimension were re-established with making temporary fixed prosthesis on maxilla and temporary removable complete denture on mandible. Using temporary denture, implant stent were constructed for taking radiographs. Implant fixture installation of 5 on maxilla with sinus lift and 6 on mandible with ramal bone graft were performed. Considering dietary habits of Korean, porcelain-fused-to-gold restoration were fabricated on both mandible and maxillary posterior teeth. Anterior to second premolar area were restored with all-ceramic using CAD/CAM zirconia core, respecting patient's high esthetic demand. Result: Treatment with positive outcome which satisfies both functional and esthetical aspect was obtained. During a 18 months of follow-up period, clinical and radiological conditions of the osseointegrated implants and the prosthesis were stable without any signs of inflammation or unexpected bone loss around the implants. Conclusions and clinical implications: Implant supported prosthesis was suitable for both functional and esthetical demand of the patient. In this case, patient's dietary habit or non-functional habit was considered when choosing the proper prosthesis as well. All-ceramic with zirconia core using CAD/CAM technology is advantageous treatment option with predictability for patient with high standard of esthetics.

Poster 111

EFFECT OF ZIRCONIA SURFACE TREATMENTS ON THE ADHESION WITH PORCELAIN

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Keywords: surface treatment, zirconia, veneer ceramic

Purpose/Aim: The goal of this study was to evaluate the effect of surface treatments on the interfacial adhesion between zirconia core and veneering ceramics.

Materials and Methods: Test 1: Fully sintered zirconia blocks, each with one polished surface, were treated with one of the followings: 1) no treatment, 2) airborne-particle abrasion with 50 μm alumina, and 3) airborne-particle abrasion with 125 μm alumina. Before veneering, either bonder or liner were applied on the zirconia surfaces. All veneered blocks were subjected to shear bond test. Test 2: The surfaces of fully sintered zirconia blocks received three different treatments: 1) bonder, 2) liner, or 3) no layer (wash-bake firing). All the treated zirconia blocks were veneered with either a) fluorapatite glass-ceramic or b) feldspathic porcelain. For the control group, the test surfaces of metal blocks were veneered with feldspathic porcelain. A half of the samples in each group were exposed to thermocycling, while the other half of the specimens were stored under dry conditions. All specimens were subjected to the shear bond test, and the fracture surfaces were microscopically examined. The elemental distribution at the core/veneer interface was analyzed.

Results: For the groups with bonder, air abrasion on Y-TZP surfaces provided greater bond strength than polishing. Application of liner on abraded zirconia surface yielded no significant influence on the adhesion. The specimens in bonder groups exhibited significantly greater mean bond strength values than those in liner group or no layer group. However, the mean bond strengths significantly decreased in the bonder groups after thermal cycling. The elemental analysis suggested diffusion of ceramic substances into the zirconia surface.

Conclusions: For the bonder, sandblasting was helpful in bonding with veneering ceramic, while it was ineffective for the liner. Although thermal cycling significantly reduced the interfacial bond strength, the bonder was beneficial to adhesion between veneering porcelain and zirconia.

Poster 112

INFLUENCE OF MICROGROOVE COLLAR DESIGN ON MARGINAL BONE RESORPTION

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Keywords: microtexturing, collar, implant

Purpose/Aim: The purpose of this study was to examine the influence of laser microtexturing of implant collar on peri-implant marginal bone loss

Materials and Methods: Radiographical marginal bone loss was examined in patients treated with implant-supported fixed partial dentures. Marginal bone level was examined with 82 implant fixtures installed in 53 patients at three periods (at the time of implantation, prosthetic treatment and 6 years after loading). Two types of implants were examined. The differences of bone loss between Silhouette IC, and Silhouette IC Laser-LokTM have been compared

Results: Within the limitation of this study, the following results were drawn.1. The marginal bone loss of Silhouette IC Laser-LokTM was less than that of Silhouette IC ($p<0.05$). 2. There was no significant difference in marginal bone loss between maxilla and mandible ($p>0.05$).3. There was no significant difference in marginal bone loss between anterior and posterior($p>0.05$)

Conclusions: The roughness and laser microtexturing of implant neck seem to affect these results. If an implant with collar length of biologic width, exposure of fixture is a possible complication especially in the anterior regions of dentition that demand high esthetics. Short smooth neck implant are often recommended in these areas which may lack the distance between microgap and the marginal bone level. In these cases, the preservation of marginal bone must be put into consideration. From the result of this study, it may be concluded that laser microtexturing of implant neck is helpful in the preservation of marginal bone. The firm attachment of the soft tissue is considered to be the main cause of this stabilizing effect.

Poster 113

THE IMPROVEMENT OF DURABILITY OF COATING LAYER WITH SILICA NANOPARTICLES

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Keywords: surface modification, denture base materials

Purpose/Aim: Hydrophobic interaction affects adherence of microbes to the acrylic denture materials surface. Hydrophilic surface modification by coating agent with silica nanoparticles prevents the adhesion of microbes to the acrylic denture base materials. Although silica coating agent have some possibilities to prevent the pollution of denture, there still remains some problems such as durability of coating layer. In preliminary experiment, diamond and platinum nanoparticles addition to silica coating agent suggests possible beneficial effects of improvement of durability and hydrophilicity of coating layer. With this back ground, the objectives of this study were to investigate an appropriate solid content concentration of silica nanoparticles for the improvement of durability of coating layer. And to investigate the effect of platinum and diamond nanoparticles addition to silica coating agent.

Materials and Methods: Heat-cure acrylic resin disks (GC, Acron) were separated into 3 groups; uncoated (treated with methanol), coated with silica coating agent and Platinum and diamond nanoparticles added to silica coating agent (Japan Nano Coat, Tokyo). Specimens were polished using silicon carbide paper up an abrasive grade of 1000. Before coating, specimens were ultrasonically cleaned for 10 min. They were coated twice with the dip-coating method. In this study, silica nanoparticles' diameter were 2-8 nm. To evaluate the durability of coating layer, the specimens were examined brush-wear test by denture brush for 200, 400 and 600 cycles, loaded 300 gf. In each cycle, the contact angle of water was measured in order to confirm the residual of coating layer. The contact angle was determined by measuring the angle of the tangent to the substratum surface of a liquid droplet. (VCA Optima, AST Products, Inc., USA) The measurement for each specimen was repeated twice on different areas of the surface, and the average contact angle was calculated. Statistical analysis was determined by IBM SPSS Statistics(ver.22) .

Results: Coated groups showed high hydrophilicity. After brushed 600 cycles, 0.5 and 0.75%wt group showed statistically high hydrophilicity. And an appropriate solid content concentration of Si coating agent is in 0.5-0.75%wt range. After brushed 600 cycles, all Pt and diamond added groups showed high hydrophilicity. In 1.0, 0.5 and 0.25%wt groups, Pt and diamond addition to Si coating agent indicates an inhibition of degradation of hydrophilicity.

Conclusions: 1. The appropriate solid content concentration of silica nanoparticle was in 0.5-0.75%wt range. 2. Platinum and diamond nanoparticles addition to the silica coating agent indicates an inhibition of degradation of hydrophilicity.

Poster 114

INCREASE IN OCCLUSAL VERTICAL DIMENSION AFFECTS ON RETENTION OF CONDITIONING

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Keywords: occlusal vertical dimension, memory, trigeminal system

Purpose/Aim: In aged mice, reduction of occlusion efficiency due to crown resection causes a decrease of sensory information input from the trigeminal system, the promotion of neuronal cell death in the basal forebrain and hippocampus,

and the learning and memory impairment. However, this has not been reported in the young and mature animals (Onozuka et al., Brain Res 1999). In our previous study, effects of vibration of masseter muscles on the isometric contraction were investigated to clarify how the activity of muscle spindles is involved in the regulation of the voluntary isometric contraction of masseter muscles. We demonstrate that the activity of spindle afferents plays a crucial role in regulating the isometric contraction of masseter muscles in the jaw-closed position, presumably through the calibration between the activity of spindle afferents and that of periodontal mechanoreceptor afferents. The purpose of this study was to reveal whether increasing occlusal vertical dimension caused learning and impairment of conditioning in the mature animals.

Materials and Methods: The present study examined the effects of an increased occlusal vertical dimension in hartley guinea pig (4-5week old) on acquisition and retension of passive avoidance conditioning. The occlusal vertical dimension was raised by fixation of a bite-raising appiance to the lower incisors, and increased by 3mm at the first molars. After the space produced between the upper and lower molars was filled within 7 days due to eruption of the molars, they were reared for 10-30 days and we evaluated the acquisition and retention of the passive-avoidance conditioning. Trials of learning for memory acquisition was performed. After the 1 to 14 days of trials, retention of conditioning was evaluated.

Results: A significant difference was observed between 6-day bite raising group and the control group only in acquisition trials after 7-day memory retension trials. A significant difference was also observed between 16-day or 56-days bite raising group and the control group in acquisition trials after 7 and 14-day memory retension trials.

Conclusions: It was concludeded that there was a tendency that the retention of conditioning decrease as the period of bite raising was longer. This result suggested, when chewing motion control mechanism dose not work because of the bite-rasing, the retension of coditioning decreased in mature animal.

Poster 115

THE REMOVAL TORQUE OF TITANIA NANOTUBES IN RABBIT TIBIA

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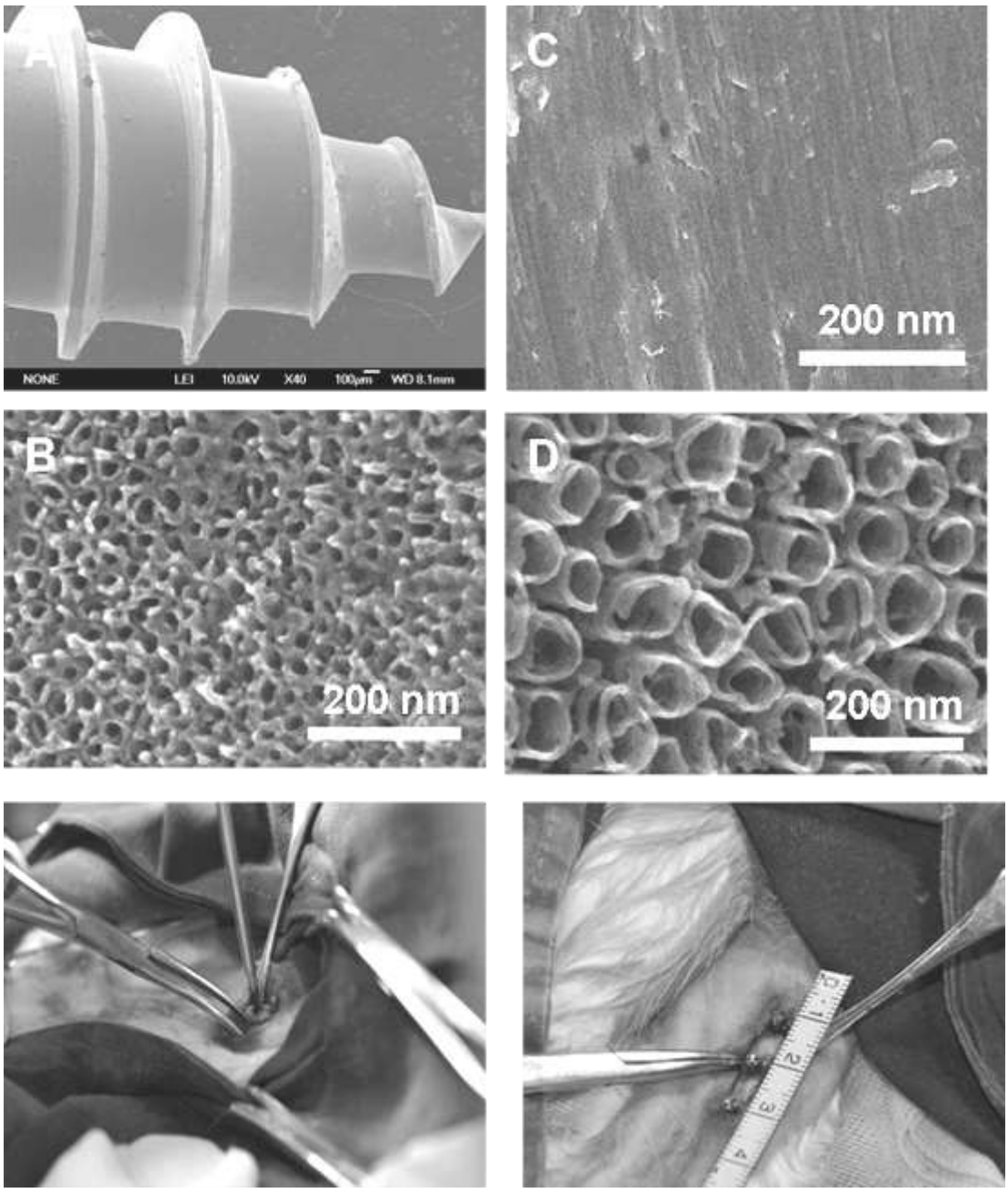
Keywords: Nanotubes, removal torque, rabbit model

Purpose/Aim: The removal torque, osteoblast adhesion and gene expression of different TiO2 nanotubes implant were evaluated with the rabbit model at 4 weeks.

Materials and Methods: A total of 24 custom-made, screw-shaped, commercially pure titanium implants with length of 6 mm and an outer diameter of 2.5 mm were divided into 3 groups. Group A: the control implant is machined. Group B: enght implants anodized with 30 nm nanotubes. Group C: enght implants anodized with 70 nm nanotubes. Four weeks post-surgically, the rabbits were sacrificed, Subsequently, the leg was stabilized and the implant was removed under reverse torque rotation with a digital torque gauge. Osteoblast adhesion was analyzed with scanning electron microscope. the gene expression of alkaline phosphatase (ALP), osterix (Osx), collagen-I (Col-I) and tartrate-resistant acid phosphatase (TRAP) was examined by using real-time PCR.

Results: The area of osteoblast adhesion on 70 nm TiO2 nanotube layer was larger than that on machined titanium and 30 nm TiO2 nanotube layer. The removal torque strength was significantly higher for 70 nm nanotube implants (13.28±3.18 kgf) than the machined implants (controls) (8.18±2.59kgf) at 4 weeks after implantation ($p<0.05$). The gene expression levels of the bone around implants with 70 nm nantubes were increased than those with machined and 30 nm nantube implants.

Conclusions: The implants with large diameter nantubes achieved favorable osteoblast response and a high interfacial strength at an early implantation period compared with the machined titanium implants and small diameter nantube implant.



Poster 116

EFFECT OF ZN ON CORROSION RATE OF SURFACE-TREATED MG-ZN ALLOY

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Keywords: Mg-Zn alloy, biodegradable implant, corrosion resistance

Purpose/Aim: Magnesium has excellent biological activity as a biodegradable implant material, but it is difficult to apply to a rapid corrosion rate expressed in vivo. Therefore, this study was to evaluate the effective amount of zinc to lower the corrosion rate by the surface treatment of zinc alloy to lower the corrosion rate.

Materials and Methods: Specimen was classified into 3 groups; control group(pure Mg), Mg-0.5 wt.% Zn alloy, Mg-1.0 wt.% Zn. There were 6 samples in each group and 3 samples of 6 were coated with hydroxyapatite sol, and the other 3 samples were coated with ß-Tricalcium phosphate. The corrosion rate of coated magnesium-zinc alloy was investigated in order to determine the corrosion characteristics in the Tas-SBF (Tas-simulated body fluid) solution through the hydrogen emission test.

Results: Hydrogen emission amount were higher in the order Mg> Mg-1.0 wt.% Zn> Mg-0.5 wt.% Zn specimens of the HA-coated and ß-TCP coated. That showed that the corrosion rate of pure magnesium is the fastest, Mg-0.5 wt.% Zn alloy is the slowest. Zinc can effectively decrease the corrosion rate of magnesium alloys. Mg-0.5Zn alloy can decrease the corrosion rate of magnesium alloys more effectively than Mg-1Zn alloy.

Conclusions: With the findings from this study, evaluation of corrosion resistance on the alloys of the different ratios containing calcium seems to be required for the development of a suitable biodegradable implant material in vivo.

Poster 117

NGF'S EFFECT ON TITANIUM-IMPLANTS OSSEOINTEGRATION IN TYPE 2 DIABETIC RATS

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Keywords: osseointegration, nerve growth factor, Titanium implants

Purpose/Aim: Compared with the general population, there is poorer quality osseointegration and a higher failure rate in patients with type 2 diabetes mellitus (DM). The aim of the present study was to investigate the effects of local injection of nerve growth factor (NGF) at the implant-bone interface after implantation in diabetic rats.

Materials and Methods: GK rats (10-weeks-old Goto-Kakizaki Wistar rats, n = 30) were used as a model of type 2 DM, and Wistar rats were used as controls (n = 15). GK rats were divided into two groups: those with DM alone (DM group) and those with DM given nerve growth factor (NGF group) (n = 15 in each group). Titanium implants were placed in the tibia of each animal. Immediately postoperatively, 15 GK rats were injected NGF 0.4μg /day intramuscularly around implant, daily for 7 days. While the other 15 GK rats as well as 15 Wistar rats received normal saline in an identical manner. The rats were sacrificed at 2, 4, and 8 weeks following implant surgery. The histological features and fluorochrome labeling changes of bone around implants on the non-decalcified sections were investigated by using traditional light-and confocal laser scanning microscope.

Results: Clinical Observations: During the experiment, diabetic animals showed significantly greater serum glucose levels

than controls (P<0.01). While there were no significant differences in serum glucose between NGF groups and diabetic groups. Fluorochromes Microscopy Imaging The calcein-labeled lines (green) ration in the ROI (mm/mm2) was 6.47±1.36 for control groups, 3.42±1.31 for diabetic groups and 5.18±1.82 for NGF groups. There were significant differences between NGF groups and diabetic groups (P<0.05). Histological Observation 1. Direct bone-implant contact (BIC) in cortical area was 36.97±3.23% for control groups, 22.11±3.84% for diabetic groups and 36.97±3.23% for NGF groups. One-way ANOVA plus Turkey test found significant differences between NGF groups and diabetic groups (P<0.05) 2. Bone volume associated with implants placed in NGF groups and control groups was greater than in diabetic groups. Total bone volume in marrow zone in control and NGF groups was 34.95±5.81% and 28.59±2.95%, compared to 19.29±5.12% in diabetic groups, a significant difference (P< 0.05). There were significant differences between control groups and diabetic groups (P<0.05), while the figures were very similar between control groups and NGF groups.

Conclusions: Local injection of NGF could improve implant-bone osseointegration in diabetic rats and may have important clinical implications.

Poster 118

CBK (CRANIAL BALANCING KEY) SPLINT & ANTI-AGING EFFECT

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Keywords: CBK splint

Case Presentation: CBK(cranial balancing key) splint & Anti-aging effect D.D.S., Ph. D., F.I.C.D., Byung kee Choi* ABSTRACT CBK (cranial balancing key) splint is an individual occlusal stabilizing appliance that gives space a thickness of 1.5-2mm to occlusally adjusted posterior area. CBK splint, using night time and workout, reduces the occlusal stress occurred by bruxism or swallowing force. And it protects the teeth and releases the buzzing in the ears, rhinitis, and migraine by effects on the central and peripheral nervous system through the traction of the atlas (C1) and axis (C2). 9 cranial nerves affect the "temporo-mandibular joint". Especially, 5th cranial nerve (trigeminal nerve) is connected to axis. * effects of the CBK splint 1. secure normal TMJ disk space 2. release related nuchal muscles, which constricted and tensed, by upper cervical vertebrae traction 3. promote stability of cranial bone motion 4. remove occlusal interferences and their effect on the cranium 5. remove imbalance of temporal and sphenoid bone Most patients have occlusal diseases such as attrition, abfraction, hypersensitivity, muscle pain etc. After taking occlusal adjustment by T scan, we tried to make ideal occlusion nevertheless our patients have slide in centric. CBK splint reduces the deteriorating force during night by complete releasing of the inferior belly of lateral pterygoid muscle. And it also makes good periodontal conditions by reduced occlusal force. Secondly, most patients using CBK splint have good sleep because of reduced occlusal force which occured by swallowing once a minute while sleep. Third, CBK splint so assigns tensile force on TMJ that makes normal alignment of atlas and axis. It improves the immune system and homeostasis by cranial balancing key effect. Fourth, most people have asymmetrical face. Using CBK splint makes symmetrical facial appearance by releasing of the parieto-temporal and occipito-temporal suture fixation. Conclusion Key of the immune system is putting CBK splint on along with a correct posture of spine, straight walking, abdominal breathing, proper dietary life and positive attitude. CBK splint helps to improve the level of immunity by recovering the spine and cranium which is crucial to regulation of autonomic nerve system. The essences of CBK splint are different thickness from existing splints, different concept of intra-oral treatment such as occlusal adjustment, and connect concept of occlusion to health of whole body by spinal stretching exercise combined with CBK splint. CBK splint might be one of solution for the aging induced by the distortion of spine and cranium, caused by the irritating occlusal force.

Poster 119

ACCURACY OF DIFFERENT DENTAL IMPLANT IMPRESSION TECHNIQUES COMPARING DIFFERENT IMPRESSION MATERIALS AND DIGITAL IMPRESSION

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Purpose/Aim: The aim of this in vitro study is to evaluate the accuracy of 8 implant impression techniques for fabrication of multiple-implant prostheses.

Materials and Methods: A master cast was used representing a jaw in which 4 implants were placed at the level of the canines and the first molars.

Impressions of the master cast were taken using different materials (Impregum Penta, Ramitec Penta 3M ESPE; BF Plaster, Dental Torino, Italy) and different techniques (snap-on impression, pick-up impression and digital impression) For each of the traditional techniques 5 impressions of the master cast were taken. Casts were realized from the standard impressions. A total of 15 digital impressions were taken.

A three-dimensional CMM (Coordinate Measurement Machine) was used in a specialized laboratory to measure the master model in order to obtain the actual data of the three-dimensional position of the implants.
Distances among the implants and angle values for each implant in the casts derived from traditional impressions were calculated thanks to the CMM. These data and STL files from the digital impressions were compared with the data of the position of the implants in the master cast.

The best and the worst impressions made with traditional techniques as well as the best and the worst impressions made with digital impression (as assessed by the CMM) were selected in order to fabricate 4 milled titanium bars. The accuracy of the frameworks was evaluated by the Sheffield's test. An optical microscope with a 120x magnification was used to measure the accuracy of the interface between the abutment analogues incorporated in the cast and the metal frameworks.

Results: Significant differences in accuracy were found comparing the impression techniques by CMM and through Sheffield test. Digital impression performed the best, followed by plaster impression. These techniques also revealed the lowest variation. Traditional impression techniques revealed a greater variability in the results.

Conclusions: Digital impression showed the best accuracy among the tested techniques and seems a viable alternative to traditional impression techniques for fabrication of full-arch implant-supported prostheses. Among traditional impressions, the open tray technique using rigid materials exhibited the greatest accuracy.

NOTES

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