13th Biennial Meeting

International College of Prosthodontists

Cape Town, South Africa
September 10 - 13, 2009




Conference Program

with generous financial support from

Southern Implants
Nobel Biocare
Straumann

an international fellowship dedicated to the advancement of Prosthodontics

SOUTHERN IMPLANTS

At **Southern Implants**, we have been providing innovative solutions to dental professionals since 1987. Solutions like the **MAX Implants** - the first implants for immediate placement in a multi-rooted molar socket. Solutions like the **Co-Axis Implants** - the only angled, threaded implants that enables placement in available bone and facilitates an ideal aesthetic emergence profile.

Keep your practice growing and your patients smiling. Contact your **Southern Implants** representative today and find out how bright ideas lead to better results.

Shine

The **Brightest Ideas** In Dental Implants

For more information, contact Southern Implants
Tel: 0027 12 667 1046. Fax: 0027 12 667 1029
E-mail: info@southernimplants.com

www.southernimplants.com

NobelProcera™

Full zirconia product assortment in four colors.

white light medium intense

Certified for excellent material homogeneity and purity

Excellent flexural strength and no degradation in strength compared to white zirconia*

Innovative coloring technique

Excellent esthetic results supported by the coloring of the underlying framework

5 YEAR PRODUCT WARRANTY NobelProcera™

* Nordic Institute of Dental Materials (NIOM) NobelProcera™ Zirconia testing: S306269B, S306205B.
** Products for NobelActive™ platform are currently under development.

Following the success of shaded NobelProcera Zirconia Crowns, the same colors are now available for the full assortment** – crowns, copings, bridges, abutments, implant bridges. The innovative coloring technique ensures excellent material homogeneity, consistent color throughout frameworks. External studies show no degradation in strength compared to white zirconia*. NobelProcera offers solutions for all indications – single crowns, bridges up to 14 units, cemented or screw retained, fixed or removable prosthetics on natural teeth and implants. NobelProcera provides extensive experience and access to a quality-assured centralized industrial manufacturing. Precision of fit, quick turnaround times, consistent and predictable results – you will enhance your customer satisfaction and the efficiency of your practice.
Nobel Biocare is the world leader in innovative evidence-based dental solutions.
For more information, contact a Nobel Biocare Representative at +27 11 802 0112 or visit our website.

www.nobelbiocare.com/nobelprocera

Nobel Biocare South Africa (Pty) Ltd
Tel: +27 11 802 0112, Web: www.nobelbiocare.com

Finally you can achieve a twofold long-lasting high-strength bond in one step to tooth structure AND to aesthetic restorations, especially zirconium.

Resin luting re-defined: new **G-CEM Automix** from **GC**.

Use G-CEM Automix and enjoy:

- one step mixing – the work is done for you
- one step application – direct delivery, even in the root canal
- one step cleanup – precise removal of all excess

With an ideal setting time and the reliable results you've come to expect from GC.

GC EUROPE N.V.
Head Office
Tel. +32.16.74.10.00
info@gceurope.com
www.gceurope.com

GC UNITED KINGDOM Ltd.
Tel. +44.1908.218.999
info@uk.gceurope.com
www.uk.gceurope.com

GC

International College of Prosthodontists

ICP welcomes our colleagues and guests to Cape Town, South Africa

13th Meeting of the

International College of Prosthodontists

Cape Town, South Africa
September 10-13, 2009

International College of Prosthodontists
PO Box 99119
4425 Cass Street, Suite A
San Diego, CA 92109
Tel: 858 270-1814 Fax: 858 272-7687
Email: icp@icp-org.com
Web Site: www.icp-org.com

International College of Prosthodontists

Table of Contents

Conference Supporting Organizations

Academy of Prosthodontics of South Africa

Prosthodontic Society of South Africa

ICP Organizational Members

Academy of Australian and New Zealand Prosthodontists
http://www.aanzp.com.au

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

Academy of Prosthodontics of South Africa
E-mail Address: dgh@howes.co.za *(Web site forthcoming)*

American Academy of Maxillofacial Prosthetics
http://www.maxillofacialprosth.org

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

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

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

Chinese Prosthodontic Society

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

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/english/index.htm

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

Norwegian Association for Prosthetic Dentistry
http://www.tannlegeforeningen.no/cda/zonepg.aspx?zone=110

Swedish Society for Prosthodontics
http://www.sfop.se

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

Dear Colleagues – Welcome to Cape Town !!

We can confirm that the Scientific Chairs - Drs Nicola Zitzmann and Sreenivas Koka - have developed an exciting scientific program which will cater for the spectrum of interests for our members. In addition the uniquely beautiful harbor location will be an attraction for our social and cultural programs.

A new initiative for the 2009 meeting is the Postgraduate Student Forum. This is being planned as a mentored session conducted by postgraduate students. Our Student Forum provides an opportunity for colleagues to interact, exchange ideas and develop friendships.

We are delighted to acknowledge our current Sponsors: Southern Implants, Nobel Biocare and Straumann. Sponsors are appreciated for their collaboration with the ICP and recognized as integral to the program's success. Other corporate partners will join us in Cape Town and we encourage all delegates to visit each booth location and review the latest in products and services.

The ICP is committed to the philosophy of inclusion of both prosthodontists and prosthodontic organizations nationally and internationally, and we especially welcome our Organizational Members. The goal of this program as well as the ICP's commitment to global outreach is to foster educational, clinical and cultural interactions and create opportunities to share knowledge and expertise. Its goal is to advance the art and science of prosthodontics for community benefit.

Yours Sincerely,

Dr. Iven Klineberg
ICP Co- President
Dental Clinical School,
Westmead Hospital
Westmead, Australia

Dr. Jaime Gil
ICP Co- President
Albia Dental Institute
Balbao, Spain

14th Meeting of the

International College of Prosthodontists Hilton Waikoloa Village, Big Island, Hawaii September 8-11, 2011

Hilton Waikoloa Village

62 acres of fun, the Hilton Waikoloa Village's 1500 rooms and suites are artistically set among tropical gardens, exotic wildlife, cascading waterfalls, tranquil lagoons and waterways, awaiting your arrival by the hotel's exclusive tram or boat. Fresh from a $6 million makeover, the Hilton Waikoloa Village recently unveiled the new Dolphin Quest Village and the "coolest pools in Hawaii," along with extensive indoor and outdoor meeting and event venues, a seaside putting course, world-class tennis, the luxurious Kohala Sports Club & Spa, nine international cuisine restaurants, the Museum Walkway, Camp Menehune children's program and Hawaiian cultural activities. With something different every day, Hilton Waikoloa Village is a favorite for families on the go.

Guests traverse the resort aboard mahogany boats that cruise tranquil waterways or in Swiss-made trams. Award-winning restaurants, shops and galleries invite exploration amid breathtaking scenery, lush tropical landscaping and abundant wildlife.

- Exquisite guestrooms ranging from standard accommodations to fabulous suites
- 1240 guestrooms in three towers
- Three pools – two large pools featuring waterfalls & slides, one for adults only
- Snorkel or kayak in an ocean-fed lagoon
- Dolphin Quest Learning Lagoon (independently owned and operated)
- 8 tennis courts
- Two championship golf courses – 36 holes
- 18 hole seaside putting course
- Children's Program – Camp Menehune®
- 9 restaurants offering distinctive cuisine – Pacific Rim, Japanese, Chinese and casual American cuisine
- Nightly entertainment
- Tuesday and Friday night luau, "Legends of the Pacific"
- World-renowned Kohala Spa
- Exciting shops specializing in clothing, art, jewelry, sundries and Big Island souvenirs
- Hilton Waikoloa Wedding Planner Atelier specializes in perfect weddings at our breathtaking oceanfront Hale Aloha Chapel or wedding gazebo
- Tour & Activity Travel Desk
- 235,000 sq. ft. of exceptional and flexible indoor/outdoor facilities for meetings, conventions and special events

The New Fully Digital System with Flat Panel Detector

3D Accuitomo XYZ Slice View Tomograph

The next generation digital X-ray sensor, equipped with a flat panel detector (FPD), offers you high-quality radiographs at minimum effective dose.

- **Two Sizes of Imaging Areas**
  ϕ40×H40 ϕ60×H60
- **High resolution for large imaging area**
  Voxel size 0.125 mm, high resolution (2.0 lp/mm)
- **Low effective dose**
- **Wide dynamic range and expressive tone create brilliant images of both soft and hard tissue areas.**

Manufactured by
J.MORITA MFG.CORP.
www.jmorita-mfg.co.jp Tel:075-611-2141

J.MORITA CORPORATION
Tokyo Head Office : 11-15,
2-Chome Ueno,Taito-ku,Tokyo,110-8513
tel : 03-3834-6161
Osaka Office : 33-18, 3-Chome Tarumi-cho,
Suita, Osaka, 564-8650
Tel : 06-6380-2525

Thinking ahead. Focused on life.

www.dental-plaza.com

MORITA

Sponsors

SOUTHERN IMPLANTS
No 1 Albert Road Irene 0062
P O Box 605 Irene 0062
Tel: 012 667 1046
Fax: 012 667 1029
Email: sue@southernimplants.com
Website: www.southernimplants.com
Advertisement: inside front cover

INSTITUT STRAUMANN AG
Peter Merian-Weg 12
CH- 4052 Basel, Switzerland
Phone: +41 61 965 1111
Fax: +41 61 965 1101
Email: info@straumann.com
Website: www.straumann.com
Avertisement: inside back cover

NOBEL BIOCARE SOUTH AFRICA (PTY) LTD
Unit E105, Yellow Wood Place
Woodmead Business Park,
145 Western Services Rd, Woodmead, SA
Tel: +27 11 802 0112
Fax: +27 11 802 0120
Web: www.nobelbiocare.com
Email: info.southafrica@nobelbiocare.com
Advertisement: page 1

Patron

GC EUROPE N.V.
Interleuvenlaan 33
3001 Leuven, Belgium
Tel: +32 16 74 10 00 Fax: +32 16 74 11 99
Email: info@gceurope.com
Website: www.gceurope.com
Advertisement: page 2

Gold Exhibitors

DMG
Chemisch-Pharmazeutische Fabrik GmbH
Elbgaustrasse 248
22547 Hamburg, Germany
Tel: +49 40 84006 0 Fax: +49 40 84006 222
Email: info@dmg-dental.com
Website: www.dmg-dental.com
www.drilling-no-thanks.com
Advertisement: page 192

J MORITA CORPORATION
11-15, 2-Chome, Ueno, Taito-ku, Tokyo 110-8512
Tel: +81 3 3834 6161
33-18, 3-Chome, Tarumi-cho, Suita, Osaka 564-8650
Tel: +81 6 6380 2525
Website: www.jmorita.com/
Advertisement: page 9

Exhibitors

3M ESPE DENTAL PRODUCTS
3M South Africa (Pty) Ltd
146a Kelvin Drive, Woodmead 2191
Tel: +27 11 806 2240 Fax: +27 11 806 2138
Email: za3mespe.co.za
Website: www.3mespe.co.za

Products, services and trusted brands: LAVA™, Filtek™ Restorative Materials, Impregum™ Impression Materials and Pentamix™ Automatic Mixing Unit, RelyX™ Cements, RelyX™ Fiber Posts, Adper™ Adhesives, Sof-Lex™ Finishing and Polishing Systems, Clinpro™ Preventation and Local Anaesthetic. Products are available for purchase through authorized 3M ESPE distributors. For more information on the complete 3M ESPE range of dental products, visit the 3M ESPE Web site at www.3mespe.co.za.

BIOHORIZONS
2300 Riverchase Center
Birmingham, AL 35244
Tel: 1 205 967 7880 Fax: 1 205 870 0304
E-Mail: http://www.biohorizons.com/contact.aspx
Website: www.biohorizons.com

Products: Dental implants, surgical planning software, regenerative products, CAD/CAM and traditional dental restorations. Sales force in the USA, Canada, Spain, United Kingdom, Germany, Australia and Chile. Products are distributed via a network of independent distributors.

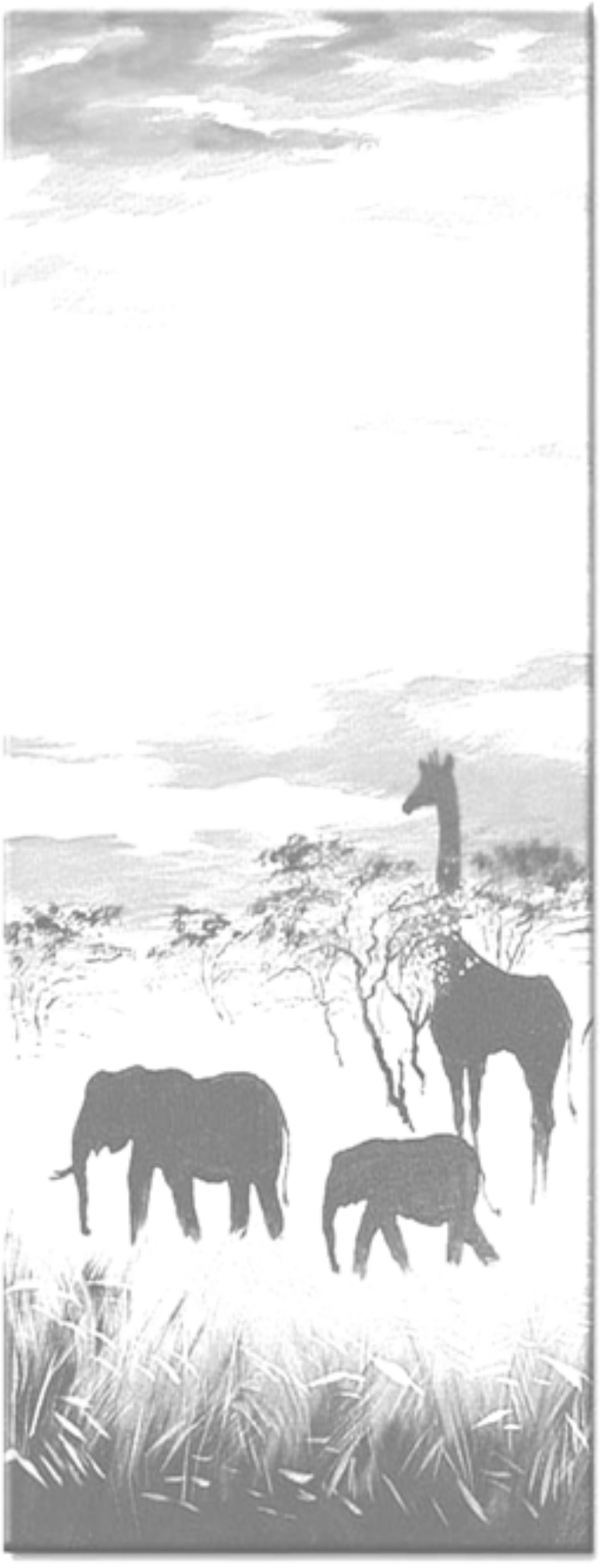
CONDYLATOR SERVICE
Bellariastrasse 48
CH- 8038 Zurich, Switzerland
Tel: 41 44 481 83 42 Fax: 41 44 482 17 85
Email: gerber@condylator.com
Website: www.condylator.com

ISS IMPLANT SUPPORT SERVICES
Hazel Close Office Park unit 1D
141 Witch Hazel Avenue
Highveld Techno Park, Centurion
Tel: +27 12 665 4631 or +27 21 851 4875
Fax: +27 12 665 0631
Email: Info@implant.co.za or bruce@implant.co.za
Website: www.implant.co.za

SIRONA DENTAL SYSTEMS
Fabrikstrasse 31
64625 Bensheim, Germany
Tel: +43 662 2450 635 Fax: +43 662 2450 640
Email: contact@sirona.de
Website: www.sirona.com

The Program Committee wishes to thank our Sponsors, Patrons, and Organizations for their generous support. We encourage all delegates to visit exhibit booths to review the latest advancements and services in the field of Prosthodontics.

ICP Officers and Board of Councilors 2008-2009



Presidents

Dr. Jaime Gil
Bilbao, Spain

Dr. Iven Klineberg
Westmead, Australia

Vice Presidents

Dr. Sang-Wan Shin
Seoul, Korea

Dr. Thomas D. Taylor
Farmington, CT USA

Secretary

Dr. Rhonda Jacob
Houston, Texas USA

Treasurer

Dr. C. Peter Owen
Johannesburg, South Africa

Board of Councilors

Dr. Mario Bresciano
Torino, Italy

Dr. Martin D. Gross
Tel Aviv, Israel

Dr. Asbjörn Jokstad
Toronto ON Canada

Dr. Yoshinobu Maeda
Osaka, Japan

Dr. Keiichi Sasaki
Sendai, Japan

Dr. Joerg R. Strub
Freiburg, Germany

Dr. Ann Wennerberg
Goteborg, Sweden

Dr. Johan Wolfaardt
Edmonton, Alberta Canada

2009 Scientific Program Committee

Dr. Sree Koka
Rochester, MN USA

Dr. Nicola Zitzmann
Basel, Switzerland

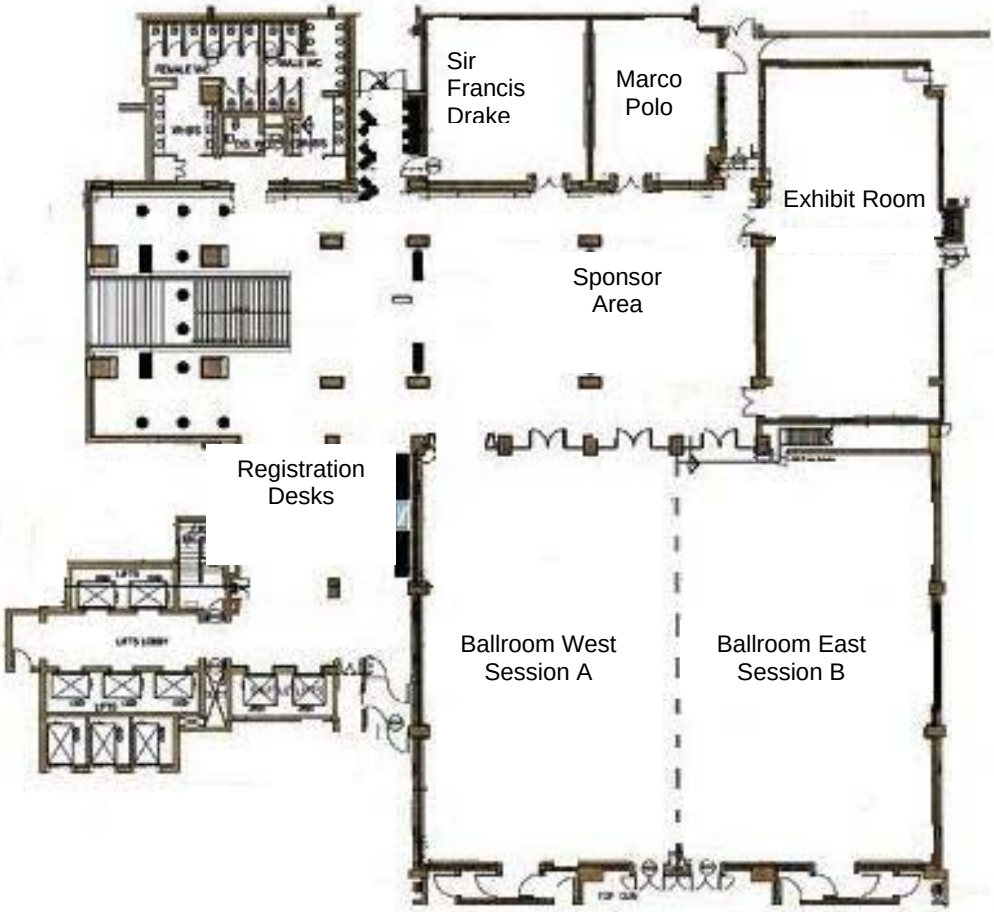
Immediate Past Presidents (2007-2008)

Dr. Kiyoshi Koyano
Fukuoka, Japan

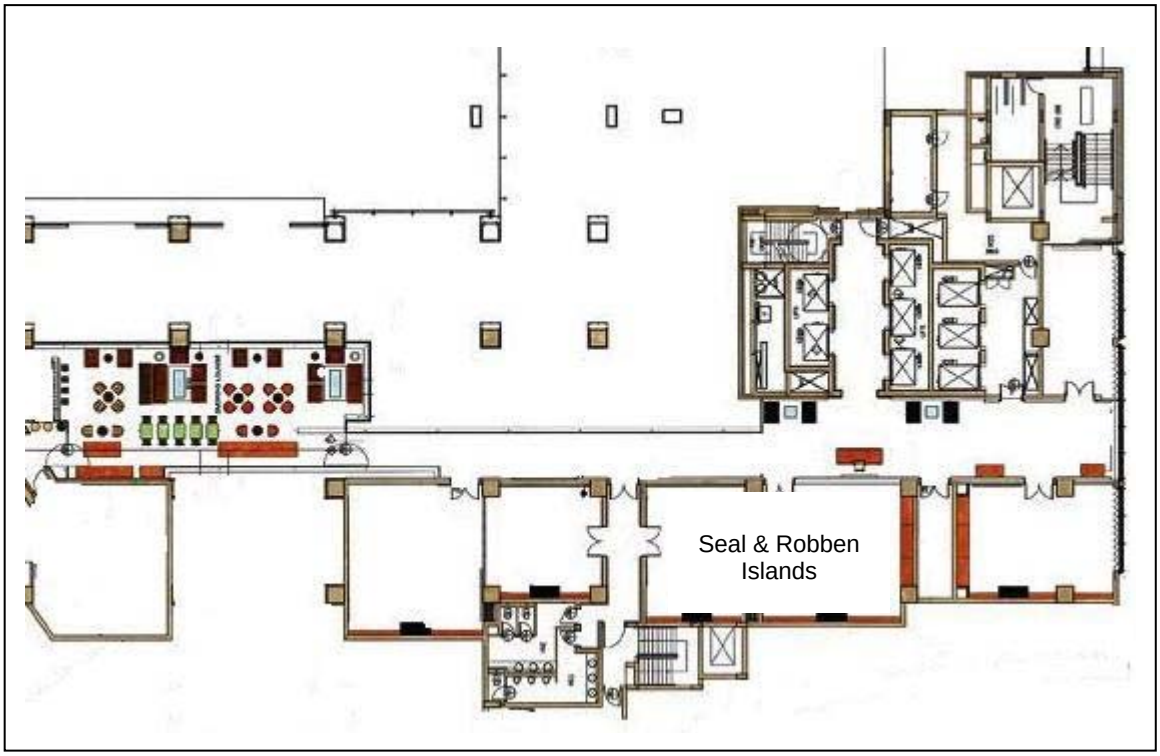
Dr. Regina Mericske-Stern
Bern, Switzerland

Hotel Map

Old Harbour Level Venues



The Bridge Level Venues



International College of Prosthodontists

Conference Overview

Wednesday, Sept. 9th		**Location**
08:00 - 17:00	ICP Board Meeting (Officers/Councilors only)	**Seal Island / Robben Island**
Thursday, Sept. 10th		
08:00 - 14:00	ICP Board Meeting (Officers/Councilors only)	**Seal Island / Robben Island**
14:00 - 17:00	**Poster Session - Competition Review**	**Grand Ballroom / Foyer**
14:00 - 17:00	**ICP Graduate Student Treatment Planning Session**	**Sir Francis Drake**
17:00 - 19:00	**Welcome & Poster Reception**	**Grand Ballroom / Foyer**
Friday, Sept. 11th		
09:00 - 12:30	Focus Session- Keynote Presentations	**Grand Ballroom**
12:15	Discussion	
12:30 - 14:00	Conference Luncheon	**Old Harbor Lobby / Thirty 7**
14:00 - 17:15	Concurrent Session A	**Ballroom West**
14:00 - 17:15	Concurrent Session B	**Ballroom East**
19:00	**Exhibit Reception**	**Grand Ballroom / Foyer**
Saturday, Sept. 12th		
08:00 - 17:00	Concurrent Session A	**Ballroom West**
08:00 - 17:00	Concurrent Session B	**Ballroom East**
08:00 – 12:30	Concurrent Session C: Maxillofacial Rehabilitation	**Sir Francis Drake**
12:30 - 14:00	Conference Lunch (non-members)	**Conference Lobby**
12:30 - 14:00	ICP Business Luncheon (members only)	**Thirty 7 Restaurant**
17:00	Session Adjourns	
19:30	**ICP Reception & Banquet (reservations required)**	**Grand Ballroom/ Foyer**
Sunday, Sept. 13th		
09:00 - 12:50	Focus Session- Keynote Presentations	**Grand Ballroom**
12:30	Discussion	
12:50	Conference Announcements - 2011 Meeting: Big Island, Hawaii	**Grand Ballroom**
13:00	Conference Adjourns	
13:00	ICP Board Meeting (Officers/Councilors only)	**Sir Francis Drake**
16:00	**ICP Social Outing (elective)** ***Spier Vineyard Wine Tasting and Moyo African Dinner***	

Conference Social Events

Thursday, Sept. 10th

17:00 - 19:00 Welcome & Poster Reception

Pick-up your program books, conference credentials and support your colleagues by reviewing their posters. Poster Session is scheduled from 2:00pm - 4:00pm. Posters will remain up throughout the Welcome Reception for all to review. Entertainment, Light appetizers, beer and wine will be available for your pleasure.

No fee required

Dress: Casual

Friday, Sept. 11th

19:00 Exhibit Reception

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. Entertainment, light appetizers, beer and wine will be available for your pleasure.

No fee required

Dress: Business Casual

Saturday, Sept. 12th

19:30 ICP Reception & Banquet

All delegates and guests (guest fee required) are encouraged to attend this gala event for the recognition of participating countries and their representatives, presentation of awards and installation of new officers. Entertainment, light appetizers, dinner and wine is included in this banquet event.

No fee required

Dress: formal optional, suits for men / evening dress for ladies or traditional dress of your country acceptable

Sunday, Sept. 13th

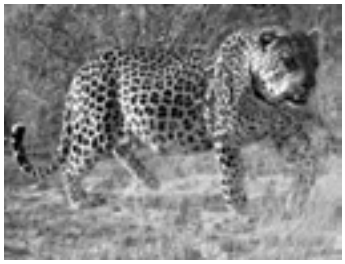
16:00 ICP Social Outing: Wine Tasting at Spier Vineyards & African Dinner at Moyo

Spier Vineyards - One of the most famous sites in the Cape Winelands, the Spier estate near Stellenbosch proudly offers award winning wines in the beautiful setting of an historic 1000-hectare wine estate. The wine tasting experience is a guided tasting of wines at a selected site, including both Classic and Private Collection Range Wines from Spier. A Wine Educator will provide valuable insight into the Spier Collection and their mission and vision.

Moyo at Spier, unlike any other restaurant, is set under the starlit African sky, set in a garden in the Western Cape Winelands. Bedouin tents and gazebos are placed throughout the garden and create a setting similar to a nomadic African village. This unexpected delight in the Winelands is set to the humming and ululating voices of performing artists, pushing the boundaries of African art to the limits.

Transportation Fee: $75/person (delegates and paid guests)
Dress: Casual

Conference Elective Activities



Friday, Sept. 11th

09:00 - 13:00 Half Day Cape Town City Tour

Includes Pan African Market & Three Course Lunch

This tour highlights the Castle of Good Hope, the flower sellers in Adderley Street, Company Gardens and Parliament Buildings, the City Hall, St. George's Cathedral and the South African Museum. Visit to the Great Synagogue and Holocaust Museum, Greenmarket Square and eclectic Long Street. Explore the Malay Quarter [also known as the Bo- Kaap] which means "Above Cape" because of its location up against the slopes of Table Mountain. Our route then leads us to the magnificent Table Mountain. The ascent up Table Mountain is a short cable car ride to reach the top, from here you will have magnificent views of the City Centre below, the Table Bay harbour and the distant Cape Flats and the Cape Winelands.

Please Note: weather permitting

Fee: $70/person Dress: Casual

Saturday Sept. 12th

09:00 - 17:00 Full Day Cape Peninsula Tour

Includes: Three Course Lunch

A beautiful coastal drive along the "Atlantic Seaboard" passing several sandy beaches, coves, and luxury villas before travelling through the fishing village of Hout Bay. Then travel along scenic Chapmans Peak Drive (subject to being open) before reaching the "rural" village of Noordhoek. Continue through OceanView, Misty Cliffs and Scarborough in order to reach the Cape of Good Hope Nature Reserve.

From the uppermost viewpoint (also at the base of the old lighthouse) view the "traditional" tip of Africa. Breathe the freshest air in the world - straight from the Antarctic Situated in the 22 100 hectare Table Mountain National Park, a natural World Heritage Site. The tour continues on to Boulders Beach, a great place for photographing some of the residents, land-based African (Jackass) Penguin colony. Continue on through the Naval town of Simons Town, before following a coastal route through Glencairn, Fish Hoek, Kalk Bay and Muizenberg then detour inland towards the Kirstenbosch Botanical Gardens

Fee: $90/person Dress: Casual

Mon, Sept. 14th - Thurs, Sept. 17th

Post Conference Safari - Shamwari Game Reserve

Includes: Accommodations, all meals, 2 game drives per day with guide, selected beverages and taxes

After our ICP meeting in Cape Town we offered colleagues a wonderful opportunity to take that African Safari they have always dreamed of… Shamwari Private Game Reserve, located a short distance from Port Elizabeth. Our post conference tours are a great opportunity to visit with colleagues that you have not seen in years and meet new friends. Shamwari offers malaria free, first class accommodations, opportunities to see all the "big five" in one location and ease of travel from Cape Town.

2008-2009 Scientific Program Chair Welcome Letter

It has been two years since we first received the invitation to be Scientific Program Co-Chairs for the 2009 International College of Prosthodontics (ICP) Biennial Meeting. We are humbled and honored by this opportunity and sincerely hope that you enjoy the program that has been assembled. With this meeting, the ICP can truly lay claim to being the premier international prosthodontic organization since the last five meetings have been held on five different continents (2009: Africa [Cape Town, South Africa]; 2007: Asia [Fukuoka, Japan]; 2005: Europe [Crete, Greece]; North America [Halifax, Canada]; and 2001: Australasia [Sydney, Australia]).

This program is especially noteworthy for two new sessions on the schedule. First, a graduate student treatment planning session, organized by Dr. Martin Gross, will take place on the afternoon of Thursday September 10th. Second, a Maxillofacial Rehabilitation session, organized by Dr. Arun Sharma, is scheduled for the afternoon of Saturday September 12th. Combined with the traditional program schedule, these are two exciting opportunities for additional education.

It is ICP Board policy that invited speakers do not receive any reimbursement for travel, lodging and meals nor do they receive an honorarium. The invited speakers represent all corners of the globe and bring enormous experience and wisdom to the podium to share with you. Truly, their participation represents a wonderful spirit of volunteerism and professional service and, in these uncertain economic times, we wish to express special gratitude to them for accepting our invitation to participate in the program. In addition, we thank every presenter and meeting attendee for your willingness to make the journey to Cape Town and ensure the success of the meeting and consolidate the role of the ICP as the leading international prosthodontic organization.

In closing, we would like to acknowledge the privilege it has been to serve the ICP as Scientific Program Co-Chairs. We offer special congratulations to the ICP Co-Presidents Jaime Gil and Iven Klineberg and thank them for their service to the ICP. The team at RES Inc, led by Mr. Eben Yancey, has been instrumental in organizing this meeting and we thank them also. In addition, we would like to thank Peter Owen for the local support and the help in organizing the exceptional agenda with social outings around the scientific program. However, at the end of the day, it is for you, the meeting attendees to determine whether we have been successful in organizing a high-quality program. We trust that the program meets your expectations.

Finally, we hope that you cherish your time in Cape Town and leave with exceptional memories of our time together at the 2009 ICP meeting. Thanks for being here!

Sincerely,

Nicola U. Zitzmann, Dr med dent, PhD
Fixed and Removable Prosthodontics
Univeristy of Basel
Basel, Switzerland

Sreenivas Koka, DDS, PhD
Chair, Dental Specialties Prothodontics
Mayo Clinic
Rochester, MN USA

Program Moderators

Thursday, September 10th

Graduate Student Treatment Planning Session

Dr. Martin Gross

Friday, September 11th

Focus Session I *(Morning)*

Dr. Kiyoshi Koyano
Dr. Terry Walton

Concurrent Session A *(Afternoon)*

Dr. Alan Payne
Dr. Keeichi Sasaki

Concurrent Session B *(Afternoon)*

Dr. Harold Preiskel
Dr. Francine Albert

Saturday, September 12th

Concurrent Session A *(Morning)*

Dr. Bernard Smith
Dr. Steven Eckert

Saturday, September 12th *(continued)*

Concurrent Session B *(Morning)*

Dr. George Zarb
Dr. Ting Jiang

Concurrent Session C – Maxillofacial *(Morning)*

Dr. Arun Sharma
Dr. Terry Kelly

Concurrent Session A *(Afternoon)*

Dr. Cecilia Dong
Dr. Jung-Sung Shim

Concurrent Session B *(Afternoon)*

Dr. Michael MacEntee
Dr. Ann Wennerberg

Sunday, September 13th

Focus Session II *(Morning)*

Dr. Tom Taylor
Dr. Sang-Wan Shin

Conference Program Schedule

Thursday, September 10th

Abstract #			
	08:00 - 14:00	ICP Board Meeting *Officers/Councilors only*	***Location: Sir Francis Drake***
	14:00 - 17:00	**Poster Session - Competition Review**	***Location: Grand Ballroom***
	14:00 - 17:00	**Graduate Student Treatment Planning**	***Location: Seal / Robben Islands***
	14:00	**Martin Gross**	**Introduction / Moderator**
A	14:10	Ryo Akatsuka	*A Case Report Of Prosthodontic Treatment For Irregularity Of Occlusal Plane By Missing Teeth And Inadequate Prostheses*
	14:30	Discussion	
B	14:45	Jee Hwan Kim	*Anterior Cross Bite With Prognathism*
	15:05	Discussion	
	15:20	Coffee Break	
C	15:35	Lai Agnes	*Simplified Approach In Treatment Planning For A Geriatric Cleft Patient*
	15:55	Discussion	
D	16:10	M. Sad Chaar	*Clinical Treatment Planning*
	16:30	Discussion	
	16:45	Summary and Review	
	17:00	Session Adjourns	
	17:00 - 19:00	**Welcome & Poster Reception**	***Location: Grand Ballroom***

Friday, September 11th

Abstract #			
	09:00 - 12:30	**Focus Session- Keynote Presentations**	***Location: Grand Ballroom***
		Moderators: Kiyoshi Koyano & Terry Walton	
1	9:00	***Takahiro Ogawa**	*Super-Osseointegration*
2	9:40	***Sandro Palla**	*Masticatory Muscle Pain: A Overuse Problem?*
	10:20	Discussion	
	10:35	Coffee Break	
3	10:55	***Clark Stanford**	*Enhancing the Bone-Implant-Interface*
4	11:35	***Nico Creugers**	*Status of Adhesive Biotechnology in Fixed Prosthodontics*
	12:15	Discussion	
	12:30 - 14:00	Conference Luncheon	***Location: Lobby / Thirty 7***
	14:00 - 17:15	**Concurrent Session A**	***Location: Ballroom West***
		Moderators: Alan Payne & Keeichi Sasaki	
5	14:00	***Kung-Rock Kwon**	*Implant Supported Overdentures for the Elderly*
6	14:30	Daniel Wismeyer	*The Radiological Evaluation Of 110 Patients Treated With Three Different Overdenture Treatment Strategies 18 Years After Treatment*
7	14:45	Nabeel Alsabeeha	*Mandibular Single Implant Overdentures: A Randomized Controlled Trial Using An Early Loading Protocol With Different Implants And Attachment Systems*
8	15:00	Sunyoung Ma	*Mandibular Implant Overdentures: Marginal Bone Loss Over 10 Years With Different Loading Protocols And Attachment Systems*
9	15:15	Regina Mericske-Stern	*Mandibular Implant Overdentures: Long-Term Observations From 10 To 24 Years*
	15:30	Coffee Break	

* ***Denotes Invited Speaker***

Friday, September 11 th *(Continued)*

Abstract #			
10	15:45	*__Jocelyne Feine__	*Will Implant Therapy Improve the Health of Edentate Elders?*
11	16:15	Mario Bresciano	*Mind Traps In Prosthodontic Treatment Planning*
12	16:30	Joanne N. Walton	*Can We Predict Patient Responses To Implant Prostheses?*
13	16:45	T. Tealdo	*Immediate Function With Fixed Implant-Supported Maxillary Dentures: A 36-Month Follow-Up Study*
14	17:00	Frauke Müller	*Dental Appearance And Elderly Persons' Personality Judgment*
Friday	14:00 - 17:15	**Concurrent Session B**	***Location: Ballroom East***
		Moderators: Harold Preiskel & Francine Albert	
15	14:00	*__Dale Howes__	*Challenging Occlusal Concepts*
16	14:30	Winfried Walther	*20 Year Outcome In Cases With Severely Reduced Dentition Treated With Conical Crown Restorations*
17	14:45	Enrico Conserva	*Analysis Of Bite Force Transmission Through Different Restoration Materials To Implant Using A Robotic Chewing Simulator*
18	15:00	Anders Ekfeldt	*Oral Treatment With Implant-Supported Fixed Prostheses In Patients With Neurological Disabilities: A Prospective Study*
19	15:15	Stefan Scholtz	*Clinical Assessment Of Composite Facings For Conical-Crown Retained Dentures. Results After An Average Observation Period Of 5 Years*
	15:30	Coffee Break	
20	15:45	*__Shane White__	*Enamel - The Ultimate Biomaterial*
21	16:15	*__Brian Fitzpatrick__	*Why Women are Better Prosthodontists than Men*
22	16:45	*__Rhonda Jacob__	*Why Men are Better Prosthodontists than Women*
	17:15	Session Adjourns	
	19:00	Exhibit Reception	

Saturday, September 12th

	08:00 - 17:00	**Concurrent Session A**	***Location: Ballroom West***
		Moderators: Bernard Smith & Steven Eckert	
23	8:30	*__Jonathan Wiens__	*How Globalisation is Changing Prosthodontics*
24	9:00	Ulrich Pauls	*The Ontological Challenge In Prosthodontic Dentistry*
25	9:15	Ting Jiang	*Clinical Results Of Surgical Crown Lengthening For Crown Restoration*
26	9:30	Jörg Strub	*Impact Of Oral Implantology On Education*
27	9:45	Martin Gross	*Decision Making In Diagnosis And Treatment Planning In Prosthodontics*
28	10:00	Senay Canay	*The Effect Of Surface Treatments On Push-Out Bond Strength Of Resin-Core Material To Various Fiber-Post Systems*
29	10:15	Lieve van Zeghbroeck	*The Influence Of Experience And Specialty Training On Treatment Planning For A Referred Patient*
	10:30	Coffee Break	
30	11:00	*__Tetsuo Ichikawa__	*Strategies to Prevent Occlusal Collapse in the Ultra-Aged Society-Force and Infection Control*
31	11:30	David Reisberg	*Facial Prosthetics In A Digital World*
32	11:45	Michael Lewis	*A Clinical Protocol for the Prosthodontic Rehabilitation of a Single-Tooth Implant – A Review of the Literature to Optimize Outcomes*

* ***Denotes Invited Speaker***

Saturday, September 12th Concurrent Session A *(Continued)* ***Location: Ballroom West***

Abstract #			
33	12:00	Danielle Layton	*Patient Satisfaction Questionnaire Of Prosthodontic Treatment Provided Over 20 Years. Part 1: Profiles Of 500 Responding And 486 Non-Responding Patients*
34	12:15	Terry Walton	*Patient Satisfaction Questionnaire Of Prosthodontic Treatment Provided Over 20 Years. Part 2: Responses Of 500 Patients With 1908 Fixed Prosthodontic Prostheses Relating To Aesthetics, Comfort, Function, Phonetics, Cleansibility And Cost*
	12:30 - 14:00	Conference Lunch (non-members)	***Location: Conference Lobby***
	12:30 - 14:00	ICP Business Luncheon (members only)	***Location: Thirty 7 Restaurant***
		Moderators: Cecilia Dong & Jung-Sung Shim	
35	14:00	***H L Feng**	*The Fracture Origins of Bilayered All-Ceramic Dental Composites*
36	14:30	Bulem Yuzugullu	*Surface Roughness And Bond Strengths Of Glass-Infiltrated Alumina-Ceramics Prepared Using Various Surface Treatments*
37	14:45	Kohal Ralf	*Long-Term Evaluation Of All-Ceramic Reconstructions On Zirconia Implants*
38	15:00	Jean-Francois Roulet	*Lithium Disilicate Ceramic - A Versatile Material With Good Potential*
	15:15	Coffee Break	
39	15:45	***Ann Wennerberg**	*Do Nanometer Surface Modifications Matter?*
40	16:15	Xinquan Jiang	*Maxillary Sinus Augmentation With A Tissue-Engineered Bone Complex Of Beta-Tricalcium Phosphate And Autologous Bone-Derived Osteoblasts In Canines*
41	16:30	Maria Menini	*The Effect Of Different Titanium Surfaces On Plaque Accumulation And Periimplant Tissues Behavior. A 1-Year Clinical Study*
42	16:45	Wael Att	*Enhanced Osteoblast Function On Ultraviolet Light-Treated Zirconia*

Saturday	08:00 - 17:00	**Concurrent Session B**	***Location: Ballroom East***
		Moderators: George Zarb & Ting Jiang	
43	8:30	***Mijin Choi**	*Perceptions of Saliva as a Diagnostic Fluid Among Different Racial/Ethnic Groups*
44	9:00	Tomas Albrektsson	*Reasons For Primary And Secondary Bone Loss Around Oral Implants*
45	9:15	Kenichi Matsuda	*Relationship Between Maximum Implant Insertion Torque And Bone Density Using Computerized Tomography*
46	9:30	Takanori Ando	*Force Distribution Beneath Implant Supported Overdentures: An In Vivo Study*
47	9:45	Mats Kronstrom	*Patient Evaluation After Treatment With Maxillary Complete Dentures In Combination With Mandibular Overdentures Supported By One Or Two Implants Placed According To The Immediatel Loading Protocol*
48	10:00	Petra Guess	*Effect Of Framework Modification And Veneering Techniques On Damage And Reliability Of Y-Tzp Crowns*
49	10:15	Konstantinos Michalakis	*Fracture Resistance Of Porcelain Fused To Metal Restorations With Two Different Margin Designs After Exposure To Masticatory Simulation*
	10:30	Coffee Break	
50	11:00	***Izchak Barzilay**	*Can this Implant be Saved? Biomechanical Implant Repairs*

****Denotes Invited Speaker***

Saturday, September 12th Concurrent Session B *(Continued)* ***Location: Ballroom East***

Abstract #			
51	11:45	Palo Pera	*The Influence Of Cantilever Length And Implant Inclination On Stress Distribution For Implant-Supported Full Fixed Prostheses*
52	12:00	Aris-Petros Tripodakis	*Transformation Of Periodontal Into Periimplant Tissues By Immediate Intrasocket Implant Placement: A Five Year Retrospective Clinical And Volumetric Radiographic Evaluation Of Periodontally Compromised Sites*
53	12:15	Alon Preiskel	*Case Report: Rapid Prototype Technology Used To Rehabilitate And Edentulous 55 Year Old Male With Severe Alveolar Resorption*
	12:30 - 14:00	Conference Lunch (non-members)	***Location: Conference Lobby***
	12:30 - 14:00	ICP Business Luncheon (members only)	***Location: Thirty 7 Restaurant***
		Moderators: Michael MacEntee & Ann Wennerberg	
54	14:00	***Nels Ewoldsen**	*Dental Materials in Underserved Areas*
55	14:30	Leslie Laing-Gibbard	*Oral Neurophysiologic Characterization Of Patients With Sjögren'S Syndrome*
56	14:45	Pasquale Lino Calvani	*Biomechanics Of Prosthetic Facial And Lips Support*
57	15:00	Birgitta Bergendal	*Orofacial Dysfunction In Ectodermal Dysplasias Measured With The Nordic Orofacial Test-Screening*
	15:15	Coffee Break	
58	15:45	***Robert Wright**	*Current Trends In Advanced Education In Prosthodontics: 2000-2009*
59	16:15	Feng Sun	*The Clinical Study Of Full Ceramic Restorations With Cad/Cam Zirconium*
60	16:30	Eyal Tarazi	*Non-Contact Collinear Optical Probe Scanner For Porcelain Fused To Zirconia (Pfz) Restorations Production*
61	16:45	Ridwaan Omar	*Prosthodontic Decision Making: What Information Do Dentists Seek Before Recommending Treatment?*
	17:00	Session Adjourns	

Saturday	08:00 - 12:30	**Concurrent Session C: Maxillofacial**	***Location: Sir Francis Drake***
		Moderators: Arun Sharma & Terry Kelly	
62	8:30	***Larry Brecht**	*Nasoalveolar Molding and Infant Cleft Care*
63	9:00	***Jana Rieger**	*Functional Assessment: Choosing So That You Don't Lose*
64	9:30	***Dale Howes**	*The Use of Zygomatic Implants in Midface Reconstruction after Trauma and Oncological Resection*
65	10:00	***Hishashi Taniguchi**	*In Vivo Application of Modal Analysis to Maxillofacial Prosthodontics*
	10:30	Coffee Break	
66	11:00	***Harry Reintsema**	*Treatment Outcomes with Implants in Head and Neck Oncology Patients*
67	11:30	***John Beumer**	*Implants in the Irradiated Tissue*
68	12:00	***Betsy Davis**	*Facial Prostheses at the Crossroads: Lessons of the Past and Future Horizons*
	12:30 - 14:00	Conference Lunch (non-members)	***Location: Conference Lobby***
	12:30 - 14:00	ICP Business Luncheon (members only)	***Location: Thirty 7 Restaurant***
	17:00	Session Adjourns	
	19:30	**ICP Reception & Banquet** *(reservations required)*	

**** Denotes Invited Speaker***

Sunday, September 13th

Abstract #			
	09:00 - 12:50	Focus Session- Keynote Presentations	***Location: Grand Ballroom***
		Moderators: Tom Taylor & Sang-Wan Shin	
69	9:00	***Kenneth Malament**	*Understanding Dental Ceramic Flaws and Clinical Risks*
70	9:40	***Sang-Chun Oh**	*Comparing the Perception of a Korean and a Westerner to Altered Dental Esthetics in Upper Anterior Dentition*
	10:20	Discussion	
	10:40	Coffee Break	
71	11:10	***Michael MacEntee / *Peter Owen**	*Three-Visit Technique for Complete Dentures*
72	11:50	***Alan GT Payne**	*Long-Term Outcomes of Early Loading Protocols for Implant Overdentures*
	12:30	Discussion	
	12:50	Conference Announcements	***2011 Meeting: Hawaii***
	13:00	Conference Adjourns	
	13:00	ICP Board Meeting *Officers/Councilors only*	***Location: Sir Francis Drake***
	16:00	**ICP Social Outing** (Elective)	***Spier Vineyard Wine Tasting & Moyo African Dinner***

**** Denotes Invited Speaker***

Posters

Thursday, September 10th

Young Prosthodontists Poster Award Nominations

Location: Grand Ballroom 14:00-19:00

Abstract #	Table #	Last Name, First Name ***Poster Abstracts are Listed Alphabetical Order***	
73	1	Brown, Simon	*Immediately Restored Single Implants With A Novel Design In The Anterior Maxilla*
74	2	Ma, Sunyoung	*Innovative Ideas For The Rehabilitation Of Edentulism With Maxillary And Mandibular Implant Overdentures*
75	3	Naidoo, Lushen	*Implant Supported Reconstruction Following Surgical Resection Of A Maxillary Ameloblastoma*

Poster Abstracts

Location: Grand Ballroom 14:00-19:00

Abstract #	Table #	Last Name, First Name ***Poster Abstracts are Listed Alphabetical Order***	
76	4	Avivi Arber,Limor	*Face Motor Cortex Neuroplasticity Associated With Occlusal Modifications*
77	5	Bae, Hanna	*Implant Restoration In Patients With Vascular Malformation In Maxillofacial Region*
78	6	Baldi, Domenico	*Double Chamfer Preparation. An In Vitro Research*
79	7	Bassi, Francesco	*Evaluation Of The Silent Period In Mandibular Overdenture Before And After Anchorage On Two Implants*
80	8	Bassi, Francesco	*Kinesiographic Evaluation Of The Motor Performance Of The Mandible Based On "Reaching" Tasks*
81	9	Berteretche,Marie Violaine	*Evaluation Of Masticatory Performances Of Edentulous Patients Needing New Complete Dentures*
82	10	Bonica, Paolo	*Sinus Floor Elevation Using Osteotomes And Piezoelectric Surgery- A New Approach*
83	11	Canay, Senay	*Effect Of Immediate And Delayed Post Preparation On Apical Leakage Using Different Filling Materials And Obturation Techniques*

Abstract #	Table #	Last Name, First Name	
		Poster Abstracts are Listed Alphabetical Order	
84	12	Carossa, Stefano	*Immediate Loading Of Osseointegrated Dental Implants: A Literature Review And Meta-Analysis Of Randomized, Controlled Clinical Trials*
85	13	Casucci, Alessio	*Responsiveness Of Lava Zirconia Ceramic To Different Surface Treatments*
86	14	Celebic, Asja	*Changes Of Co-Cr-Mo Alloy Surface And Composition After Biocorrosion In "Plaque" And "Saliva" Solutions*
87	15	Chang, Chee	*Effects Of High Speed Grinding With Diamond Burs On All-Ceramic Veneering Porcelain*
88	16	Chen, Liping	*The Microscopic Characteristic Of The Dentine Adhesive Interface Of Luting Resin To Fiber Post*
89	17	Cui, Huang	*Effects Of Two Different Bonding Techniques On Root Dentin Adhesion*
90	18	Damyanov, Nikola	*Prosthodontic Production In Sofia, Bulgaria*
91	19	Del Rio Highsmith, Jaime	*Emg Activity Of Masticatory Muscles In Implant-Retained Overdenture Weares*
92	20	Doi, Kazuya	*Development Of Inorganic Polyphosphate-Adsorbed Interconnected Porous Calcium Hydroxyapatite As A New Bone Regeneration Material*
93	21	Donadio, Antonio	*Evaluation Of The Dimensional Accuracy Of Three Impression Materials Used In Fixed Implant-Supported Prostheses*
94	22	Dong, Jin-Keun	*A New Technique Of Fixed Partial Denture Without Tooth Preparation*
95	23	Dubojska, Anna Maria	*Analysis Of TMJ-Function In Prosthodontic Treatment Planning*
96	24	Fenton, Aaron	*Microleakage Of Posterior Composite Restorations With Self-Adhesive Resin Cement Liners.*
97	25	Fokkinga, Wietske	*Reproducibility Of Box-Depth Estimations Of Restorations Using X-Rays*
98	26	Frangou, Maria	*Effect Of Denture Cleansers On Titanium Surface: A Gloss And Electron Microscope Study*
99	27	Fuh, Lih-Jyh	*Assessments Of Anatomical Inclinations Of Glenoid Fossa From Ct Data Base In Taiwan*
100	28	Fujisawa, Masanori	*Determination Of Daytime Clenching Behavior And Regulation Using A Newly Developed Portable Electromyogram Biofeedback System*
101	29	Gennaro, Auricchio	*Research Protocol: Realization Of Cad-Cam Edentulous-Ridge Models For Mechanical Tests Application*
102	30	Gerritsen, Anneloes	*The Vietnamese Short Version Of The Oral Health Impact Profile*
103	31	Gil, Jaime A.	*Correlation Between Crown-Implant Ratio And Marginal Bone Resorption*
104	32	Giovannetti, Martina	*Assessing The Frontal Teeth Set-Up In Maxillary Complete Dentures: A Biometric Study*
105	33	Göthberg, Catharina	*Tissue Reactions Around Implants In Fixed Partial Dentures And Evaluation Of Healing Times, 1- Year Results From A Randomized Controlled Study*
106	34	Grilli, Leopoldo	*Effects Of Chlorine Donors On Cobalt-Chromium Alloys For Prp*

Abstract #	Table #	Last Name, First Name ***Poster Abstracts are Listed Alphabetical Order***	
107	35	Grilli, Leopoldo	*Research Protocol: Analysis Of The Influence Of Divergent Implants On The Wear Rate Of The Retention System Of A Two-Implant Retained Overdenture*
108	36	Grossi, Marcio	*Validation Of The Bitestrip© For Sleep Bruxism Diagnosis Using Polysomnography As A Gold Standard*
109	37	Hanatani, Shigeru	*Titanium & Laser Welding -The Finest Combination*
110	38	Hedzelek, Wieslaw	*Dental Implants Fatigue Strength Evaluation – Finite Element Study*
111	39	Hikita, Kazuhiro	*Effect Of Surface Treatment On The Bond Strength To Zirconium*
112	40	Hongama, Seiko	*Effect Of Body Posture And Capsaicin Intake On Swallowing Evaluated With An Mi Sensor-Oriented System*
113	41	Hue, Olivier	*Analysis Of Hygienic Advices On The Biofilm Development On Intaglio Of Removable Dentures*
114	42	Iizuka, Tomoaki	*Effect Of Mandibular Control On Posture Control In The 3-D Virtual Space*
115	43	Jeong, Jae-Heon	*Sinking And Fit Of Abutment Of Locking Taper Connection Implant System*
116	44	Jiang, Ting	*Study On The Relationship Between State Of Occlusal Support And Activities Of Daily Life In Aged Group*
117	45	Jiao, Ting	*Photoelastic Analysis Of Supporting Tissue Under The Complete Dentures With Lingualized Occlusion*
118	46	June-Seong, Kim	*Effect Of Platelet-Rich Plasma On Bone Regeneration In Ovariectomized Osteoporotic Rats*
119	47	Jung, Yu Seok	*Effects Of The Polycaprolactone Scaffolds, Mesenchymal Stem Cells And Rhbmp-2 On Mandibular Bone Regeneration In Dogs*
120	48	Juwon, Song	*Aesthetic Anterior Restoration Cases Using Porcelain Laminate Veneers*
121	49	Kanbara, Ryo	*Stress Analysis Of Abutment Tooth With Extracoronal Magnetic Attachment Using The Three Dimensional Finite Element Method - The Effect Of Bracing Arm*
122	50	Kar, Aswini Kumar	*An In-Vitro Study To Compare The Microleakage Of Different Composite Laminate Veneering Materials Using Sem And Eds Systems*
123	51	Kazunori, Ikebe	*Minimum Number Of Implants For Establishing Stable Occlusal Support In An Edentulous Maxilla; Biomechanical Rationale*
124	52	Kazuya, Asami	*Functional Assessment of Masticatory and Speech for Post Maxillectomy Patients*
125	53	Kim, Hee-Jung	*Restoration Of Anterior And Posterior Teeth With Zirconia (Case Report)*
126	54	Kim, Hee-Jung	*Sinking And Fit Of Abutment Of Conical Internal Connection Implant System*
127	55	Kim, Jongeun	*Effect Of Block Bone Graft With Rhbmp-2 On Vertical Bone Augmentation In Rabbits' Cranial Bone*
128	56	Kim, Sun-Jong	*Implant Site Preparation By Low Speed Drilling Pros And Cons*

Poster Abstracts are Listed Alphabetical Order

Abstract #	Table #	Last Name, First Name	
129	57	Kim, Sung-Hun	*Effect Of Sandblasting And Various Metal Primers On The Shear Bond Strength Of Resin Cement To Y-Tzp Ceramic*
130	58	Knezovic Zlataric, Dubravka	*Variations In Mandibular Bone Mineral Density Values Dependent On Age, Gender And Antagonistic Contacts*
131	59	Kogiso, Taro	*A Case Report Of The Full Mouth Reconstruction Using Magnetic Attachments*
132	60	Kuremoto, Koh-ichi	*Influence Of Mechanical Loads On Bone Surrounding Short Implants Studied By Finite Element Analysis*
133	61	Kwun, Soon-Min	*A Case Study: Fixed Prothodontic Restoration Accompanying Displacement Of A Condyle – Practical Application Of Provisional Restoration Effective In Transmitting Esthetic And Functional Information*
134	62	Lee, Du-Hyeong	*Effects Of Flapless Implant Surgery On Soft Tissue Profiles: A Prospective Clinical Study*
135	63	Lee, Jong Hyuk	*Influence Of The Methods On The Strength And Constitution Of The Soldered Joint.*
136	64	Lee, Sang Yeup	*Implant Restoration Of The Missing Maxillary Anterior Tooth By Immediate Provisional Prosthesis*
137	65	Lu, Eryi	*A Three-Dimensional Reconstructive And Measuring System For Complete Denture Occlusion*
138	66	Lv, Peijun	*Study On Cad&Rp Of Complete Denture*
139	67	Maeda, Teruta	*Influence Of Unpleasant And Imperceptible Spots Under An Experimental Acrylic Plate Covering The Palatal Mucosa On Salivary Biochemical Stress Markers*
140	68	Malaguti, Giuliano	*Rotational Misfit Of Implant Abutments: Influence Of Casting Procedures On Ucla-Type Abutments*
141	69	Malaguti, Giuliano	*Psychological And Clinical Evaluation Of Social Implant Dentistry: Study Protocol*
142	70	Marin, Mihaela	*Analysis Of Deciding Factors For Miniimplants Loading In Complete Overdenture Treatment*
143	71	Mordini, Lorenzo	*Effects Of Sodium Hypochlorite On Titanium For Partial Removable Prostheses*
144	72	Mordini, Lorenzo	*Experimental Evaluation On Ovd Retention With Implants' Different Angulations*
145	73	Moreno, Isabel	*Effects Of Occlusal Splint On The Emg Activities Of Masticatory Muscles In Patients With Temporomandibular Disorders*
146	74	Morokuma, Masakazu	*Influence Of Proper Fitting Of Dentures In Partial Denture Wearers On Brain Function: Relationship Of Correctly Fitted Dentures To Emotions And Brain Function*
147	75	Muntianu, Ligia Adriana Stanca	*Clinically Relevant Anatomy In Removable Prosthodontics*
148	76	Muraji, Naoko	*Effect Of Plasma Glow Discharge On The Surface Properties Of Titanium*
149	77	Naito, Yoshihito	*Development Of An Antibacterial Tissue Conditioner With A Micro-Biologically Derived Component*
150	78	Nakamura, Yoshinori	*Stress Analysis Of Removable Partial Dentures With Magnetic Attachments*

Abstract #	Table #	Last Name, First Name ***Poster Abstracts are Listed Alphabetical Order***	
151	79	Nissan, Joseph	*Implant Survival Rate In Combination With Cancellous Bone Block-Allograft In The Atrophic Anterior Maxilla*
152	80	Ohkubo, Chikahiro	*Trayless Impression For Implant Prosthesis To Prevent Patient'S Vomiting Reflex*
153	81	Okada, Michio	*Clinical Application Of The Extracoronal Magnetic Attachment*
154	82	Okamoto, Kazuhiko	*The Relationship Between Matrix Movements And Retentive Force In Ball Attachments*
155	83	Okuyama, Tokiko	*Occlusion Of Prostheses Supported By An Implant For A Single Intermediate Missing Posterior Tooth*
156	84	Owen C., Peter	*Measurement Of Restorative Margins In Situ*
157	85	Owen C., Peter	*Guidelines For The Use Of Wrought Wire Clasps For Removable Partial Dentures*
158	86	Park, Chan-Kyung	*The Effect Of Rhpmp-2 Coating Onto Anodized Implants On Osseointegration In Rabbit*
159	87	Park, Hyo-Jin	*A Retrospective Study On The 15-Year Treatment Outcome Of Nobelbiocare Implants*
160	88	Park, Sangwon	*Sintering Behavior And Mechanical Properties Of Zirconia Compacts For Dental Applications*
161	89	Patel, Zaheed	*Heat Transmission Along A Dental Implant*
162	90	Petricevic, Nikola	*A 1-Year Longitudinal Study Of Quality Of Life Outcomes In Patients With Different Prosthodontic Therapies*
163	91	Polyzois, Grigorios	*Antimicrobial Efficacy Of Denture Adhesives*
164	92	Potthoff, Inga	*Treatment Modalities For The Replacement Of A Maxillary Incisor*
165	93	Preiskel, Alon	*The Conservative Treatment Of Localised Tooth Surface Loss Using Adhesive Technology And A Dynamic Approach To Occlusion*
166	94	Ren, Wei Hong	*The Effects Of Prosthodontic Treatment On The Oral Function Related Quality Of Life For Maxillary Tumor Patients Of Complexity For Edentulous And Partly Edentulous Patients*
167	95	Richards, Lindsay	*Implementing And Evaluating The Acp Classification Of Complexity For Edentulous And Partly Edentulous Patients*
168	96	Roderic, Le Thanh	*Adhesion Of Veneering Porcelain To Zirconium Dioxide Ceramic As Determined By The Strain Energy Release Rate*
169	97	Ryosuke, Kagawa	*Study Of Bone Regeneration Material Using Collagen Gel With Dmp1*
170	98	Sato, Yohei	*Morphological Analysis Of Tongue And Mandible In Japanese Males*
171	99	Seo Young, Lee	*Treatment Planning Of The Patient With Severe Chronic Periodontitis*
172	100	Shimpo, Hidemasa	*Bonding Of Auto-Polymerized Polymethyl Methacrylate Resin To Nylon Denture Base*
173	101	Shin, MeeRan	*A Study On The Fracture Load And Marginal Fitness Of Zirconia Ceramic Coping By Design And Coloration*

Poster Abstracts are Listed Alphabetical Order

Abstract #	Table #	Last Name, First Name	
174	102	Son, Mee-Kyoung	*A Case Report: Maxillary Implant Supported Overdenture For A Class Iii Skeletal Patient*
175	103	Sun, Jian	*A Preliminary Study On The Properties Of The Dental Phosphate-Bonded Casting Mold Formed By Three Dimensional Printing*
176	104	Taddei, Corinne	*Contribution On Cad/Cam Techniques For Removable Partial Denture Framework*
177	105	Taddei, Corinne	*Significance Of The Anatomy And Physiology Of The Structures Around Lower Full Complete Dentures*
178	106	Takebe, Jun	*Effects Of Ionizing Radiation On In Vitro Differentiation Of Osteoblasts Derived From Rat Bone Marrow Stroma*
179	107	Takeuchi, Yasuhisa	*Detection Of Microorganisms From Inside Of Acrylic Resin Prostheses*
180	108	Tan, Jianguo	*Development And Evaluation Of An Online Color Training System*
181	109	Tanaka, Yoshinobu	*Stress Analysis Of Abutment Tooth With Extracoronal Magnetic Attachment Using The Three Dimensional Finite Element Method - The Construction Of Finite Element Model From Ct Data*
182	110	Tokue, Al	*Prosthetic Management Of A Patient With Severe Grinding Using A Removable Metal Splint: A Case Report*
183	111	Toyoshita, Yoshifumi	*Mastication Promotes Recovery Of Memory And Learning Dysfunction By Middle Cerebral Artery Occlusion In Rats*
184	112	Tsukiboshi, Taisuke	*Case Report: Esthetic Restoration For Root-Crown Fracture In Anterior Region With Limited Orthodontic Treatment And Provisional Restoration Technique*
185	113	Vang, Mong-Sook	*The Effect Of Surface Treatments Of Y-Tzp Zirconia Ceramic On The Microstructure And Flexural Strength*
186	114	Wang, Yining	*Consistence Of Try-In Pastes And Luting Agents On The Resultant Color Of Ips Empress? All-Ceramic Veneers*
187	115	Watanabe, Fumihiko	*Torsion Test At The Interface Between Implant And Implant Abutment Of The Implant Body*
188	116	Watanabe, Megumi	*Mkk6/P38 Signal Transduction Cascades Regulate Nickel Allergy In The Model Mouse*
189	117	Wei, Bin	*Study On Volunteer To Detect Mri Artifacts Caused By Fpds*
190	118	Witkowski, Siegbert	*Reliability Of Shade Selection Using An Intraoral Spectrophotometer*
191	119	Xu, Chun	*Apoptosis Was Induced In Human Periodontal Ligament Cells By Cyclic Stretching Through The Activation Of Caspase-3 Via Caspase-9 Signaling Cascade*
192	120	Xu, Kan	*The Research On 3-D Reconstruction Of The Maxillary Central Incisor By Digital Camera*
193	121	Xuliang, Deng	*Effects Of Four Dental Bondings On The Expression Of Tnf-? And Il-1? Of Cultured Murine Macrophage Cells*

Thursday, September 10th
Poster Abstracts *(Continued)* ***Location: Grand Ballroom 14:00-19:00***

Poster Abstracts are Listed Alphabetical Order

Abstract #	Table #	Last Name, First Name	
194	122	Yang, Hong-So	*Shear Bond Strength Between Zirconia Ceramic And Bovine Dentin Luted With Various Dental Cements*
195	123	Yoneyama, Yoshikazu	*Influence Of Proper Fitting Of Dentures In Partial Denture Wearers On Brain Function – Relationship Between Mastication And Brain Function*
196	124	Yoo, Jin-Suk	*Full Mouth Fixed Implant Rehalibitation In Chronic Periodontitis Patient*
197	125	Yoon, Hyung-In	*A Histomorphometric And Removal Torque Study Of Oxidized Titanium Implants With Macroscopic Grooves In Rabbit Bone*
198	126	Yoshinori, Gunji	*A Case Of Reconstruction Of Missing Lower Right-Side Molars With An Implant-Supported Fixed Prosthesis*
199	127	Yuanli, Zheng	*The Corrosion Behavior Of Dental Metallic Materials In The Presence Of Microorganism*
200	128	Yuka, Abe	*Evaluation Of Genetic, Psychological, And Behavioral Factors As Risk Factors For Sleep Bruxism*
201	129	Yuzugullu, Bulem	*Oral Health Status Of A Group Of Turkish Dental Patients*
202	130	Zagar , Maja	*A Quantitative Evaluation Of The Distal Displacement Of The Gingival Zenith In The Maxillary Anterior Teeth*
203	131	Zhang, Baowei	*Measurement Of Three Dimensional Morphology Of Composite Resin Polymerization Shrinkage*
204	132	Zhang, Fuqiang	*Apoptosis In Periodontal Ligament Cells After Being Challenged By Cyclic Stretching Force*
205	133	Zhang, Xiuyin	*The Study On The Microcracks Of All-Ceramic Material Appling The Digital Image Correlation Method*

Meeting Planner
RES Seminars
PO Box 99119
San Diego, CA 92109
Tel: 858 272-1018 Fax: 858 272-7687
Email: res@res-inc.com
Web Site: www.res-inc.com

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

The ICP reserves the right to cancel or modify its program as circumstances might dictate.

Invited Speakers

Izchak Barzilay, **DDS, Cert Prostho, MS, FRCD(C)**

Dr. Izchak Barzilay received his DDS from the University of Toronto in 1983, a Certificate in Prosthodontics from the Eastman Dental Center in Rochester, NY in 1986, and a MS from the University of Rochester in 1991. He is currently Head of the Division of Prosthodontics and Restorative Dentistry, Mt. Sinai Hospital, Toronto, Ont.; Assistant Professor, University of Toronto, Toronto, Ont.; Adjunct Professor, Division of Prosthodontics of the Eastman Department of Dentistry, University of Rochester, Rochester, NY; Prosthodontic Examiner – Royal College of Dentists of Canada.

Dr. Barzilay is the past President of the Association of Prosthodontists of Canada: Past President - Ontario Study Club for Osseointegration.; Advisory Board - Toronto Implant and Aesthetic Study Club,; Medical Advisory Board Member – Sjogren's Society of Canada; Editorial Council – Spectrum Dialogue Journal, Teamwork Journal, and is in private practice limited to prosthodontics and implant dentistry in Toronto, Ontario Canada.

He has been awarded the Tylman Award, Prosthodontics Research Award, Buonocore Award, the Essay Award (ACP), the JOMI-Best Paper-1996, A.B. Hord Master Teacher Award (University of Toronto) and the Division of Prosthodontics 2007 Alumni Award (University of Rochester Eastman Dental Center).

Lawrence E. Brecht, DDS

Dr. Brecht is Clinical Associate Professor of Prosthodontics and Occlusion in the Division of Prosthodontics and Restorative Dentistry at New York University College of Dentistry. He also serves as the Director of Maxillofacial Prosthetics in the Advanced Education Program in Prosthodontics at NYU.

He has a joint appointment at the Institute of Reconstructive Plastic Surgery of New York University School of Medicine where he is Director of the Center for Craniofacial Prosthetics and serves on the Institute's Cleft Palate, Craniofacial and Ear Anomalies teams. He received his DDS from New York University and his Certificates in both Prosthodontics, as well as Maxillofacial Prosthetics from the New York Veterans Administration Hospital.

He is a Fellow of The Greater New York Academy of Prosthodontics, American Academy of Maxillofacial Prosthetics, The Academy of Prosthodontics, and a member of the American College of Prosthodontists and the American Cleft Palate/Craniofacial Association. He serves on the Board of Directors of the ACP as well. His clinical research interests include nasoalveolar molding and the extraoral application of osseointegration in both pediatric and adult patients. Dr. Brecht has made numerous contributions to the cleft palate and maxillofacial prosthetics literature. He maintains a practice limited to prosthodontics and maxillofacial prosthetics in New York City.

John Beumer III, DDS, MS

Dr. Beumer received his D.D.S. from the University of California, San Francisco. He completed a residency in Oral Medicine at UCSF (1967-1970), a residency in Prosthodontics (1973-1975) at UCLA and was awarded a Masters in Oral Biology from UCSF in 1970.

He currently is Professor and Chair, Division of Advanced Prosthodontics, Biomaterials and Hospital Dentistry, UCLA and Director of UCLA's Residency in Maxillofacial Prosthetics. He is the author of three books, and numerous publications and the co inventor of the UCLA abutment with W. Hornberg.

In 1999 he received an honorary degree in medicine and surgery from the University of Turin. In 2004, he received the Dan Gordon Award from the American College of Prosthodontics. In 2005 he received the Andrew Ackerman Award from the American Academy of Maxillofacial Prosthodontics and the Jerome M. and Dorothy Schweitzer Award from the Greater New York Academy of Prosthodontics and in 2009 he received the Tjellstrom Award from the Institute of Reconstructive Sciences in Medicine.

Mijin Choi, DDS, MS, FACP

Dr. Choi is a Clinical Assistant Professor in the Department of Prosthodontics at the New York University of College of Dentistry. She is currently Director of Advanced Prosthodontics and Honors in Prosthodontics.

Dr. Choi devotes her time in development of prosthodontic curriculum in both predoctoral and postdoctoral level, and patient care. She is a Diplomate of the American Board of Prosthodontics, and a Fellow of American College of Prosthodontists.

Dr. Choi was a participant in the first IJP Young Prosthodontics Educators Workshop (2006) held in Karlsruhe, Germany. She received her DDS degree from Columbia University and her post-doctoral specialty certificates in prosthodontics and maxillofacial prosthetics from University of Maryland and Memorial Sloan-Kettering Cancer Center respectively. During her post-doctoral training, she also obtained a Master of Science degree in Oral Biology.

Invited Speakers

Nico Creugers, DDS, PhD

Dr. Creugers graduated as dentist in 1980 and PhD from the University of Nijmegen in 1987. He has served as a clinical instructor at the department of Occlusal Reconstruction and Assistant Professor.

In 1994 he was appointed as Professor and Chairman Department Oral Function and Prosthetic Dentistry at the University of Nijmegen, Netherlands. In 1996- Fellow of the Academy of Dental Materials and director of the Nijmegen dental curriculum since 2002.

Dr. Creuger's was project leader research line 'Adhesive Dentistry (KUN MED VI.05), (1991 --) and also project leader with PhD projects: Miniature anchored bridges. Post and core restorations, Veneer restorations, Milled adhesive inlays, Cusp replacement in fractured teeth, Shortened dental arches in the oral health care in developing countries and Non-casted crowns. Other projects included: Fiber reinforced composite bridges and the use of human tooth tissue as a restorative material.

Dr. Crueger has over 100 publications as author or co-author published in refereed scientific journals, 70 publications in non-refereed dental journals, 100 published abstracts of conference papers and 40 invited lectures at national/international conferences.

He is on editorial boards for the International Journal of Prosthodontics

Journal of Adhesive Dentistry, Evidence Based Dentistry and Deutsche Zahnärtzliche Zeitung.

Betsy Davis, MS, DMD

Dr. Betsy K. Davis is an Associate Professor of Otolaryngology-Head and Neck Surgery in the College of Medicine at the Medical University of South Carolina (MUSC). She also is an Associate Professor of Oral & Maxillofacial Surgery in the College of Dental Medicine at MUSC, and Adjunct Professor with Clemson University.

Dr. Davis is a cum laude graduate of Wofford College and received her D.M.D. degree from the Medical University of South Carolina. Dr. Davis pursued graduate training in Prosthodontics at the University of Iowa where she received her Certification and Master's degree in Prosthodontics.

She joined the faculty at Ohio State University where she taught and practiced from 1989-1992. Davis completed her fellowship training in Maxillofacial Prosthetics at M.D. Anderson Cancer Center in Houston, Texas, followed by a Maxillofacial Prosthetic/Implant Residency at UCLA Maxillofacial Prosthetic Clinic under the direction of Dr. John Beumer.

Nels Ewoldsen, DDS, MSD

Nels Ewoldsen earned his dental degree (DDS) in 1978 and MSD (Dental Materials) in 1994 while in private practice in rural Indiana. He has held faculty appointments at Indiana University School of Dentistry and University of Nebraska Medical Center College of Dentistry and continues to support dental education volunteering at both institutions. From 1998 to 2002 Dr. Ewoldsen directed New Technology Development (GC America, Alsip, IL) and from 2002-2009 directed Clinical Research for Dentsply Prosthetics. Now retired, Dr. Ewoldsen spends two days per week doing public health outreach dentistry and works as a dental consultant. He is a member of the ADA, Academy General Dentistry, American Prosthodontic Society, International College of Prosthodontics and is a Fellow of the Academy Dentistry International. Nels and his wife Jane recently completed a log cabin home in the covered bridge capital of the world (Parke County, Indiana) where he enjoys fly fishing and finding the road not taken.

Conflict of interest Disclosure: Dr Ewoldsen receives lecture honoraria from GC Corporation and various Dentsply Divisions as well as consulting fees from Dentsply Prosthetics.

Jocelyne S. Feine, **DDS, MS, HDR**

Jocelyne Feine is Professor in the Faculty of Dentistry and Associate Member in the Departments of Epidemiology & Biostatistics and Oncology in the Faculty of Medicine, McGill University, Montréal, Québec, Canada.

Professor Feine's research interests involve the assessment of therapies intended to improve function and life quality in populations with chronic orofacial conditions, such as edentulism and pain. In particular, Dr. Feine develops and carries out multidisciplinary randomized clinical trials with expert teams of local and international collaborators. She is author of numerous book chapters, and her manuscripts have been published in peer-reviewed dental and medical journals. Dr. Feine has presented her work at university and professional conferences worldwide. She is presently the Associate Editor for Clinical Reports with the Journal of Dental Research.

Invited Speakers

HaiLan Feng, PhD, Dr Med

Feng Hailan is Professor and Chair of Department of Prosthodontic of Peking University School of Stomatology, Beijing China. She is the President of Chinese Prosthetic Society of Chinese Stomatological Association.

She received her DDS in 1979 and MD in 1982 by the forth military medical university, Xian China, and received a PhD degree in 1987 by Beijing Medical University. She was the Humboldt fellow at School of Dentistry, University of Nurnberg-Erlangen Germany and the visiting fellow at School of Dentistry, University of Aachen, Germany in 1998, at School of Dentistry, University of Karoliska, Sweden in 2006.

Professor Feng has published 4 textbooks as a chief editor and published over 50 articles on international and national peer-reviewed Journals.

Brian Fitzpatrick, DDS, BDSc, MDSc, FRACDS

Dr Brian Fitzpatrick graduated from the University of Queensland, School of Dentistry in 1976. He spent several years in private general practice in Brisbane and completed his prosthodontic training also at the University of Queensland in 1983. He then undertook training in implant Prosthodontics at the University of Washington, Seattle in 1983 and the University of Gothenberg, Sweden 1987.

He has maintained part-time teaching and continuing professional education responsibilities at the University of Queensland for many years. He has delivered a considerable number of invited scholarly presentations in Australia and internationally on various subjects including aspects of Evidence Based Dentistry.

Dr Fitzpatrick maintains membership of numerous national and international dental and prosthodontic organizations. He currently serves on several Boards and Prosthodontic Academies in leadership and advisory positions and maintains a full-time prosthodontic practice in Brisbane. He is a reviewer for the International Journal of Prosthodontics and the Australian Dental Journal.

Dale Howes, B.Sc.(Dent); BDS; M.Dent (Wits); FCD(SA)Pros

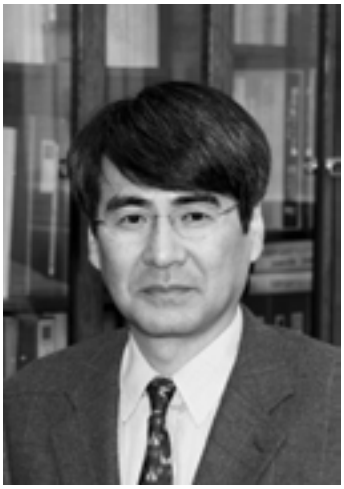
Dale Howes is in full time private prosthodontic practice in Morningside, Johannesburg. He is in a group practice that serves the advanced restorative requirements of the Multidisciplinary Head and Neck Reconstruction Unit at the Morningside Medi-Clinic.

He is the Senior Consultant of the Post Graduate Prosthodontic Programme at the University of the Witwatersrand, School of Oral Health Sciences where he an internal examiner and has served as external examiner at the Universities of Pretoria and Gent, Belgium and also for the South African College of Dentistry.

He is currently President of the Academy of Prosthodontics of South Africa, a National Councillor of the South African Dental Association and a founder of the PI Brånemark Institute of South Africa.

His research has involved jaw movement studies, occlusion, caries susceptibility, implantology as well as CAD CAM technology and rapid prototyping for craniofacial reconstruction.

He has been awarded "best presentation" at the scientific poster session at the Nobel Biocare World Conference in Las Vegas (2003) and the Academy of Osseointegration in Boston (2008). He was an invited speaker at the 40th anniversary World Celebration of Osseointegration in Sao Paulo in 2005 and also at the American Academy of Maxillofacial Prosthetics and Australasian Osseointegration Society (2009).



Tetsuo Ichikawa, DDS, PhD

Professor Ichikawa is chairman of the Department of Oral & Maxillofacial Prosthodontics at the University of Tokushima, Institute of Health Biosciences.

In 1983 he received his DDS degree at the University of Tokushima, School of Dentistry and in 1987 received his PhD from the University of Tokushima, Graduate School of Dentistry.

Professor Ichikawa has held postions as Instructor at the Department of Removable Prosthodontics, University of Tokushima, School of Dentistry (1987) and as a lecturer at the Removable Prosthodontics Department at the University of Tokushima, School of Dentistry (1990).

From 1990 to 1991 he was the visiting Scientist at the Massachusetts Institute of Technology (MIT), Cambridge, MA, USA and in 1997 was Professor and Chairman for the Removable Prosthodontic Department at the University of Tokushima, School of Dentistry. In 2004 he was appointed Professor and Chairman of the Department of Oral & Maxillofacial Prosthodontics at the University of Tokushima, Institute of Health Biosciences

Professor Ichikawa is a member of the Japan Prosthodontic Society (Director), Japanese Society of Oral Implantology (Councilor) and Academy of Osseointegration (Active member). He has won awards for Best poster presentation, 7th Meeting of the Academy of Osseointegration (USA) and in 1986 Best original paper, the Japanese Society of Oral Implantology (Japan).

Invited Speakers

Rhonda F. Jacob. DDS, MS

Rhonda F. Jacob received her DDS and MS in prosthodontics from the University of Iowa. She completed training in maxillofacial prosthodontics and dental oncology at the University of Texas M.D. Anderson Cancer Center, where she is Professor and maxillofacial prosthodontist in the Department of Head and Neck Surgery. Dr. Jacob is a Diplomate and Examiner of the American Board of Prosthodontics and Fellow of the American College of Prosthodontists, and Past President of the American Academy of Maxillofacial Prosthetics and Academy of Prosthodontics. She is the current secretary of the ICP. Her clinical and academic interests relate to the orofacial endosteal implant rehabilitation of the head and neck cancer patient.

Kung-Rock Kwon, DMD, PhD

Dr. KR Kwon received his DMD(1987) and PhD degree(1995) from School of Dentistry, Kyung Hee University, Seoul. He was trained in Prosthodontics from Department of Prosthodontics of the Kyung Hee Medical Center (1987-1990). After serving as an Army Dentist, he came to Dept. of Prosthodontics Kyung Hee Medical Center as a Full time Clinical Professor in 1993. He was accepted a Visiting Associated Professor position in the Dept. of Fixed Prosthodontics and Occlusion (Chairman : Prof. U.C. Belser) , School of Dental Medicine, University of Geneva, Switzerlan(1996-1998). In 1999, he received his promotion to Assistant Professor in the Dept.of Prosthodontics, School of Dentistry Kyung Hee Univ. He was accepted a Visiting Professorship in the Dept. of Restorative Dentistry and Biomaterials, Implantology (Chairman : Prof. H.P. Weber), School of Dental Medicine, Harvard University, USA (2002-2003). In 2003, he was promoted to Associate Professor in the Department of Prosthodontics of the Kyung Hee Univ. In 2007, He was became the Chairman and Head of the Department of Prosthodontics of the School of Dentistry, Kyung Hee Univ. In 2008, he was promoted to Full Professor and became to Head of Implant Center, Kyung Hee Medical Center.

He is a Director of Academic Affair of the Korean Academy of Prosthodontics, a Secretary of Korean Academy of Sports Dentistry, and a Vice President of ICOI Korea (2007-present). He received the Ko-Hwang Medical Award (bronze), Kyung Hee Medical Center, Korea, 2000 and 2006. He received the Best Post Presentation Award at the ITI World Symposium, ITI Foundation (Straumann Institute), Switzerland (2000). Since 2004, he is serving as an Editor of the Korean Journal of Prosthetic Dentistry and the Korean Journal of Stomatognathic Function and Occlusion. In 2008, he was became to the Faculty of ITI.

His research interests and focuses are in the fields of biomechanics of the implant dentistry and related areas, occlusion, and sports dentistry.

Michael MacEntee, PhD, LDS(I), Dip. Prosth, FRCD(C)

Dr. MacEntee is Professor of Prosthodontics and Dental Geriatrics, Faculty of Dentistry, University of British Columbia. He has been involved for most of his academic career with the oral health needs of elders - as a prosthodontist, a teacher, and a researcher. He established the ELDERS (Elders' Link with Dental Education, Research and Service) Group with colleagues at UBC to provide administrative structure to the service needs of our ageing population and to the educational needs of dentists and dental students within an overall context of research.

His work over the years includes contributions to epidemiology, biomaterials, clinical science, and, most recently, to the oral health needs of elderly populations. His research in recent years addresses oral health and quality of life in old age, with a particular focus on frailty and the psychosocial impact of oral prostheses. He serves on several editorial boards for prosthodontic and geriatric journals, and has published extensively on the measurement, distribution, impact and management of oral disorders of older adults. He is a past-president of the Association of Prosthodontists of Canada, the Royal College of Dentists of Canada, and the International College of Prosthodontists.

Recently, he received the Distinguished Scientist "Geriatric Oral Research Award" from the International Association for Dental Research.

Kenneth Malament, DDS, MScD

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. He is President of the American Board of Prosthodontics. In Boston, Dr. Malament has a full time practice that includes a dental laboratory with Master Dental Technologists. He is a Clinical Professor at Tufts University in postgraduate prosthodontics.

Dr. Malament has served as the President of the Greater New York Academy of Prosthodontics, Northeastern Gnathological Society and Northeastern Prosthodontic Society, Secretary of the American College of Prosthodontists and Secretary-Treasurer of the International College of Prosthodontists.

He is a Fellow of the American College of Prosthodontists, Academy of Prosthodontics, Greater N.Y. Academy of Prosthodontics and Northeastern Gnathological Society and an active member of the American Academy of Fixed Prosthodontics, American Academy of Esthetic Dentistry and Academy of Osseointegration. He was on the research and development teams for two different well-known ceramic products and developed instrumentation used in clinical practice.

Dr. Malament has been a consultant to three journals and has published in the dental literature in the areas of all-ceramic survival statistics, fixed and implant prosthodontics, risk analysis, occlusion, material science and periodontics.

Invited Speakers

Takahiro Ogawa, DDS, PhD

Dr. Takahiro Ogawa is widely recognized as a pioneer in photo-energy- and photocatalysis-based functionalization of oxide metals. Dr Ogawa directs Laboratory of Bone and Implant Sciences (LBIS) in UCLA Weintraub Center and is currently an Associate Professor in Division of Advanced Prosthodontics at UCLA School of Dentistry.

Research areas of interest include implant surface science and technology, nano-design and –fabrication of biomaterials, detoxification and bioactivation of oxidant-generating materials, and osteogenic enhancing molecules.

Dr Ogawa holds over 10 patents and published 95 papers in peer reviewed journals, including largely the highly respected journals in the field, such as Journal Bone and Mineral Research, Biomaterials, and Tissue Engineering. Students and postdoctoral researchers in his team received more than 20 scientific awards in the last five years.

Dr. Ogawa currently serves as a President-Elect of IADR Prosthodontic Group.

Sang-Chun Oh, DDS, MsD, PhD

Dr. Oh is a Professor at the Department of Prosthodontics, and a Director of the Sanbon Dental Hospital, Wonkwang University in Korea.

He received his DDS degree from Wonkang University in 1989. He obtained his postgraduate training in prosthodontics at the Iksan Dental Hospital of the same University. He received his PhD degree from Kyunghee University, Korea in 1997. He was a Visiting Research Scientist at the Department of Prosthodontics and Dental Materials at the University of Zurich, Switzerland in 1999.

His research interests focus on the geometric analysis for esthetic restorations, all-ceramics such as the heat-pressable glass-ceramics and zirconia ceramics, and the computerized dentistry including CAD/CAM for dentist and dental laboratories, CAD/CAM materials, computerized implantation.

C. Peter Owen, BDS, MScDent, MChD

Peter Owen is currently Professor and Head of Prosthodontics at Wits University. He was actively involved in the anti-apartheid struggle within South Africa, holding executive positions in a number of anti-apartheid organisations and was part of the six-person team that drafted the National Health Plan for the first democratic elections in 1994.

In prosthodontics his main interest is the interpretation and transformation of technology for greater accessibility – the use of "*appropriatech*" – and the development of principles and protocols as clinical guidelines. He has developed a computer-based assessment system for clinical disciplines, and software for e-learning.

He has been the Treasurer of the ICP for a number of years, is a member of the Academy of Prosthodontics of SA, the IADR, and the Board of Children of Fire International, an NGO which helps child victims of fires. He has made over 80 presentations locally and internationally and has over 150 of a variety of publications. Current non academic interests include golf and painting in oils and pastels.

Sandro Palla, DMD, PhD

Professor Sandro Palla just retired from his position at the University of Zurich, where he has been chairman of the Clinic of Masticatory Disorders, Removable Prosthodontics, and Special Care Dentistry between 1981 and 2009. 2007 – 2009 he served as Dean of the Center for Oral Medicine, Dental and Maxillo-Facial Surgery.

He has authored numerous research papers on craniomandibular disorders, orofacial pain, temporomandibular joint biomechanics/imaging and removable prosthodontics and has lectured throughout the world on these topics.

He is an active member of several international pain and dental associations in some of which he served as president. At present he is Associate Editor of the Journal of Orofacial Pain and Odontology.

Invited Speakers

Alan GT Payne, BDS, MDent (Witw), DDSc (Otago), FCD (SA)

Dr Payne is Associate Dean for Graduate Studies and leads the Oral Implantology Research Group, Sir John Walsh Research Institute, School of Dentistry, University of Otago, New Zealand.

His research team conducts clinical trials along with laboratory-based research on both implant overdentures and single implant crowns. Their evidence-based treatment approach in providing evidence for reducing the delay between oral implant placement and loading is internationally recognized.

He lectured by invitation internationally and serves as a member of editorial boards for numerous peer-reviewed journals. Currently he is supervising several PhD and clinical doctorate students researching new parameters in these treatment paradigms. Dr Payne also maintains a part-time practice limited to prosthodontics.

Harry Reintsema, DDS, PhD

Harry Reintsema graduated from Dental School in Groningen, The Netherlands in 1982 and defended his Ph.D.-thesis in 1988. He is working as a dentist / maxillofacial prosthodontist since 1984, and is head of the UMCG Center for Special Dental Care and Maxillofacial Prosthetics since 2003.

His fields of interest concern e.g. the dental / prosthetic treatment of Head-and-Neck Oncology patients and patients with congenital or acquired oro-facial defects, and dental (implant) treatment in general. He is (co-)author of several articles and books on implant dentistry and maxillofacial prosthetics, and has participated in the organization of several conferences and workshops on maxillofacial prosthetic subjects.

He has been on the board of the Dutch Society for Gnathology and Prosthetic Dentistry (NVGPT) from 1992- 2002 and member of the International Society for Maxillofacial Rehabilitation (ISMR) executive council since 2007.

Jana Rieger, PhD

Jana Rieger is the Program Director for Functional Outcomes at the Institute for Reconstructive Sciences in Medicine (iRSM) in Edmonton, Alberta, Canada. Dr. Rieger established both the Head and Neck Surgery Functional Assessment Laboratory and the Stomatognathic Function Laboratory at iRSM.

She holds a joint appointment between iRSM and the University of Alberta, where she is an Associate Professor in Rehabilitation Medicine. Dr. Rieger is currently supported by the Alberta Heritage Foundation for Medical Research as a Heritage Researcher (Population Health Investigator). She is studying the effect of pharmaceutical and surgical interventions to determine the most effective approach to prevent xerostomia and maintain functional ability and quality of life in patients with head and neck cancer.

Other current research interests include determination of function after surgical reconstruction and prosthetic rehabilitation of structures of the head and neck. Dr. Rieger has lectured internationally by invitation on functional outcomes of head and neck surgery and has published in scientific journals on research in this area.

Clark M. Stanford DDS, PhD

Dr. Clark Stanford is the Associate Dean for Research and Centennial Fund Professor for Clinical Research, Dows Institute for Dental Research and Department of Prosthodontics, College of Dentistry, University of Iowa. He holds secondary appointments in the Department of Orthopaedic Surgery and the Department of Biomedical Engineering. Dr. Stanford received his BS, DDS, Certificate in Prosthodontics and Ph.D. from the University of Iowa.

He runs the Office for Clinical Research and is Director for the Nanoscience section of the NIH Institute for Clincal and Translational Sciences (ICTS) at the University. He is the author 8 book chapters, 64 published papers and more than 140 published research abstracts.

He is the recipient of 15 academic awards including the 2007 State of Iowa Regents Award for Faculty Excellence and the IADR Distinguished Scientist Award (2007). He see patients in a intramural practice at the University with am emphasis in implant Prosthodontics and congenital anomalies.

Invited Speakers

Hishashi Taniguchi, DDS, PhD

Dr. Hisashi Taniguchi received his DDS degree from the Faculty of Dentistry at the Tokyo Medical and Dental University, Japan in 1979 and his PhD from the Graduate School at the same University in 1984.

He also gained certification from the Japan Prosthodontic Society as Accredited Dentist/Accredited Instructor in 1997. He has been Professor and Chair for the Department of Maxillofacial Prosthetics, Graduate School, Tokyo Medical and Dental University since 1999.

He has also been an Executive Councilor of the International Society for Maxillofacial Rehabilitation (ISMR) since 2003 and a Director of the Japanese Academy of Maxillofacial Prosthetics since 1997. He is currently vice-president of Tokyo Medical and Dental University.

Ann Wennerberg, DDS, PhD

Ann Wennerberg became a dentist in 1979, PhD in 1996, a license degree in Prosthodontics in 1997 and became Professor in Prosthodontics 2002.

She is the head of the Department of Prosthodontics, Faculty of Odontology, Malmö University, Sweden.

Her main research is aimed at finding optimal solutions for implant surfaces. Dr. Wennerberg has written above 130 scientific papers published in international peer reviewed journals. She has received several national and international awards for her research about implant surface topography.

Shane White, BDent Sc, MA, MS, PhD

Dr. White graduated from dental school at Trinity College, Dublin, Ireland, spent several years in private practice, then received Certificates in Prosthodontics and Endodontics, and an MS degree in Oral Biology from UCLA, as well as a PhD in Craniofacial Biology from USC.

He has won several major awards for his research. He has held several National Institutes of Health (NIH/NIDCR) grants as principal investigator. His creative activities broadly span basic science, clinical outcomes and teaching approaches. His research interests include dental biomaterials, principally cements and ceramics.

Currently, he focuses upon natural bioceramics, particularly on the genetic-structural relationships for enamel and dentin. He has authored approximately 90 research papers. He has given several hundred invited scholarly presentations. Currently, he is a Professor at the UCLA School of Dentistry, where he has served as Chairman of the Section of Endodontics. Amongst other university leadership positions, he currently serves as a member of the UCLA Faculty Senate Executive Board and is an incoming member of the UC system-wide Academic Council.

He is also a faculty member of the UCLA Center for Esthetic Dentistry and of the Center for Craniofacial Molecular Biology at the USC School of Dentistry.

Jonathan Wiens, DDS, MSD

Jonathan P. Wiens received his DDS from the University of Detroit in 1973. He completed advanced prosthodontic training in fixed and removable prosthodontics and maxillofacial prosthetics at the Mayo Graduate School of Medicine in 1979 and received a MS degree.

He achieved Diplomate status of the American Board of Prosthodontics in 1982 with ABP recertification in 2004. He was recently elected as a Board Examiner and currently serves as the Secretary-treasurer. He is in private practice limited to prosthodontics in West Bloomfield, Michigan since 1979.

He has held teaching positions at University of Detroit Mercy were he reached the rank of Clinical Professor. He also is the attending staff maxillofacial prosthodontist in the Craniofacial Department at Providence Hospital, DMC in Southfield, Michigan. He is the Vice-president and Scientific Program Chair and Fellow of the American College of Prosthodontists and Dr. Wiens is a Past-president of the Academy of Prosthodontics and the American Academy of Maxillofacial Prosthetics.

Invited Speakers

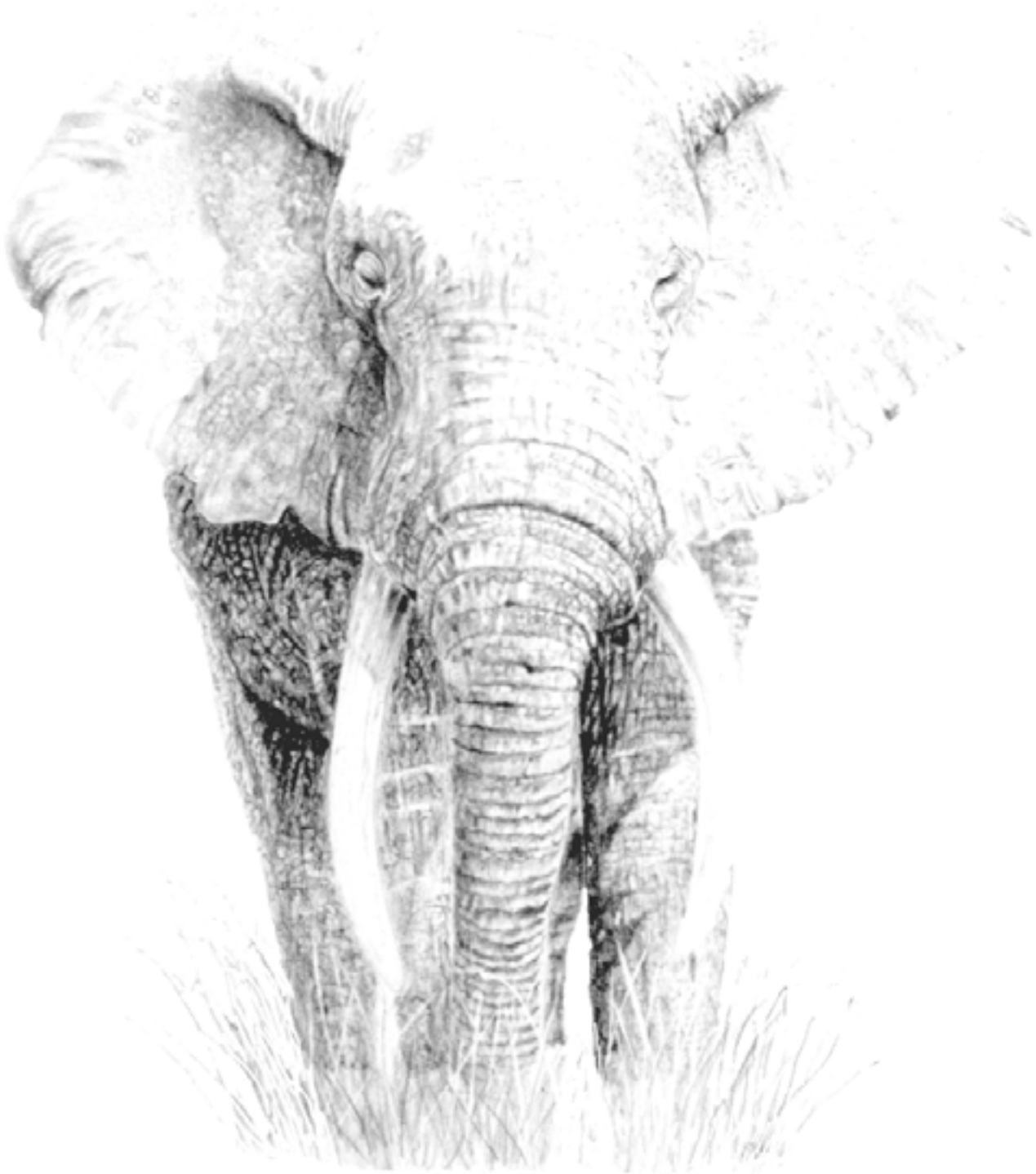
Robert F. Wright, DDS, FACP

Diplomate, American Board of Prosthodontics
Director, Advanced Graduate Prosthodontics
Associate Chair of restorative Dentistry and Biomaterials Sciences
Harvard School of Dental Medicine

Dr. Wright has held the position of Director of Advanced Graduate Prosthodontics at the Harvard School of Dental Medicine since October 2004, where he is appointed as Associate Professor of Restorative Dentistry and Biomaterials Sciences. The program has been completely restructured under his direction and the program has become a highly competitive program for admission. The clinical productivity has more than tripled with his leadership. He received his B.S. from the University of Memphis and his D.D.S. from the University of Tennessee at Memphis in 1982. He completed his fellowships at Memorial Sloan Kettering Cancer Center/Cornell University. His career in dental education began at Columbia University School of Dental and Oral Surgery where he went on to serve as Director of the Division of Prosthodontics for 12 years. Dr. Wright was a tenured professor at Columbia University.

Dr. Wright has published extensively in the medical and dental literature and has lectured throughout North America and Asia. His research is in maxillofacial prosthodontics, implants, dental materials, education, and clinical trials. He is a Diplomate of the American Board of Prosthodontics and Fellow of the American College of Prosthodontists. He is a fellow of the Greater New York Academy of Prosthodontists, the American Academy of Maxillofacial Prosthetics and the American College of Dentists. He served on the American Academy of Fixed Prosthodontics' Board of Directors. Dr. Wright is a member of the American Dental Association, International College of Prosthodontists, and the Academy of Oseeointegration. He has served as a prosthodontic site visitor and a Prosthodontic Review Committee member for the Commission on Dental Accreditation. He serves on the editorial review board of the Journal of Prosthetic Dentistry and Quintessence International. He is also an editor for the Journal of Prosthodontics. He currently practices at the Harvard Dental Center.

Thursday, September 11th
ICP Graduate Student Treatment Planning Session



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

The ICP reserves the right to cancel or modify its program as circumstances might dictate.

Case Paper: A

A Case Report Of Prosthodontic Treatment For Irregularity Of Occlusal Plane By Missing Teeth And Inadequate Prostheses

Ryo Akatsuka
Tohoku University Graduate School Of Dentistry
Division Of Advanced Prosthetic Dentistry
Sendai, Japan

Purpose: A case is a 62-year-old man with complaints of pain and gingival enlargement in right lower molar area. He was referred to the prosthodontic clinic in Tohoku University Hospital after removing implants at the left upper and right lower molar area and extracting teeth 25, 43 and 48 (FDI) at the dental surgery clinic.

He was diagnosed with esthetic disturbance and masticatory dysfunction due to missing teeth and inadequate maxillary and mandibular prostheses. Judging from the extrusion of residual teeth, occlusion with the inadequate prostheses, enlargement of the freeway space and the facial appearance, he was also diagnosed as having the irregular occlusal plane and vertical dimension loss in the intermaxillary relation. Hence it is reported that irregularity of occlusal plane is one of the factors to cause the occlusal trauma of the teeth, their supporting structures, and temporomandibular joints, correction of the irregularity in his occlusal plane was planned.

Maxillary and mandibular treatment dentures were immediately made and inserted for restoring the occlusal support. After finishing the needed endodontic and periodontal treatment of the residual teeth, composite resin post and core or cast metal post and core were applied at 14, 15, 23, 24, 31, 32, 34, 35, 41 and 42. Because of root fracture, 16 and 17 were extracted and artificial teeth were added to the dentures. Irregularity in his occlusal plane and the occlusal vertical dimension were restored by reconstruction of the occlusal surfaces of the artificial teeth of treatment dentures and provisional restorations at 14, 15, 23, 24, 31, 32, 34, 35, 41 and 42, for having the adequate occlusal supports and occlusal vertical dimension. Bilateral balanced occlusion was applied as occlusal schema for the denture stabilization. To estimate the occlusal plane, the diagnostic casts were mounted by use of face-bow transfer. Confirming no complications after follow-up observation, the final prostheses were applied.

The patient has had a good satisfaction thereafter. To obtain a good prognosis, continuous regular follow-up and observation of occlusal condition should be needed.

Case Paper: B

Anterior Cross Bite With Prognathism

Jee Hwan Kim
Yonsei University Dental College
Prosthodontics
Seoul, South Korea

Purpose: This patient is a 55 year-old man who has anterior cross bite with deep vertical overlap of 10mm and negative horizontal overlap of 6mm. His chief complaint is ‘the need for upper prosthesis’. Some teeth of upper dentition (#13,14,15,22,23,24,25) were missing. In this case, there was a discrepancy between the centric relation and the maximum intercuspation. When at the centric relation position, the relation of anterior dentition was edge to edge relation, but it became anterior cross bite state at the maximum intercuspation. Anterior interferences in centric relation were in need to be removed. When it was removed, mandible move more anteriorly, resulting in anterior cross bite again. Various treatment options were considered.(orthodontic surgery, non-correction of dental relation)

Stage of execution: Upper Provisional denture

Final treatment plan: extraction of #27,47
Upper : Removable partial denture & surveyed crown on #26 & surveyed splinted crown on #12,11,21,#16,17
Lower : Crown on #33,34,35,36,37,43,44,45,46,

Other Options for upper jaw treatment:

1. Implantation on #13,14,15,#22,23,24,25 & crown on #12,11,21(splint), #16,17(splint), #26
2. Orthognathic surgery to correct anterior crossbite & removable partial denture or fixed implant prosthesis

Prosthetic concerns:

1. Class III malocclusion with mandible overgrowth (anterior dental relation; vertical overlap 10mm, negative horizontal overlap 6mm)
2. Vertical dimension
3. Discrepancy between centric relation and maximum intercuspation

Methods & Materials: Stage of execution: Upper Provisional denture

Results: Final treatment plan: extraction of #27,47
upper : removable partial denture & surveyed crown on #26 & surveyed splinted crown on #12,11,21,#16,17
lower : crown on #33,34,35,36,37,43,44,45,46,

Conclusion: Other Options for upper jaw treatment
1.Implantation on #13,14,15,#22,23,24,25 & crown on #12,11,21(splint), #16,17(splint),#26
2.Orthognathic surgery to correct anterior crossbite & removable partial denture or fixed implant prosthesis

Prosthetic concerns:

1.Class III malocclusion with mandible overgrowth (anterior dental relation; vertical overlap 10mm, negative horizontal overlap 6mm)
2.Vertical dimension
3.Discrepancy between centric relation and maximum intercuspation

Case Paper: C

Simplified Approach In Treatment Planning For A Geriatric Cleft Patient

Lai, Agnes*
University Of Sydney
Faculty Of Dentistry - D Clin Dent (Prosthetics)
Sydney, Australia

Purpose: Presentation: Mr. S is a 72 year-old partially dentate patient presenting with a debilitated oral condition with generalised dental caries and odontogenic pain.

Methods & Materials: History: Mr. S presented with a complete unilateral right-sided cleft. Despite the Z-plasty surgery during childhood, facial and maxillary asymmetry remains together with uneven contour and scarring of the lip. The palatal surgery did not achieve full palatal closure which has resulted in a residual fistula in the anterior palate and buccal sulcus of 13. As a result Mr. S's velopharyngeal insufficiency remains. However, Mr. S has adapted well physiologically (swallowing reflex and speech) and does not have any communication difficulties.

Results: Main Concern: to maintain a healthy oral condition, preserve the residual dentition, and achieve satisfactory function and aesthetics. Mr. S would prefer to avoid major surgery considering his age and role as a full-time carer at home.
Prosthodontic Challenge: cleft anatomy, uneven ridge contour, mal-aligned teeth (forming an unfavourable transition zone), discrepancy in the dento-facial midline, lack of inter-arch space (as a result of occlusal instability and collapse), and severe attrition.
Treatment Considerations: Is a removable solution involving implant and tooth support a viable treatment option? Considering the patient's chief complaint, lifestyle and need, a patient-centred, evidence-based treatment plan has been followed.
Full-mouth rehabilitation was designed: (a) utilising a telescopic removable prosthesis in the maxilla supported by residual teeth and an implant to avoid a distal extension saddle to enhance support; (b) in the mandible fixed dental prostheses for the remaining dentition (10 units) and a single implant crown were selected.

Conclusion: Outcome Assessment: SCL90R and OHRQL questionnaire with 5-point Likert score has been employed.

Clinician: Agnes Lai
Supervisor: Associate Professor Stefan Scholz
Course Co-ordinator: Professor Iven Klineberg

Case Paper: D

Clinical Treatment Planning

M. Sad Chaar (Dds, M.Sc.)1 / Wael Att (Dds, Dr Med Dent)2 1Postgraduate Student 2Clinical Associate Professor, Director Of Postgraduate Program
School Of Dentistry, Albert-Ludwigs-University
Department Of Prosthodontics
Freiburg, Germany

Purpose: A sixty one-year old female patient (Mrs. G.W) visited the Department of Prosthodontics, Albert-Ludwigs University Hospital, Freiburg, Germany. She was concerned about the insufficient 3 year-old prosthetic treatment. Her primary goals were to avoid removable denture and to improve her masticatory function. Her medical history was noncontributory, and her extraoral and TMJ findings were within normal limits.

All old crowns and fixed dental prostheses (FDPs) were inadequate with multiple secondary caries, missing teeth nos. 27, 37, 36. She had generalized chronic moderate periodontitis. The prognosis was hopeless for tooth no. 25, fair for tooth no. 34.

Methods & Materials: For an evidence-based treatment planning a number of scientific papers were considered and two varieties of treatment planning were established: The first one by implant-supported single crowns (SCs) and replacing the old crowns in the posterior segments, and the other one with conventional fixed dental prostheses (FDPs) and new metal ceramic crowns.

Given the previously mentioned findings, scientific evidence, patient desire and financial limits, a general treatment plan was established for a conventional FDP in the maxilla, implant-supported SCs in the mandible and renewal of the insufficient crowns in the posterior segments.

We worked with the ideals of synoptic treatment concept. So we started with preprosthetic treatment phase I and II. Before the definitive prosthetic treatment, we evaluated the patient´s biologic and biomechanical response to therapy, including stability of implants and prognosis of remaining teeth.

Results: The prosthetic phase was carried out using the conventional protocol consisting of full-arch impressions, jaw relation records, facebow registration, shade selection, articulator mounting (semi-adjustable), full-contour wax-up, abutment selection, fabrication of the definitive restorations, try-in, and final cementation and placement. From a restorative design standpoint, there were several prosthetic variables associated with implant-supported fixed restorations:

. Screw-retained versus cement-retained implant-supported restorations.
. Splinting versus individualizing the implant-supported restorations.
. Restorative materials (porcelain-fused to-metal versus all-ceramic technology).

These points are going to be discussed in the presentation. The patient was enrolled in four-month periodic recall program. The clinical case as well as one-year outcome will be presented in the treatment planning session.

Conclusion: Abstract Info Presentation Type Graduate Student Title Evidenced-Based Treatment Planning Author M. Sad Chaar (Dds, M.Sc.)1 / Wael Att (Dds, Dr Med Dent)2 1Postgraduate Student 2Clinical Associate Professor, Director Of Postgraduate Program Institution School Of Dentistry, Albert-Ludwigs-University Department Department Of Prosthodontics Location Freiburg, Germany Abstract Paper Purpose A sixty one-year old female patient (Mrs. G.W) visited the Department of Prosthodontics, Albert-Ludwigs University Hospital, Freiburg, Germany. She was concerned about the insufficient 3 year-old prosthetic treatment. Her primary goals were to avoid removable denture and to improve her masticatory function. Her medical history was noncontributory, and her extraoral and TMJ findings were within normal limits. All old crowns and fixed dental prostheses (FDPs) were inadequate with multiple secondary caries, missing teeth nos. 27, 37, 36. She had generalized chronic moderate periodontitis. The prognosis was hopeless for tooth no. 25, fair for tooth no. 34. Methods For an evidence-based treatment planning a number of scientific papers were considered and two varieties of treatment planning were established: The first one by implant-supported single crowns (SCs) and replacing the old crowns in the posterior segments, and the other one with conventional fixed dental prostheses (FDPs) and new metal ceramic crowns. We worked with the ideals of synoptic treatment concept. So we started with preprosthetic treatment phase I and II. Before the definitive prosthetic treatment, we evaluated the patient´s biologic and biomechanical response to therapy, including stability of implants and prognosis of remaining teeth. The prosthetic phase was carried out using the conventional protocol consisting of full-arch impressions, jaw relation records, facebow registration, shade selection, articulator mounting (semi-adjustable), full-contour wax-up, abutment selection, fabrication of the definitive restorations, try-in, and final cementation and placement. Results From a restorative design standpoint, there were several prosthetic variables associated with implant-supported fixed restorations: . Screw-retained versus cement-retained implant-supported restorations. . Splinting versus individualizing the implant-supported restorations. . Restorative materials (porcelain-fused to-metal versus all-ceramic technology). These points are going to be discussed in the presentation. The patient was enrolled in four-month periodic recall program. Conclusion The clinical case as well as one-year outcome will be presented in the treatment planning session.

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

The ICP reserves the right to cancel or modify its program as circumstances might dictate.

1

Super Osseointegration

Ogawa, T.
Weintraub Center for Reconstructive Biotechnology
UCLA School of Dentistry
Los Angeles, CA USA

Osteoporotic fractures, degenerative changes in joints, and edentulous jaws are quite common clinical problems. Titanium implants are used as a reconstructive anchor in such diseases and disorders. Here, we present an ultraviolet (UV) light-treated titanium surface with markedly increased osteoconductivity. The light-treated surfaces offer osteoblast-affinity environment, as shown in expedited and enhanced migration, attachment, spread, adhesion, proliferation and differentiation of the cells, as well as increased protein adsorption.

Newly formed bone spreads extensively onto the light-treated titanium with virtually no intervention by soft tissue, maximizing the bone-implant contact to nearly 100%. The light treatment accelerated the establishment of implant biomechanical fixation by 4-folds. These cell-affinity properties strongly correlated with UV-catalytic removal of hydrocarbons from the TiO2 surfaces. We have thus developed a novel photofunctionalization of titanium enabling more rapid and complete establishment of bone-titanium integration. This unique biological phenomenon was found to be induced by distinct titanium surface properties from the ones of current understanding.

2

Masticatory Muscle Pain: A Overuse Problem?

Palla, S.
Clinic Masticatory Disorders, Removable Prosthodontics & Special Care Dentistry
University of Zurich
Zurich, Switzerland

There is good evidence that prolonged low-level muscle contractions or repetitive muscle work, as it likely happens during wake time parafunction can lead to tissue damage, that in turn leads to nociceptive activation and muscle pain (overuse injury). A strong and consistent association exists between exposure to prolonged or monotonous muscle-work and upper extremity muscle pain. Thus, the masticatory muscle pain (MMP) may also be due to muscle overuse caused by occlusal parafunction as (1) pain patients report parafunction more frequently than controls, (2) MMP develops after long lasting muscle contractions and (3) about 20% of sleep bruxers wakes up with facial pain.

Wake time parafunction is more similar to prolonged/monotonous muscle-work than sleep bruxism, because the former is accompanied by prolonged, low-level clenching, making wake time parafunction a more relevant risk factor than sleep bruxism. This hypothesis is supported by the following observations: (1) low-intensity muscle contractions can cause muscle damage provided that the load imposed on muscle tissue is static and of long duration (2) prolonged low-level but not high-level clenching tasks leads to deep tissue hyperalgesia, (3) MMP patients have the habit to keep the teeth in contact nearly four times more often than normal subjects, and (4) the advice to relax and to keep the teeth out of contact often leads to pain remission.

The “Cinderella hypothesis” provides a plausible explanation for the generation of localized tissue damage after long lasting low-level muscle contractions. The hypothesis postulates that some motor units containing type I fibers (“Cinderella motor units”) are contracting throughout the entire motor task, and may therefore become overloaded and damaged leading to focal inflammation and, eventually, to nociceptor sensitization and muscle pain.

Motor unit territories in the human jaw muscles are focally distributed, and the intra-muscle contraction pattern shift between tasks, but not during a prolonged low-intensity muscle contraction in the majority of evaluated subjects. This could indicate individual contractions strategies with individuals with a more regionalized, eg, more stereotyped contraction patterns being possibly more at risk to develop a regional MMP. Consequently, it is possible that during specific tasks, *e.g.* parafunctional habits, selected muscle fibers contract for longer periods. Indeed, Cinderella motor units have been recorded from the masseter muscle during prolonged low-level clenching tasks by means of fine wire intramuscular electrodes. These motor units are therefore the most likely candidates for initiating a localized muscle pain.

Thus, while it is likely that short lasting muscle overuse can lead to tissue changes that lead to activation and sensitization of the muscle nociceptors eliciting localized muscle pain, tenderness to palpation and motor function alterations, it is also evident that these tissue changes disappear within few days. The mechanical overuse can therefore not lead by itself to the development of chronic pain. However, persistence of nociceptive barrage may lead to central sensitization and therefore to a state of enhanced pain sensitivity, increased temporal summation of painful stimuli and psychological distress that all concur to the development of chronic masticatory muscle pain.

3

Enhancing the Bone-Implant Interface?

Clark Stanford
Dows Institute for Dental Research
Department of Prosthodontics
College of Dentistry, University of Iowa
IA, USA

Medical device therapies have developed to improve patient-care outcomes often with an singular emphasis on the bone-to-implant contact (BIC) at the interface. While this is important, it is not the only interface important to patient outcomes. Biological interfaces are dynamic by nature and "optimal" goals such as increasing BIC would appear to be a common goal of research efforts.

Unfortunately, this ignores the fact that the interface is in continuous remodeling both at the interface and at a distance from the surface with many of these functions being mediated by an inflammatory response that cannot be modeled using *in vitro* approaches. The ability of the interface to continuously remodel is a key to long term outcomes. Many of these issues are targeted at earlier or "immediate" loading yet implant outcomes can be clinically predictable with appropriate surgical techniques (indirect sinus lifts, grafting site development, distraction, simply more time healing in an unloaded state, etc.).

The larger issue is the long-term outcomes of the implant interface and the bony response to loading within the complex systems level complexity of the patient. One example is the long-term potential for bone turnover, bone loss and subsequent recession in patients with systemic risk factors such as altered inflammatory responses (such as, periodontal disease risk factors), or congenital anomalies such as the ectodermal dysplasias, some of which affect key pathways in inflammation and bone development (NF-KB).

The results can be significant impact on outcomes that do not relate to the implant device itself but may relate to systems design (surface, abutment composition, shape, surgical intervention, prosthetic design, patient risk factors, etc.). The complexity is there, creating an enhanced set of predictive risk factors in assessment is the key to understanding and placing the role of implant surface technologies within the greater context of outcomes of patient care, in general.

4

Status of Adhesive Biotechnology in Fixed Prosthodontics

Creugers, N.
Department Oral Function and Prosthetic Dentistry
Radboud University Nijmegen
Nijmegen, The Netherlands

Adhesive biotechnology in prosthodontics has been utilized in differing clinical situations and for sufficient duration that permits some valuable analyses of success and failure parameters for partial and full coverage restorations. This presentation will present an overview of the key findings from the scientific literature and will describe the principles on which prosthodontic rehabilitations utilizing adhesive biotechnology can be founded.

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

The ICP reserves the right to cancel or modify its program as circumstances might dictate.

5

Implant Supported Overdentures for the Elderly

Kung-Rock KWON
Department of Prosthodontics
School of Dentistry, Kyung Hee University
Seoul, Korea

Edentulous patients with a severely resorbed mandible represent a significant health care problem in the growing elderly population. Despite adequate denture fabrication, it is not possible in many instances to achieve optimal retention and stability in the conventional mandibular denture. This may be caused by poor jaw and ridge relationship, psychologic conditions, reduced neuromuscular coordination, inadequate quality and quantity of available bone and alveolar mucosa.

Zarb et al. described that the quality of life of elderly edentulous patients can be improved using interforaminal implants to resolve the edentulism. There also was a consensus statement at McGill University of mandibular two-implant overdenture as the first choice standard of care for edentulous patients. Overdenture retained by two or four implants has shown to be a highly successful prosthetic treatment similar to the fixed implant denture. A variety of attachment systems have been used to retain overdentures, generally, these can be classified as clips-and–bars, balls, and magnets. The selection of an attachment system is mainly related to the personal choice of the practitioner and/or laboratory responsible, based on experience and training. The clinical trial has compared clinical outcomes.

According to the conventional Branemark protocol, periods of 3 months and 6 months have been recommended as healing times for osseointegrated implants placed in the mandible and maxilla, respectively, during which functional loading should be avoided. However these long healing periods before functional loading are not based on histologic and experimental results, but are from empirical clinical experience. These periods can impose not only functional challenges, but also inconvenience of the edentulous state to the patient.

The evaluation of different early loading protocols for unsplinted implants for mandibular overdentures opposing conventional complete maxillary dentures is best achieved by comparing groups with different reductions in healing times.

---

overdenture, attachment, immediate function

6

The Radiological Evaluation Of 110 Patients Treated With Three Different Overdenture Treatment Strategies 18 Years After Treatment

D.Wismeijer*, W Geraerts, D.Anssari
ACTA Academic Center For Dentistry Amsterdam Free University
Department of Oral Implantology and Prosthetic Dentistry
Amsterdam, The Netherlands

Purpose: From 1990-1992 110 patients were treated with dental implants and an overdenture following three different treatment protocols in the Ignatius Hospital in Breda the Netherlands. In this RTC we called BIOS (The Breda Implant Overdenture Study) they were either treated with 2 ball attachments, 2 implants with a bar or 4 interconnected Straumann implants. Of the 110 patients included initially after 18 years a little over 80 patients are still being followed

Methods & Materials: During the follow up of these patients orthopantomograms have been made on a regular basis. Bacteria analysis has also been carried out.

Results: In this presentation we will discuss the bone loss and implant loss as it has developed over time when looking at the X-rays and comparing the 3 treatment strategies. The patients treated with four interconnected implants showed more bone loss. Bacteria analysis showed that in edentulous patients AA and PG presence correlated with the evaluated bone loss.

Conclusion: OPT's are a good instrument to evaluate bone loss over time. It would seem prudent to test patients on the presence of pathogenic bacteria when bone loss around implants is diagnosed on X-rays.

7

Mandibular Single Implant Overdentures: A Randomized Controlled Trial Using An Early Loading Protocol With Different Implants And Attachment Systems

Alsabeeha, N*, Payne AGT, De Silva RK, Swain MV
University of Otago
Oral Implantology Research Group, Sir John Walsh Research Institute
School of Dentistry
Dunedin, New Zealand

Purpose: To determine surgical and prosthodontic outcomes of single regular and wide diameter implants with standard and novel attachment systems supporting mandibular overdentures.

Methods & Materials: Thirty-six elderly edentulous participants (mean age 67yrs; range 53-85yrs) were randomly allocated to 3 different treatment groups (n=12). Each participant was provided with single implant in the midline symphysis to support a mandibular overdenture opposing conventional complete maxillary denture. The control group participants each received a regular diameter implant (Southern Implants 3.75 mm). Participants in test group 1 each received a wide diameter (Southern Implants 8.00 mm) implant. Participants in test group 2 received a different regular diameter (Neoss 4.00 mm) implant. All implants were placed following standard one-stage surgical approaches with healing abutments connected at surgery. Using a standardized early loading protocol, all patrices were placed (control group -Southern Implants 2.25mm ball abutment; test group 1- Southern Implants 5.90mm novel ball abutment; test group 2- Locator abutment) and the corresponding matrices (Southern gold matrix; Southern novel large plastic cap; Locator nylon insert) were inserted into the intaglio overdenture surface at 6 weeks following indirect reline procedures in pre-fabricated diagnostic dentures. Implant and prosthodontic success were evaluated between baseline (6 weeks) and the one-year recall (52 weeks).

Results: At surgery, the majority of the single implants (72.2%; n=26) were 11-11.5 mm length, whilst the remainder were short implants of 7 and 9 mm (27.8%; n=10). Surgical outcomes were comparable across the 3 treatment groups. Prosthodontic success was high for all groups, but the actual prosthodontic maintenance was significantly lower for the Southern novel large plastic cap in test group 1 participants. The need for replacement of damaged or worn Locator nylon male inserts and activation of Southern gold matrices was observed in test group 2 and control group respectively.

Conclusion: Early loading at 6 weeks of mandibular single implant overdentures (opposed by conventional complete maxillary dentures) can be successful regardless of implant diameter. Within the limitations of this clinical trial, a paradigm shift towards using wide diameter implants and larger attachment systems to support mandibular single implant overdentures is possible.

8

Mandibular Implant Overdentures: Marginal Bone Loss Over 10 Years With Different Loading Protocols And Attachment Systems

Ma, S* & Payne, AGT
University of Otago
Oral Implantology Research Group, Sir John Walsh Research Institute
School of Dentistry
Dunedin, New Zealand

Purpose: To evaluate long-term marginal bone loss for 2 implants supporting mandibular overdentures, with different loading protocols and attachment systems.

Methods & Materials: An original cohort of 106 edentulous participants was treated with mandibular 2-implant

overdentures, opposing complete maxillary dentures. Random allocation was to 3 loading protocol groups (12-weeks, 6-weeks, and 2-weeks) with implants from 1 of 4 systems. One-stage surgery was performed with healing abutments placed in the 12-weeks and 6-weeks groups; whilst the 2-weeks group had patrices (ball abutments) connected. An unsplinted prosthodontic design was used with 6 different attachment systems. Standardized radiographs were taken at baseline (on loading) and the 1, 2, 3, 5, 8, and 10-year recalls. To assess marginal bone loss, proximal bone levels (mesial and distal) were measured with a scale in tenths of a millimeter with 7x magnification on the shielded radiographs. Specified reference points were used by 3 calibrated examiners, with measurements being repeated to minimize intra- and inter-observer variability. Bone loss relative to multiple independent variables, including conventional loading, early loading, and type of attachment system were tested using t-tests and 2-way ANOVA. Strengths of relationships were evaluated with Pearson's correlation coefficient or Spearman's rank correlation coefficient. A 5% level of probability was applied for statistical significance.

Results: Progressive attrition of participants occurred with deaths, drop-outs, and emigration. By the 10-year recall, radiographs of 79 attending participants (74.52%) were measured with 26, 25, and 28 in the 12-weeks, 6-weeks, and 2-weeks loading groups respectively. Time had a significant influence on marginal bone loss, progressing annually at low levels after the first year with episodes of bone loss and gain. No statistically significant differences in marginal bone loss were revealed by implant system, surface, length or abutment height. Data was grouped together to also reveal no significant difference between conventional and early loading or by the type/resiliency of the attachment system over 10 years.

Conclusion: Acceptable, time-dependent long-term marginal bone loss occurs following loading as early as 2 weeks, specifically for 2 unsplinted implants in the mandibular inter-foraminal area supporting an overdenture. It is independent of the attachment system used.

9

Mandibular Implant Overdentures: Long-Term Observations From 10 To 24 Years

R. Mericske*, A. Kollar, S. Huber, T. Ueda
University of Berne
Department of Prosthodontics
Berne, Switzerland

Purpose: The mandibular implant overdenture (IOD) is a popular treatment modality and is based on high evidence. Follow-up studies with a long observation periods are difficult to perform due to the age of the patients. The present data summarize long-term clinical observation of elderly patients with IOD.

Methods & Materials: From 1984 to 1998 174 edentulous patients were consecutively admitted to treatment with IOD supported by a total of 373 implants. Regular maintenance care was provided with 1 up to 3 annual visits. In 2008 all patients available were recalled for a clinical examination, including an OPT. The OHIP -14 was administered.

Results: From 1984 to 2008 altogether 133 patients with a total of 295 implants had completed an follow-up period of >10 years. In 2008 from 101 patients a new OPT was taken. 45 patients were not re-examined; they had passed away (32) or were in frail condition in a nursing home (13). 15 drop outs were registered, and 13 patients had been referred to private dentists. A total of 21 implants failed, 12 after an observation time >10yrs. Reasons for implant removal was mostly increased mobility and only few implants exhibited periimplant bone loss. > 90%. Of the dentures remained in service. The OHIP questionnaire was correctly completed by 83 patients resulting in a mean sum OHIP of 4.14.

Conclusion: This long-term follow up demonstrates that IOD are a favorable solution for edentulous patients with regular maintenance. In spite of specific circumstances in an ageing population long- term care can be provided resulting in a good prognosis and low risk.

10

Will Implant Therapy Improve the Health of Edentate Elders?

Feine, Jocelyne
Departments of Epidemiology, Biostatistics and Oncology
Faculty of Medicine, McGill University
Montréal, Québec, Canada

Edentate elders eat fewer fruits and vegetables than those with teeth, which increases their risk for a number of illnesses, such as cancer and heart disease. There is now evidence that health deteriorates more rapidly than normal in edentate elders and that they die at an earlier age.

Studies show that implant treatment to stabilize dentures has a positive effect on diet and health, and denture wearers who receive mandibular implant overdentures report that their quality of life is significantly improved.

In this presentation, Professor Feine will discuss these findings, so that clinicians can share the information with their patients in decision-making discussions

11

Mind Traps In Prosthodontic Treatment Planning

Bresciano, M*., Morello, M., Poglio, E., Borelli, P.
Albesano, M., Bassi, F.
Università Di Torino
Department of Biomedical Science and Human Oncology
Prosthetic Dentistry Section
Torino, Italy

Purpose: Treatment planning in prosthodontics is a complex decision making process. Several factors condition our decisions, like professional competence, personal experience, clinical organization, etc. In the dental literature, while several studies deal with the patient's personality, little has been published on psychological aspects which may condition the clinician's behaviour. The purpose of this study is to analyze the decision making process in prosthodontics treatment planning and to describe the psychological factors which may interfere with the clinician's decisions.

Methods & Materials: A review of the dental and psychological literature was performed.

Results: Decision making models, "classic" and "descriptive", are discussed. The most common psychological patterns, called heuristics, are presented with examples from everyday clincal practice and evidence from the dental literature.

Conclusion: The prosthodontist should know that his/her decisions can be biased because of psychological conditioning. A more scientific approach to treatment planning, as advocated in Evidence Based Dentistry, might be useful in minimizing clinical errors.

12

Can We Predict Patient Responses To Implant Prostheses?

Walton, J.N.*, Bryant, S.R., Macentee, M.I.
University of British Columbia
Oral Health Sciences
Vancouver, BC, Canada

Purpose: We set out to measure changes in patients' satisfaction, using Visual Analogue Scales (VAS) and the Oral Health Impact Profile (OHIP), and to assess the value of these psychometric instruments as predictors of change following treatment with dentures retained by one or two mandibular implants.

Methods & Materials: As part of a randomized clinical trial comparing mandibular implant overdentures retained by 1 or 2 implants, 85 subjects completed the VAS and the OHIP at baseline and at 1 year post-implant retention of a complete lower denture. We used nonparametric rank tests to analyze changes in VAS and OHIP scores from baseline to post-treatment, and logistic regression to test the predictive power of multivariate models relating to the subjects' responses.

Results: There was a significant improvement in satisfaction identified by both instruments from baseline to 1 year post-implant retention in both groups of subjects ($p < 0.001$), although there were 3 subjects who reported feeling less satisfied with their dentures after treatment and another 6 whose final satisfaction scores were low outliers.

Conclusion: There is great appeal in the use of simple, pre-treatment instruments to predict which patients are more or less likely to be satisfied following implant treatment. While VAS and OHIP measured different experiences and expectations, there was no significant difference between instruments as predictors of responses to treatment.

13

Immediate Function With Fixed Implant-Supported Maxillary Dentures: A 36-Month Follow-Up Study

Tealdo T*, Bevilacqua M, Pera F, Menini M, Ravera G, Drago C, Pera P.
University of Genoa
Department of Prosthetic Dentistry
Genoa, Italy

Purpose: Immediate occlusal loading of dental implants in the edentulous mandible has proven to be an effective, reliable, and predictable procedure. There is little long-term data available on similar treatments in the edentulous maxilla.The purpose of this study was to evaluate the 36-month implant survival after immediate loading of 4 to 6 implants with fixed screw-retained prostheses in edentulous maxillae.

Methods & Materials: Twenty-one patients, edentulous or with remaining teeth to be extracted in the maxilla, received 4 to 6 implants (n=111). The patients were restored with screw-retained fixed provisional prostheses supported by palladium-alloy frameworks within 24 hours after surgery. Insertion torques for implants were at least 40 Ncm. Implants, grouped as tapered or cylindrical screws, were placed in healed bone or extraction sockets. Implants were also classified as either vertical or off-angle. Definitive prostheses were placed after a mean healing time of 18 weeks. Radiographic examinations were made at the time of placement of provisional prostheses and 12, 24 and 36 months later. Between-groups bone resorption was compared using 2-way ANOVA (alpha=.05).

Results: The mean follow-up time for all of the patients was 44 months (range, 37 to 50 months). The cumulative implant survival rate at the 36-month follow-up visits (after surgery) was 94.8%; the prostheses survival rate was 100%. No significant differences were found between the survival of tapered or cylindrical screw-type implants placed in postextraction sockets versus those in healed edentulous sites or between vertical and off-angle placed implants. Eight implants failed during the first 3 months, 5 of which were the most distal implants. The mean reduction in marginal bone height over the 36-month observation period was 1.04 mm (CI 95%; 0.98-1.29 mm).

Conclusion: In this study with 36-month follow-up, 4 to 6 implants were sufficient to successfully support fixed implant screw-retained prostheses in the edentulous maxillae of 21 patients.

14

Dental Appearance And Elderly Persons' Personality Judgment

Müller*, F., Duvernay, E., Legrand, D., Gurny, M.,
Herrmann, F. R., von Steinbüchel, N.
University of Geneva
Division of Gerodontology and Removable Prosthodontics
Department of Geriatrics and Rehabilitation
Geneva, Switzerland

Purpose: Little is known on the importance elderly persons attribute to dental appearance and how it affects their judgement of others. The aim of the study is therefore to evaluate the impact of a natural, stereotype or decayed dentition on their assessment of the personal traits of an interlocutor.

Methods & Materials: From a population based sample 120 young and 120 old randomly selected persons agreed to participate in the study (age 24.9 ± 3.4 and 78.5 ± 9.4 years, respectively). Photographs from a male and a female old person were morphed and electronically modified with three different dental appearances. At first the "dental" origin of the study was masked and the subjects were asked to judge the personality of one of the man's and one of the woman's photos. Further questionnaires like MMSE, OHIP20, SF12, WHO-QoL old and IADL were employed. Finally a short dental examination was performed.

Results: The results indicate a very similar judgement of the persons in the photographs by the young and the old group. Consistently the social class was thought to be higher in photos of persons with stereotype and white teeth than with a natural or decayed dental appearance (Kruskall Wallis: $0.0379 < P < 0.0002$). In contrast, no significant difference was found for the dimensions "social competence", "intelligence" and "psycho-social competence", except for the young group's judgement of the old woman, who was rated more intelligent and psycho-socially competent with a natural, age-adequate dentition. Women and men judged the persons in the photos nearly identical, but the female participants rated the old man in the photo more intelligent and more socially competent than the male participants ($P < 0.05$).

Conclusion: In conclusion, the dental appearance has little impact on elderly persons' appreciation of an interlocutor, yet stereotype and white teeth are associated with a high social class.

15

Challenging Occlusal Concepts

Howes, D.
Department of Prosthodontics, School of Oral Health Sciences
Faculty of Health Sciences
University of the Witwatersrand
Johannesburg, South Africa

Our profession has grappled for well over a century with the manner in which the opposing jaws should relate during function, at rest, in health and disease. From this quandary has evolved varied concepts in an attempt to describe "occlusion". For many reasons these have remained only concepts and confusion has prevailed apart from the accepted need for the maintenance of function and stability of the stomatognathic system.

Studies in the search for answers have evolved from the description of static morbid anatomy in the 1800's through advanced mechanical models to complicated neurophysiological techniques used today. These generally have produced more questions than answers, particularly when confounded with psychological influences and advancing treatment alternatives such as implants which continue to move the goalposts.

This lecture will attempt to separate fact from fiction with the growing need for evidence in occlusal management and stand to challenge and be challenged by those concepts that we have ourselves created.

16

20 Year Outcome In Cases With Severely Reduced Dentition Treated With Conical Crown Restorations

Walther, W.*, Mueller-Koelbl, I., Pauls, U.
Institute for Continuing Professional Development
Akademie Für Zahnärztliche Fortbildung
Karlsruhe, Germany

Purpose: In cases with severely reduced dentition the prognosis of the remaining teeth should be assessed carefully prior to prosthodontic treatment. In principle preservation of teeth is the ultimate goal of treatment plannig even in jaws with less than 6 teeth left. But in those cases prognostic considerations appear to be most challenging as scientific information about the long-term fate of the reduced dentition is sparse. Therefore the outcome 20 years after prosthodontic therapy was analysed in a patient population treated with conical crowns.

Methods & Materials: Patients that had been treated in a dental clinic during the period 1982-1986 were analysed. To be included in the study the patient condition required less than 6 teeth in the jaw involved and treatment with conical crown retained dentures. The cases had to be followed up for an intervall of at least 20 years.

Thus the study population consists of 63 patients with 40 restorations in the upper and 23 in the lower jaw. Evaluation of the outcome of treatment was based on the criteria loss of abutments, loss of restorations and number of technical complications.

Results: 20 years after prosthodontic treatment 20 out of 63 patients had lost all abutment teeth. Initial number of abutments and periodontal condition appear to be the most important factors influencing the longevity of the restorations.

Conclusion: Conventional tooth supported restorations can be considered as a long-functioning treatment option in cases with severely reduced dentition if the initial examination shows sound periodontal conditions.

17

Analysis Of Bite Force Transmission Through Different Restoration Materials To Implant Using A Robotic Chewing Simulator

Conserva, E.*, Menini, M, Giorgi, F., Pagliari, P., Pera P.
Genoa University, Dental School
Department of Fixed and Implant Prosthodontics
Genova, Italy

Purpose: Patients with prostheses supported by immediately loaded or osseointegrated implants show an impairment of fine motor control of the mandible, related to the loss of afferent information from periodontal ligament mechanoreceptors, that influences the precision of magnitude, direction and rate of occlusal load application. The shock absorption properties of the restoration material could play an important role while the new sensation referred to as osseoperception replaces the periodontal ligament afferent information. The aim of this study was to measure in vitro the chewing load forces transmitted through crowns of different prosthetic restorative materials to dental implant.

Methods & Materials: A masticatory robot was used to reproduce mandibular movements and forces during the mastication. A sensorized base, simulating the peri-implant bone, has a pin on the moving platform of the robot that reproduces the fixture-abutment system.(Conserva E. et al,Int J Prosthodont 2008;21:501-508) N°3 composite resins, n°2 provisional acrylic resins, n°2 ceramics and n°1 zirconium oxide materials were tested. Two samples for each material were used with the same number of identical masticatory cycles (#350) occluding with the upper, flat, fixed surface of the masticatory robot, always starting from the same position: the only variable in the system was the crown material. The force peaks recorded were statistically analyzed (one-way ANOVA and Sheffè's post hoc test).

Results: The statistical evaluation of the force peaks recorded on the vertical z-axis showed median values of 39.529 Kg for the Procera Crown Zirconia, 30.127 Kg for the Empress 2 and 20.678 Kg for the Finesse ceramics; 17.491 Kg for Experience, 13.920 Kg for Adoro and 9.510 Kg for Signum composites; 5.499 Kg for Acry Plus V and 2.471 Kg for EasyTemp acrylic resins. We analyzed also the data for groups of materials and the comparisons made within groups showed a significant p-value < 0.0001.

Conclusion: This study proved that materials with a greater Young's Modulus transfer significantly greater forces than more elastic materials. These results could be considered for the immediate loaded implant restorations and for the long term maintenance of the osseointegration in conjunction with the reduction of the patient capability to modulate the occlusal forces during the masticatory function.

18

Oral Treatment With Implant-Supported Fixed Prostheses In Patients With Neurological Disabilities: A Prospective Study

Ekfeldt, A.*
University of Oslo
Department of Prosthetic Dentistry and Oral Function,
Institute of Clinical Dentistry
Oslo, Norway

Purpose: Very little is documented regarding rehabilitation with implant-supported prostheses in patients with disabilities. The purpose of this prospective study was to provide a report of implant treatment in patients with neurological disabilities.

Methods & Materials: The patients recruited for the study had been referred to the National Orofacial Resource Centre

(Mun-H-Center) with different disabilities, e.g. neurological disorders, causing various orofacial dysfunction problems suitable for prosthodontic treatment with implants. Enrolled patients were treated with single-implant supported crowns, fixed dental prostheses or complete implant-supported prostheses. Implants were threaded titanium cylinders (Nobel Biocare, Göteborg, Sweden). Implants were inserted under general or local anaesthesia. All surgical complications in the healing period or at second-stage surgery were noted as well as all prosthodontic complications.

Results: In all, 27 patients were treated with (various types of) fixed prostheses supported by 92 implants. Three implants were lost before or at second-stage surgery and three implants were lost after loading. All those complications were observed in three patients and probably related to oral and finger habits . Implant failures and other complications were observed in two patients in the mandible because of rupture of the mucoperiosteal flap and infection. The third patient with the diagnosis Aspberger syndrome was a heavy bruxer and a heavy smoker. Radiological examinations were made of most of the placed implants and mostly only a moderate bone loss was observed. No major complications have been observed for the other 24 patients treated. The cumulative survival rate for placed implants was 92.5 % after 5-6 years.

Conclusion: Implant-supported fixed prostheses are a viable treatment option in patients with neurological disabilities provided a slightly increased failure rate is accepted. It is important to inform the patient's personal caretaker about maintenance of good oral hygiene and the increased risk of complications due to finger or oral habits.

19

Clinical Assessment Of Composite Facings for Conical-Crown Retained Dentures- Results After an Average Observation Period of 5 Years

Scholz, S.[1]* Strub, J.R.[2], Gerds, T.
[1]Oral Rehabilitation, Univesity of Sydney
[2]University of Freiburg
Department Of Prosthodontics
Freiburg, Baden-Württemberg, Germany

Purpose: This prospective long-term study aimed to evaluate the facing composite Signum (Heraeus-Kulzer, Hanau, Germany) on secondary crowns of conical-crown-retained dentures with regards to resistance to fracture and discoloration.

Methods & Materials: The shade of the facings was determined at commencement of the study and at annual recall utilising the Vita-Classic colour shade guide. The integrity of the facing material (intact facing; fractured/chipped facing or loss of facing) including the localisation of the defect (buccal, oral, incisal/occlusal) and the shade of the facing composite (no discoloration, slight discoloration, severe discoloration) was measured.

Results: The average observation period was 61 months (min 54 months, max 72 months). The Kaplan-Meyer estimated fracture rate after 5 years was 20.6 % (CI 14.2 % to 26.9 %), the Kaplan-Meyer estimated discoloration rate was 16.3 % (CI 11.2 % to 21.4 %).

Conclusion: The data with regard to resistance to fracture and discoloration are in agreement with the current literature. It can be assumed that facing material defects appear to be a particular concern for secondary crowns of conical-crown retained dentures.

20

Enamel – The Ultimate Biomaterial

[1]White, S.N. *, [2]Paine, M.L., [2]Lacruz, R.S., [2]Snead, M.L.
[1]UCLA School of Dentistry, Los Angeles, CA, USA.
[2]Center for Craniofacial Molecular Craniofacial Biology, USC School of Dentistry, Los Angeles, CA USA

Tooth enamel is a composite bioceramic composed of carbonated hydroxyapatite (Hap) and very small amounts of protein remnants. Enamel rarely undergoes catastrophic mechanical failure despite a lifetime of repeated masticatory, parafunctional, and occasional impact loading in a hostile wet environment. Enamel is the most durable of all tissues surviving for millennia as long as it is not exposed to carious acid attack. Mature enamel reflects the unique molecular and cellular activities of ameloblasts.

After a series of interactions, ameloblasts migrate outwards from the DEJ towards the eventual tooth surface. Through programmed gene expression they leave a trail of secreted proteins in their wake. The selection of expressed genes, their timing during development and their relative abundance is under genetic control. This mixture of proteins undergoes self-assembly to form an enamel extracellular organic matrix, or scaffold, that controls the initiation, rate of growth and habit of the inorganic carbonated hydroxyapatite crystallites that form tooth enamel. During maturation almost all the organic protein matrix is broken down and removed, and is replaced by inorganic crystallites. Hence, despite an embryonic origin in protein, mature enamel is a hard, wear resistant, and surprisingly tough composite-ceramic biomaterial.

A model of enamel formation is presented that relates gene expression to the assembly of an extracellular protein matrix which in turn controls biomineralization, structural hierarchy, and the biomechanical function of tooth enamel. Creation of the enamel matrix is the essential part of this model, because the matrix guides its own transformation into the final mineral phase. The importance of the dominant enamel matrix protein, amelogenin (Amel); a minor transiently expressed enamel matrix protein, dentin sialoprotein (Dsp); an electrogenic sodium bicarbonate cotransporter (NBCe1); the timely removal of the proteinaceous matrix by a serine protease, Kallikrein-4 (Klk4); and the late stage expression of Amelotin (Amtn) on enamel biomechanical function are demonstrated using mouse models.

Understanding the genetic and molecular events that regulate the formation of enamel will result in improvements in the prevention, diagnosis, and treatment of heritable and acquired diseases of enamel, including caries, as well as insights that allow the engineering of replacement enamels for therapeutic interventions.

21 & 22

Why Women Are Better Prosthodontists Than Men
Or
Why Men Are Better Prosthodontists Than Women

Brian Fitzpatrick
BOH Dental
Brisbane, Australia

Rhonda Jacob
UT MD Anderson Cancer Center
Houston, TX USA

Traditionally, the health care profession has been dominated by gender specific stereotypes; medical and dental nurses have been almost exclusively women and medical and dental practitioners have been almost exclusively men. Prosthodontics has been no exception to this gender specific stereotyping during the past century. In recent decades,

gender specificity has been seriously challenged and it is no longer accepted that one gender has a mortgage on professional specialty groups within the health care model and within prosthodontics in particular.

The Women's Rights Movement marks July 13, 1848 as its beginning. On that sweltering summer day in upstate New York, a young housewife and mother, Elizabeth Cady Stanton, was invited to tea with four women friends to discuss gender disadvantages. This was definitely not the first small group of women to have such a conversation, but it was the first to plan and carry out a specific, large-scale program to address this inequality. Women were not allowed to enter professions such as medicine or law. Gender equality within the professions was first seriously challenged by the women's movement in the seventies. With the inclusion of Title IX in the US Education Codes of 1972, equal access to higher education and to professional schools became the law. The number of women doctors, lawyers, engineers, architects and other professionals has doubled and doubled again as quotas actually limiting women's enrollment in graduate schools were outlawed. Women have achieved parity in medical schools in some industrialized countries, since 2003 forming the majority of the United States medical student body. In 2007-2008, women accounted for 49% of medical school applicants and 48.3% of those accepted.

Confronted with the realization that women were no longer excluded from graduate school education, the number of women in prosthodontics has slowly grown. While it is not possible to state that women can compete with men in a quantitative sense, with men continuing to significantly outnumber women prosthodontists, it is possible to make qualitative comparisons based on gender within the prosthodontic workforce. These papers will provide convincing evidence to support a claim that gender may play a role in "who is better."

Saturday, September 12th
Concurrent Session A
West Ballroom

23

How Globalization is Changing Prosthodontics

Wiens, J.
West Bloomfield, Michigan USA

Synopsis: Analogous to Thomas L. Friedman's book "The World is Flat," prosthodontics is transitioning through a para-dimorphosis at the speed of an electron. Barriers to prosthodontic education and access to patient care have been lowered, yet some obstacles remain. This presentation will explore changing trends in prosthodontic education and the perfusion of prosthodontic patient care worldwide.

24

The Ontological Challenge In Prosthodontic Dentistry

Pauls, U*, Walther, W.
Institute for Continuing Professional Development
Akademie Für Zahnärztliche Fortbildung
Karlsruhe , Germany

Purpose: Evidence-Based Dentistry attracts attention not only of scientists but also of dental practitioners. The evidence session at the 2007 Fukuoka ICP meeting and the ensuing lively discussion showed the growing interest also among prosthodontists; albeit voices arose pointing out that the datapool particularly relating to the average dental office is smallish.

Dentists do use computer systems and they use them at a progressive rate to keep their health-records. Thus every day a large amount of digital data is collected which could provide a basis for EBD-research. But for a number of reasons this data is not used.

Methods & Materials: There is a lack of compatibility not only in a technical sense due to the different software but in addition due to the variety of data structures. Furthermore semantic interoperability can not be taken for granted.In information science this is referred to as the silo-problem. Ontologies are supposed to solve the depicted problems.

Since the early eighties the term ontology was introduced into the domain of artificial intelligence to denote computer-inherent models of reality. Coming from philosophy, the term signifies the science of being qua being, a part of metaphysics. Ontology tries to grasp the structure of reality within categories. Soon it became apparent that knowledge engineers, developing their models of reality, faced the same problems philosophers had reflected on throughout 2000 years. So it comes not as a surprise that information science and philosophy learned from each other during the past twenty years.

Results: Applied ontologies are representational artefacts, comprehensible equally to humans and computers which allow data based on them to be processed regardless their origin and without the problems of semantic ambiguity.

Conclusion: This talk is to give an outline of the state of ontologies particularly with regard to the dental domain. A proposal will be presented to start the development of consistent ontologies in the field of prosthodontic dentistry. Thus the digital data out of daily practice could be used to make treatment strategies comparable on a world wide basis.

25

Clinical Results Of Surgical Crown Lengthening For Crown Restoration

Jiang, T.
Peking University School and Hospital of Stomatology
Department of Prosthodontics
Beijing, China

Purpose: The surgical crown lengthening is a procedure to remove periodontal tissues and re-contouring the osseous crest around the abutment tooth of crown restoration. The purpose of crown lengthening are obtaining enough “ferrule effect” by gain sound tooth structure above the alveolar crest level and decreasing excessive display of gingival in the esthetic zone. This study observed the result of surgical crown lengthening and periodontal stability after treatment on eighteen patients with 63 anterior teeth.

Methods & Materials: The mean gain of crown height, distance from the restorative margin to the alveolar crest, pocket depth, and bleeding index were measured clinically and on the radiographic film before and soon after the crown cementation and 6, 12 months later. Statistically analyzed by one-way analysis of variance was used.

Results: The mean gain of crown height was 2.8 +/-0.9mm; the distance from the restorative margin to the alveolar crest was 2.7 +/- 0.3mm at the baseline and was kept until one year later. The pocket depth and bleeding index were 1.3mm and 1.6 soon after the crown cementation, 2.2mm and 2.4 half year later, and 1.6mm and 1.0 one year later.

Conclusion: This clinical observation suggested that the surgical crown lengthening was effective to promote the “ferrule effect” of abutment tooth and esthetic appearance of crown prosthesis. The periodontal condition was deteriorated after the crown cementation but had a tendency to recover one year later.

26

Impact Of Oral Implantology On Education

Strub, J. R.*, Kröplin, B.
Albert - Ludwigs - University
Department of Prosthodontics
Freiburg, Germany

Purpose: The impact of implantology upon the field of dentistry has been profound. Incorporation of implant technology to all disciplines of dentistry has been exciting and effective. The use of dental implants to provide support for fixed and removable protheses is considered a predictable and successful treatment modality. The aim of this presentation is to find out if dental schools have integrated oral implantology in their undergraduate program and to what degree. In addition, it will be presented how oral implantology was included in the undergraduate program at the Albert-Ludwigs University in Freiburg, Germany.

Methods & Materials: A literature review was conducted to find out if dental schools are offering didactic, laboratory or clinical courses for their undergraduate students. Undergraduate students from our school present the laboratory (manekins) and clinical (patients) procedures of the oral implantology.

Results: Most dental schools offer didactic and laboratory instruction courses. Some offer undergraduate students to perform the restorative part of implant treatment. Other schools offer an elective program, providing greater knowledge in implant dentistry. Survival rates of implants placed by undergraduate students are comparable with those presented from various centers. That justifies the concept to integrate oral implantology in the undergraduate program.

Conclusion: Oral implantology should be included in the undergraduate program, because it is an integrated part of the state of art in dentistry.

27

Decision Making In Diagnosis and Treatment Planning In Prosthodontics

Gross, M.*, Shifman, A.
Tel Aviv Unniversity
School of Dental Medicine, Prosthodontics
Tel Aviv, Israel

Purpose: In the era of purported evidence based therapy the complexity of treatment planning is becoming ever more challenging. Increasing therapeutic options and emerging outcome data in implantology and bone augmentation demand the constant reevaluation of our decision making process. Application of the 'best available evidence' BEA into this process requires continuous updating of current levels of knowledge , current opinion and the regeneration of accepted clinical guidelines. In addition each case presents its particular set of individual clinical determinants ICDs , with multiple morphologic, pathologic, behavioral and host specific parameters that must be organized into a useable diagnostic format as a template for effective analysis and treatment planning.

This paper analyses the cognitive process of some decision making models in diagnosis and treatment planning in prosthodontics. Two cognitive styles are presented and compared. 1. The conventional heuristic approach using a recognition-primed decision style incorporating, intuition personal biases and retrospective verification. 2. A structured model using a stepwise algorithmic decision tree and flow chart with prospective decision verification. Some thought provoking models on organization of diagnostic sub groups, the application of BEA and ICDs into the decision tree and an analysis of the dentist and patient factors involved in the final decision are presented.

Methods & Materials: A clinical case is presented and the two models are applied and compared in the analysis and treatment planning of the case. The case is of a patient with severe occlusal wear, missing teeth, reduced posterior support and loss of occlusal vertical dimension with disturbed function and esthetics. An application of the stepwise algorithmic decision tree model will be presented based on the particular issues pertinent to the case.

Results:

Conclusion: The applicability of the two models between a graduate program versus a daily prosthodontic practice environment will be discussed and conclusions drawn regarding the efficacy and practicability of both analytical methods.

28

The Effect Of Surface Treatments On Push-Out Bond Strength Of Resin-Core Material To Various Fiber-Post Systems

Canay, S.*, Cekic-Nagas, I., Sukuroglu E.,
Hacettepe University
Department of Prosthodontics
Ankara/Turkiye

Purpose: The aim of this study was to evaluate the effects of surface treatments on bond strength of resin-core materials to three different types of fiber posts.

Methods & Materials: Prefabricated glass (FRC Postec, Ivoclar), quartz (DT Light, Bisco) and individually formed glass (Everstick, Stick Tech) fiber posts with a coronal diameter of 1.5 mm were randomly divided into three groups according to the surface treatment performed. In Group 1 sandblasting with aluminium oxide particles (Rocatec Pre, 3M Espe) was followed by the application of a silane coupling agent. In Group 2, immersion in 9.6 % hydrofluoric acid gel for 60 s and silanization for 60 s. In Group 3, no surface tretament was performed and it served as control. For the posts in all the groups, the surface treatments were confined to a 5-mm-wide band measured from the coronal end. For the core build-up procedure, each post was positioned upright at the centre of a plastic slab and secured with an acrylic resin material.

Then the post was placed into the cylindrical plastic tube. The matrix was 10 mm in diameter and the length was equal to the non-tapered portion of the post. The resin-core material (Biscore, Bisco) or resin composites (Admira, Voco) were applied to the tube in 2-mm thick increments. Each increment was carefully placed onto the post surface, and light-cured for 40 s according to the manufacturer's instructions, using a halogen light curing unit (Optilux 501, Kerr). All specimens were stored in distilled water for 24 h at 37°C. The specimens were sectioned with the cutting machine (Isomet) and 1 mm thick discs were prepared for the push-out test. The discs (n=10) were tested in a universal testing machine (Lloyd Instruments) and pushed out with a cross-head speed of 1.0 mm/min. Statistical significance was determined by a multifactorial analysis of variance followed by Tukey's post-hoc test or independent t tests.

Results: ANOVA revealed that fiber posts and core materials had a significant effect on micropush-out bond strength values ($p < 0.001$). The surface treatment with hydrofluoric acid gel and sandblasting with aluminium oxide particles enhanced bond strength values of fiber posts except Everstick post.

Conclusion: Different surface treatments of fiber posts might affect the bonding capacity of resin-core systems to these posts' surfaces.

29

The Influence Of Experience and Specialty Training On Treatment Planning For A Referred Patient

van Zeghbroeck, L.
University of Gent
Department of Prosthetic Dentistry
Gent, Belgium

Purpose: A key factor in the decision-making process in treatment planning is the quality of the clinical information gathered. But when the same clinical information is given, the patient does not always receive the same treatment recommendation. The aim of this study was to compare the treatment-planning decision making of different groups of dentists with different experiences and specialty background for a referred patient.

Methods & Materials: The "paper" patient was selected on basis of a referred patient who had a specific medical condition (history of endocarditis), a request (possibility FPD to replace existing RPD) and a specific mutilation (problem with strategic anchor). Six groups of dentists were asked to give their treatment plan for this specific patient. A group of young graduates (YD=48) was compared with a group of experienced dentists (ED=55) who were choosen to represent the dentists who were most likely to be involved in the decision making in similar cases. The subgroups were periodontists (8), endodontists (9), oral surgeons (8), general dental practitioners (10) and prosthodontists (20). All dentists received the same clinical data: medical and dental anamnesis, casts, X-rays, dental scheme, esthetic requirements and periodontal status.

Results: For the medical condition there was a 100% interobserver agreement for the oral surgeons, endodontists, periodontists, and prosthodontists. This was for the general dental practitioners 70 % and for the young graduates 64,5%. For the question for the possibility of changing the existing RPD into a FPD,50% of the oral surgeons preferred not the interfere with the existing situation and 55% of the endodontists would refer to another discipline. For the general dentists, the prosthodontists and periodontists the answer was affirmative in > 90% with the use of implants. The most variety in reconstructive solutions was seen in the group of prosthodontists. Prosthodontists who "out" themselves in implant reconstructive dentistry tend to choose for complex rehabilitations.

Conclusion: Differences in specialty backgrounds and clinical experience amongst the participants in this study affect the treatment decision.

30

Strategies to Prevent Occlusal Collapse in the Ultra-aged Society Occlusal Force and Infection Control

Ichikawa, T.
Department of Oral & Maxillofacial Prosthodontics
University of Tokushima, Institute of Health Biosciences
Tokushima, Japan

Many Asian and European countries face severe population aging problem. In 2008, more than 22% of Japan's population comprised elderly people—aged 65 years or more - and Japan became an ultra-aged society. In such a society, prosthetic dentistry should focus on not only improving oral function and morphology but also other indirectly related dentistry problems such as poor nutritional status, aspiration pneumonia, and oral health-related depression. In the present situation, it is highly essential to prevent sudden occlusal collapse.

Occlusal collapse is caused by the following 2 factors: occlusal force and infection. The force associated with occlusal collapse has been systematically classified, and the outcome of prosthetic dentistry, especially implant dentistry, has been evaluated during each stage of occlusal collapse, which has been categorized according to the guideline of the Japan Prosthodontic Society (JPS). Force distribution, which is influenced by the difference between the mechanical properties of the supporting tissues (mucosa, teeth, and implants) and the mechanical balance between the supporting tissue and occlusal stress, is thought to be the principal component that will help in preventing occlusal collapse in individuals receiving conventional dentures or implants. Here, I have discussed the limitations of abutment splinting and occlusal contact maintenance for achieving appropriate force distribution.

I have also focused on the effect of infection caused by Candida species on overdenture abutment maintenance and investigated the therapeutic efficacy of sugar alcohol, including erythritol.

It may be necessary to redefine our strategies and implement prosthetic dentistry via both the clinical evidence and a physiome-like approach, which defines the relationships between the changes in an organism and the genome by using in vitro and in silico studies. In this presentation, I have focused on the problems regarding the management of occlusal collapse and the strategies to prevent occlusal collapse in the elderly population and outlined our ongoing research projects.

31

Facial Prosthetics In A Digital World

Reisberg, D.J.
The University of Illinois Medical Center
The Craniofacial Center, University of Illinois College of Medicine
Department of Restorative Dentistry, University of Illinois College of Dentistry
Chicago, Il., USA

Purpose: Facial prostheses have provided a reasonable alternative to surgical rehabilitation for hundreds of years. The techniques for fabrication have changed little over much of that same period of time. The advent of computers has had a profound positive impact on the fabrication of facial prostheses and their availability. This presentation describes new techniques for prosthesis fabrication and how we may take advantage of the digital revolution to make this service more globally available.

Methods & Materials: The steps involved in planning, designing, and fabricating a facial prosthesis with the aid of a computer are described.

Results: A facial prosthesis of quality is produced using CAD-CAM techniques.

Conclusion: Computers have improved the quality of care for patients in need of a facial prosthesis. While procedures and techniques are still being refined, the ultimate goal is to have a quality prosthesis made in less time, for less cost, that is more readily available to a global population.

32

Prosthetic Decision-Making For Single-Tooth Implants: A Critique Of The Literature

Lewis, M.B.*, Klineberg, I.
University of Sydney
Faculty of Dentistry, Discipline of Prosthodontics.
Sydney, NSW, Australia

Purpose: The aim is to review the literature on the restoration of a single-tooth implant, and to develop evidence-based protocols to optimize aesthetic, biologic and patient-related outcomes.

Methods & Materials: An electronic and hand-search was conducted using search-terms “Dental Implants, Single-Tooth; Dental Restoration, Temporary; Dental Impression Materials; Dental Impression Technique; Dental Prosthesis, Implant-Supported; Dental Prosthesis Design; Dental Abutments; Dental Occlusion; Maintenance; Survival;” and “Survival Analysis”. Resultant titles were screened, and full text was obtained where relevant. The authors selected the most appropriate articles, giving preference to systematic reviews and long-term, patient-based data.

Results: Thirty-nine articles were selected and critiqued by the authors.

Conclusion: There was strong suggestion by several authors that peri-implant soft-tissue aesthetics can be sculpted through provisional restoration contour, however there are no clinical outcome studies to define this. Laboratory studies demonstrate that pick-up type impression copings in conjunction with elastomeric impressions are the most accurate means for transferring implant position to a dental cast. Laboratory and finite-element analysis studies suggest implants with an internal-type connection show improved-stress distribution, however supportive clinical data is lacking. The authors of this review favour a screw-retained prosthesis for reasons of predictable retrievability. Clinical and histological studies show that gold, titanium and zirconium abutment materials exhibit excellent biological responses, although there is insufficient clinical data on the clinical service provided by zirconia as an implant-substructure material. The literature does not associate any particular occlusal scheme with superior clinical outcomes. Implant-borne single crowns offer comparable clinical service to tooth-borne fixed dental prostheses, however they are associated with an increased incidence of biological and technical complications.

33

Patient Satisfaction Questionnaire Of Prosthodontic Treatment Provided Over 20 Years Part 1: Profiles Of 500 Responding And 486 Non-Responding Patients

Layton, D*, Walton, T.
Brisbane, Queensland, Australia

Purpose: This paper aims to analyze the demographic and prosthodontic treatment differences between patients who did and did not respond to a mailed questionnaire.

Methods & Materials: All living patients who received tooth and implant related fixed prosthodontic treatment between January 1984 and June 2005 (n=986) in one private prosthodontic practice were mailed a questionnaire regarding their prosthodontic treatment. Demographic data (gender, age) and treatment data (survival, type of treatment, time in-situ, number of units, number of treatments,) for responding and non-responding patients were collected from patient files and analysed. Statistical significance was set at P=0.05.

Results: There were 500 responding patients (50.7%) with 2702 fixed prosthodontic units (60.02%) and 486 non-responding patients (49.3%) with 1800 fixed prosthodontic units (39.98%). Prostheses were in-situ from 1 to 20 years, with the average time in-situ for responders of 7.47±5.48 yrs and for non-responders of 6.5±5.21 yrs. Responding and non-responding patients had similar gender distributions (P=0.61); Kaplan Meier 10-year estimated cumulative survival

(92.2±1.72% and 91.5±1.92%; P=0.13); and received a similar distribution of treatment prostheses (implant vs tooth) (P=0.24). However, responding patients were significantly older (P<0.001), had their prosthesis/es in-situ for a greater length of time (P<0.01), received more prosthetic units (P<0.001) and underwent more treatment episodes (P<0.001) than non-responding patients.

Conclusion: Patient questionnaires provide valid and unique research information. Prosthesis/es outcomes of patients who responded to the questionnaire and patients who did not respond to the questionnaire were the same. Treatment outcomes of patients who attend review appointments and those who are lost to follow-up cannot be assumed to be different. Demographic and treatment related characteristics of responding patients indicated that an enhanced provider-patient rapport was a principal motivator for response to the questionnaire.

34

Patient Satisfaction Questionnaire Of Prosthodontic Treatment Provided Over 20 Years
Part 2: Responses Of 500 Patients With 1908 Fixed Prosthodontic Prostheses Relating To Aesthetics, Comfort, Function, Phonetics, Cleansibility And Cost

Walton T.*, Layton D.
University Of Sydney
Clinical Dentistry
Sydney, NSW, Australia

Purpose: To assess using a VAS-based patient questionnaire, patient satisfaction with aesthetics, comfort, function, phonetics, cleansibility and cost of fixed prosthodontic treatment and whether in hindsight they would undergo the treatment again.

Methods & Materials: Patients who received fixed prosthesis/es between 1984 and 2005 (n=986) in one private prosthodontic practice were mailed a questionnaire. Patients reported remembered initial satisfaction with aesthetics and costs; current satisfaction with aesthetics, comfort, mastication, phonetics, cleansibility, initial costs and maintenance costs (VAS scale); and whether they would undergo the treatment again (yes/no). Overall current satisfaction was estimated. Data was analysed for differences (Mann-Whitney U-test) and for parameters which may contribute to patients' declining the treatment again (logistic regression). Significance was set at P=0.05.

Results: Five hundred (50.7%) patients responded. Overall current satisfaction was high (82 ± 0.6%). Satisfaction with current aesthetics was lower than initial aesthetics (82±0.9%, 85±0.8%, P=0.005). Satisfaction with costs improved with the benefit of hindsight (53±1%; 81±0.9%, P<0.001). Patients who would not undergo the treatment again (n=16, 3.2%) were less satisfied in all parameters (P values <0.001 to 0.04). Logistic regression found satisfaction with costs in hindsight and comfort predicted whether patients would undergo the treatment again (Odds ratio=0.687, P=0.029; Odds ratio=0.746, P=0.024). Failure did not affect whether patients would undergo the treatment again.

Conclusion: The VAS questionnaire proved effective for assessing patient satisfaction. Retrospective questions allowing comparison between remembered and current satisfaction of the same parameter provided valuable data. Overall patient satisfaction was high. Patients recognized the cost:benefit of their treatment with time. Only 3.2% of patients impacted adversely by comfort and costs (but not failure) would not undergo the same treatment again.

35

Fracture of Bilayered All-Ceramic Dental Composites Influenced by Physical and Chemical Mismatch

Feng, H.* [1], Liu, Y. [1], Grüner, D. [2], Wang, X. [2], Bao, Y. [3], Qiu, Y. [3], Shen, Z. [2]
[1] Peking University, School and Hospital of Stomatoloy, Beijing, China
[2] Department of Inorganic Chemistry, Arrhenius Laboratory Stockholm University, Stockholm, Sweden
[3] China Building Material Test and Certification Center China Building Materials Academy, Beijing, China

Objectives: To elucidate the origins of fracture and interface delamination of bilayered composites, by focusing on the influence of physical properties and chemical mismatch between core ceramic and veneer porcelain. Four types of widely applied core ceramics, namely zirconia, alumina, glass infiltrated alumina and lithium disilicate glass ceramic are of concern.

Methods: Bilayered composite with core to veneer thickness ratio (R-value) of 1:1 and 2:1 were fabricated by an established dental laboratory multi-steps firing procedure. Flexural strength was determined by a three-point bending test and the fracture samples were examined by optical microscopy (OM), scanning electron microscopy (SEM), argon ion beam cross-section polishing technique, and X-ray spectroscopy (EDS) analysis. A finite element analysis (FEA) program RFPA'2D was adapted to simulate crack propagation trajectories and to judge the influence of flexural strength and elastic modulus.

Results: The flexural strength of bilayered composites with pure alumina as core does not differ from the ones with glass infiltrated alumina or lithium disilicate glass ceramic as cores, although the core ceramics among themselves demonstrate significantly different flexural strength. For the same core material no significant difference is observed in determined flexural strength of two groups of bilayered alumina and zirconia composites (with R=1 and 2). The often observed interface delamination in zirconia composites is attributed to the severe physical properties mismatch between veneer porcelain and core ceramics. The interface bonding can be classified by two major categories, namely, adhesive bonding and reactive bonding. Zirconia and alumina as core materials demonstrate adhesive bonding with silicate porcelain veneers, whereas glass infiltrated alumina and lithium disilicate glass ceramic have reactive bonding towards silicate veneers.

Significance: To prevent interface delamination in zirconia composite it is suggested to increase the flexural strength of veneer porcelain and the elastic modulus of core ceramics; the necessity to enhance the chemical bonding between silicate veneers and zirconia and alumina cores are demonstrated.

36

Surface Roughness And Bond Strengths Of Glass-Infiltrated Alumina-Ceramics Prepared Using Various Surface Treatments

Yuzugullu, B.*, Ersu, B., Yazici, R. , Canay, S.
Baskent University, Faculty Of Dentistry And Hacettepe University Faculty Of Dentistry, Department Of Prosthodontics Ankara-Turkey

Purpose: High crystalline ceramics are poorly conditioned using conventional methods. The purpose of this study was to evaluate the effects of various surface treatments on surface roughness and shear bond strengths of glass-infiltrated alumina-ceramics to dentinal surfaces.

Methods & Materials: One-hundred-fifty porcelain specimen discs (6 mm in diameter and 4 mm thick) of In-Ceram Spinell, In-Ceram Alumina and In-Ceram Zirconia (n=50) were prepared. The porcelain groups were then divided into 5 groups (n=10) according to surface treatment regimens tested. Specimens were; untreated (control group), sandblasted,

airborne particle abraded; etched with 9,6% hydrofluoric acid or irradiated with CO2 laser. For qualitative micromorphologic examination of porcelain surfaces, scanning electron microscope was used at x1000 magnification. Following surface roughness (Ra) determination by a profilometry, the porcelain discs were cemented on one-hundred-fifty extracted caries- and restoration-free human maxillary first molar teeth. The cemented specimens were stored in distilled water at 37°C for 1 week. Shear bond strength (MPa) tests was performed using a universal testing machine at a constant crosshead speed of 1 mm/min. Statistical comparisons were made with Wilcoxon signed ranked test, Kruskall Wallis test and Spearman's correlation coefficient.

Results: All surface treatments produced rougher surfaces in comparison to untreated groups of all porcelain types (P<.05). Sandblasting demonstrated the roughest surface for all porcelain types compared to the other surface treatments applied (P<.05). Furthermore, sandblasting has created rougher surfaces on In-Ceram Spinell specimens in comparison to In-Ceram Alumina and In-Ceram Zirconia (P<.05). Although CO2 laser treatment increased the bond strength of porcelain to dentin in all groups, it showed significantly higher bond strength than the rest of the surface treatments for In-Ceram Spinell (P<.05). Airborne particle abrasion and CO2 laser showed higher bond strengths than the rest of the surface treatments for In-Ceram Zirconia (P<.05). No significant relationship was determined between the surface roughness (Ra) and shear bond strength values (MPa) among all porcelain groups.

Conclusion: Sandblasting is an effective surface treatment for roughening the surfaces of glass-infiltrated alumina-ceramics. Although CO2 laser irradiation did not show increased surface roughness, this method revealed the highest bond strength values between ceramics and dentin.

37

Long-Term Evaluation Of All-Ceramic Reconstructions On Zirconia Implants

Kohal, Ralf J*; Knauf, M.; Butz, F.; Strub, J.R.
University Clinics of Freiburg
Department of Prosthodontics
Freiburg, Germany

Purpose: Zirconia, a ceramic material, is meanwhile used as oral implant material. No scientific data on the clinical behavior of all-ceramic prosthetic reconstructions on such implants is available. The objective of this 5-year, prospective, cohort investigation was to determine the clinical success rate after up to three years of silicate ceramic veneered zirconia frameworks on one-piece zirconia oral implants.

Methods & Materials: Patients were consecutively included into the investigation and received zirconia implants (NobelBiocare, Gothenburg, Sweden) which were immediately temporized. After a healing period of 8 weeks in the lower and 16 weeks in the upper jaw implants were restored with single crowns or three-unit bridges fabricated of Procera Zirconia (NobelBiocare, Gothenburg, Sweden) veneered with Nobel Rondo (NobelBiocare, Gothenburg, Sweden). Ninety-two patients participated in the investigation. Sixty-five patients received one implant to replace a single missing tooth, 27 patients received two implants for a three-unit bridge. In total 119 implants were placed. Of the 92 patients, 88 were seen at the 1-year follow-up, 80 at the 2-year follow-up, and 50 at the 3-year follow-up.

Results: So far, no framework fracture was observed in the single crown or 3-unit bridge groups. However, up to date, 12 of the 65 single crowns showed chipping (18.5%) after a mean observation time of 15.3 months after prosthetic reconstruction. Chipping occurred furthermore at 11 of the 27 three-unit bridges (41%) after a mean observation time of 13 months after prosthetic reconstruction.

Conclusion: Within the limits of this clinical investigation it is concluded that compared to historical results of veneer ceramic chipping/fractures of metal-ceramic reconstructions or all-ceramic reconstructions on natural teeth this investigations could detect an increased veneer chipping rate of all-ceramic reconstructions on one-piece ceramic implants.

The investigation was supported by NobelBiocare, Gothenburg, Sweden.

38

Lithium Disilicate Ceramic – A Versatile Material With Good Potential

Roulet, J.F.
Ivoclar Vivadent (Liechtenstein) and University of Siena (Italy)
Research & Development / Clinical
Schaan, Liechtenstein

Purpose: Glass based ceramics like feldspathic or leucite ceramics are very transparent and therefore allow excellent esthetics. However they are weak (fracture strength around 150 MPa, fracture toughness ca 1 MPa m1/2) and are only suitable for single crowns, veneers or inlay/onlay restorations. Furthermore for clinical success adhesive cementation is required. On the other side high strength ceramics as aluminium oxide or zirconium oxide ceramics allow fixed partial dentures (bridges) due to their strength (up to 1200 MPa fracture strength and 6 MPa m1/2 fracture toughness (Vickers indentation technique)), but being opaque they need to be veneered with glass based ceramics for esthetic appearance, which is complicated and time consuming. Therefore there was a need for developing a strong material with high esthetic potential, large indication range and easy production methods in the dental laboratory.

Methods & Materials: Using basic ceramic knowledge and applying glass technologies a new lithium disilicate ceramic was developed. The final products were designed using a structured procedure

Results: Lithium disilicate ceramic is of medium strength allowing short span bridges in the anterior and premolar region, inlays/onlays and single crowns in the molars. Due to its excellent transparency, which can be varied due to the special glass technology it becomes very versatile and yields high esthetic results. Regarding cementation all options are open. Being etchable the restorations can be luted with adhesive techniques. However, due to its good strength, conventional cementation e.g. with glass ionomer cement is possible. Ingots are produced first in glass containing all the pigments as ions. In a first cristallization phase at 600-720 °C for 20 minutes the material is pushed up to a metasilicate state, in which it can be milled using the CAD/CAM technique into fully anatomical restorations. These are then characterized, glazed, and finally crystallized at 850 °C for 20 minutes into the final stage (chairside or in the dental laboratory) with high strength in the range of ca. 400 MPa fracture strength and 3 MPa m1/2 fracture toughness. Fully crystallized lithiumdisilicate ceramic ingots for the press technique are pressed into inlays/onlays, veneers, crowns or bridges according to the lost wax technique. With both techniques a cut back technique is also possible to fulfil extreme esthetic demands. In these cases the veneering is made with conventional glass based ceramics.

Conclusion: Lithium disilicate ceramic offering different opacities and colors with simple manufacturing techniques is a good solution where high esthetics are required. Especially in the anterior and premolar area good esthetic results can be achieved with less manufacturing steps. This material even allows chairside manufacture of crowns and small bridges. It is a contribution to economically serve the patients requests for esthetics and function.

39

Do Nanometer Surface Modifications Matter?

Wennerberg, A.
Department Prosthetic Dentistry, Faculty of Odontology, Malmö University
Department Biomaterials/Handicap Research, Sahlgrenska Academy,
Göteborg University, Sweden

The implant surface is known to be of importance for the biological response to the implant. All events that occur towards a surface depend on its mechanical, physical, chemical and topographical properties. Implant surface topography has gained a huge interest during the last 15 years, especially from those with commercial interests.

One of our current research focuses is on the potentials of roughness at the nanometer level of resolution for enhanced bone- and soft tissue healing. Despite some positive indications from *in vitro* studies, our knowledge of the importance of nanometer sized irregularities remains insufficiently investigated in *in vivo*. However, some new experimental data will be presented and possible clinical benefits will be discussed.

40

Maxillary Sinus Augmentation With A Tissue-Engineered Bone Complex Of Beta-Tricalcium Phosphate And Autologous Bone–Derived Osteoblasts In Canines

Jiang X.*, Zhang, F.
Ninth Peoples Hospital Affiliated To Shanghai Jiaotong University
School of Medicine
The Department of Prosthodontics
Shanghai, China

Purpose: The repair of resorbed edentulous alveolar ridge remains a major challenge in modern dentistry. Among the techniques used to regain the height of residual alveolar crest in posterior maxilla, maxillary sinus floor augmentation is a widely accepted procedure. The objective of this study is to systematically evaluate the effects of a novel tissue engineered bone complex of porous ß-tricalcium Phosphate (ß-TCP) granules combined with autologous osteoblasts for maxillary sinus augmentation in a canine model.

Methods & Materials: Autologous osteoblasts obtained from a sheet of intraoral mandible cortical bone in beagle dogs were cultured and expanded for osteoblastic phenotype tests. Twelve alveolar augmentation surgeries in 6 animals were made bilaterally and randomly repaired with the following 3 Groups of grafts: Group A, tissue engineered osteoblasts/ß-TCP complex; Group B, ß-TCP alone; as a positive control, group C, autologous bone obtained from iliac crest (n=4 per group). All animals were sacrificed at week24. Sequential polychrome fluorescent labeling (Tetracycline hydrochloride at week4, Calcein at week12, and Alizarin red at week20 respectively), X ray, maxillofacial CT, as well as histological and histomorphometric analyses were carried out to evaluate the effects.

Results: Osteoblasts from oral cavity could be expanded while maintaining their osteoblastic phenotypes, including positive staining of ALP, calcium nodules; expression of Coll I, OPN, OCN RNA; and positive staining of OCN protein. All dogs had an uneventful healing. The tissue-engineered osteoblasts/ß-TCP complex dramatically promoted bone formation and mineralization and maximally maintained the height and volume of elevated maxillary sinus (6.55±1.21mm,0.72±0.21mL for height and volume respectively). By comparison, both control Groups of ß-TCP (4.90±0.69mm, 0.59±0.19mL) or even autologous iliac bone (4.20±1.03mm, 0.51±0.23mL) showed considerable resorption and replacement by fibrous or fatty tissue (for both height and volume, $p<0.05$ between group A and group B or group C).

Conclusion: ß-TCP along could barely maintain the height of the elevated sinus floor, but it may serve as a good scaffold for osteoblasts to promote earlier mineralization and maximally maintain the elevated bone height and volume. This tissue engineered bone complex might be a better alternative to autologous bone for the clinical edentulous maxillary sinus augmentation.

41

The Effect Of Different Titanium Surfaces On Plaque Accumulation And Periimplant Tissue Behavior. A 1-Year Clinical Study

Menini, M.*, Baldi, D., Pera, F., Ravera, G., Pera, P.
University of Genova
Department of Prosthodontics
Genova, Italy

Purpose: The aim of this research is to evaluate plaque accumulation and periimplant tissue response adjacent to machined and dual acid-etched titanium implant surfaces.

Methods & Materials: Two types of implants were used. Control implants had a dual acid-etched (DAE) surface in their

apical portion and a machined coronal part; test ones had a DAE surface for their entire length. A total of 10 sets of implants were placed in the posterior quadrants of 8 patients, with at least 2 implants (one control and a test one) placed in each site. To simulate implant exposure into the oral cavity, machined healing abutments were placed on the control implants and DAE surfaced healing abutments on the test implants. Plaque index and bleeding on probing (BOP) were recorded together with histological and microbiological analyses of the periimplant tissues. The healing abutments underwent a scanning electron microscope analysis at 5 months post-surgery. Standardized radiographs were also taken at the time of implant placement and 3, 6 and 12 months post-surgery.

Results: DAE surfaces accumulated more plaque than machined surfaces (P-Value<0.0006) and the plaque was assessed as more difficult to remove (P-Value<0.0457). No histological abnormalities were seen and the test implants showed significantly lower crestal bone resorption than control ones (P-Value<0.0174).

Conclusion: DAE healing abutments showed an increased plaque accumulation, but no significant BOP differences or histological differences were found between test and control sites. The test implants showed less interproximal bone resorption than the control ones at the end of a year's follow-up evaluation.

42

Enhanced Osteoblast Function On Ultraviolet Light-Treated Zirconia

Att, W.
Dental School, Albert-Ludwigs University
Department of Prosthodontics
Freiburg, Germany

Purpose: Ultraviolet (UV) light-treatment of titanium surface has been demonstrated to enable rapid and complete establishment of bone–titanium integration. The applicability and effectiveness of UV light treatment of zirconia on its bioactivity on osteoblasts is still unknown. The purpose of this study was to determine whether UV light treatment of zirconia enhances its bioactivity on osteoblasts.

Methods & Materials: Machined zirconia disks were treated with UV light for various time periods up to 48h. The hydrophilic status of treated and untreated surfaces was evaluated via water contact angle measurements. The crystalline property and chemical composition of treated and untreated surfaces were evaluated via X-ray diffraction (XRD) and X-ray photoelectron spectroscopy (XPS), respectively. Rat bone marrow stem cell-derived osteoblasts were seeded onto treated and untreated zirconia disks. Initial attachment of cells was evaluated by measuring the quantity of the cells attached to zirconia substrates after 3 and 24h of incubation. Cell proliferation and differentiation were evaluated by hematocytometer and reverse transcriptase-polymerase chain reaction (RT-PCR), respectively. Alkalin-phosphatase (ALP) activity and formation of mineralized tissue were evaluated by ALP and von Kossa assays, respectively.

Results: Treated and untreated zirconia disks consisted of monoclinic and tetragonal phases of ZrO2 and Y2O3 having a wide light absorption band of 200–400 nm with its peak at <250 nm. UV light treatment transformed the zirconia surface from hydrophobic to hydrophilic status and reduced the atomic percentage of surface carbon in a UV light dose-dependent manner. UV light treatment for 48h increased the rates of attachment, spread, and proliferation of rat bone marrow-derived osteoblasts. Alkaline phosphatase-positive and mineralized nodule areas doubled on UV light-treated zirconia. The expression of osteoblastic genes, such as osteopontin and osteocalcin, was not modulated by UV light treatment.

Conclusion: UV treatment of zirconia enhances its bioactivity on osteoblasts, in terms of their attachment, proliferation, and eventually mineralization. This biofunctionalization was associated with UV light-catalytic hydrophilic conversion of zirconia surfaces and progressive removal of hydrocarbons. The results implicate additional in vivo and clinical evaluations of the impact of this novel photo-biofunctionalization of zirconia on its integration with bone.

Saturday, September 12th
Concurrent Session B
East Ballroom

43

Saliva as Diagnostics: Patients' Perceptions and Integration of Health Care in Dentistry

Choi, M.
Department of Prosthodontics
New York University of College of Dentistry
New York, NY USA

In efforts to develop non-invasive, time-efficient, and more patient-accessible diagnostic procedure, saliva has been the focus in the health research. Since 1993, detection of cystic fibrosis, coeliac disease, Sjogren's syndrome, and *Helicobactoer pylori* infection, HIV, drug and hormone level monitoring, diabetes mellitus, breast cancer, and oral cancer through saliva biomarkers has been established. Recently, a researcher supported by the National Institute of Dental and Craniofacial Research (NIDCR) developed a portable-sized saliva-diagnostic-unit.

Despite the growing interests and popularity over saliva as diagnostics, the full implementation in the health care is yet to be instituted. Therefore, further establishment of scientific foundation, validation of clinical reliability, development of regulation, and finally the commercialization are essential. Furthermore, for saliva diagnostics to be accepted by clinicians and patients, it is important to establish patient preference and perception on saliva. To investigate the patient's perception, a survey instrument was used to determine patient preferences for donating saliva when directly compared to blood and urine.

The participants in New York and Minnesota rated saliva to be the most comfortable, convenient, and easiest to collect. Also, 84% of the participants showed interest in donating saliva for research study. On the contrary, only 28% expressed interests in donating blood sample. 54% of the participants were 39 years of age or younger. In comparing the responses among races, American Indians had significantly less experience in giving blood for diagnostics. Based on the findings of this study, the implementation of saliva as diagnostics shows a promising future; one that can enhance health care diagnostic procedure to be more time-efficient, cost-effective and reliable for both clinicians and patients.

44

Reasons For Primary And Secondary Bone Loss Around Oral Implants

Albrektsson, T.*[1], Brunski, J.[2], Wennerberg, A.[1,3]
[1]Department of Biomaterials, Gothenburg University
[2]Department of Biomedical Engineering, Renssaelaer Polytechnic Institute Troy, NY, USA
[3]Dept of Prosthodontics, Malmö University, Sweden

Purpose: A recent European consensus among periodontists has stated that the reason for secondary bone loss around oral implants has a simple explanation – peri-implantitis, allegedly with an incidence of somewhere between 6 and 60% of all cases depending on which definition of the disease that is preferred. However, the evidence behind peri-implantitis is based on ligature studies or on experience from investigating failed implants, in neither case actually presenting any relevant evidence of this disease being the primary cause of adverse bone reactions to an implant in the clinical situation.

Methods & Materials: Prosthodontists have had a different attitude towards interfacial bone loss, by simply changing the loading conditions by readjusting bridges or crowns, strain around implants are minimized and the bone resorption has duly stopped in many cases. However, relying on overloading as the only reason for secondary bone loss around

oral implants may be disputed too, not the least since several experimental papers verifying bone breakdown after overloading/too much strain may be criticized for not using physiological loads or for other experimental conditions difficult to directly translate to the clinical reality.

Results: Having said this, the observation of bone loss around implants is frequently reported and implant failures do occur primarily as well as secondarily. There is new theory that explains these problems in a much better manner than traditional theories have; this is the Compromised healing Adaptation theory introduced by Cvartszaid, Koka and Zarb in a recent Quintessence book “Osseointegration”. This theory is possible to apply to all sorts of adverse bone loss or failures, may they be early or late. Compromised healing may follow genetic disorders of the patient or poor bone quality for any other reason, including previous radiation or too traumatic surgical techniques.

Conclusion: The sequelae of these various factors need not necessarily lead to implant failure, but if combined with implant loading, the additional mobility of the implant in its site and the associated interfacial strain may combine to result in subsequent failure; if the combined compromised healing/adaptation factors do not result in immediate failure, instead undue bone resorption may follow that will threaten the long term survival of the implant. When implants start to be slightly unstable, inflammation and/or infection may combine with increased bone resorption and need clinical treatment in a condition that may be termed secondary peri-implantitis which does exist as a clinical reality in some contrast to primary peri-implantitis of which state there is little or no evidence to our knowledge.

45

Relationship Between Maximum Implant Insertion Torque And Bone Density Using Computerized Tomography

Matsuda, K.*, Wada, M., Kagawa, R., Ikebe,K., Okuno, I., Maeda, Y.
Osaka University Graduate School of Dentistry
Department of Prosthodotnics and Oral Rehabilitation
Osaka, Japan

Purpose: Maximum insertion torque is important for primary stability of an implant, especially in the immediately/early loading procedure. To predict the maximum insertion torque is extremely valuable for treatment planning and designing implant restorations. The aim of this in vitro study was to determine the relationships between insertion torque and bone density from pre-operative CT examination controlled for diameter and length of implants.

Methods & Materials: The implants used in this study included 20 experimental implants with diameters of 3.8mm or 5mm and length of 7mm or 12mm. A total of 20 experimental implants were placed in swine femoral articular heads. Before insertion, the bone density in the designated implant site was individually recorded in Hounsfield units (HU) by using computerized tomography (CT scanner light speed QX10, GE co., USA) and the diagnosis software (iCAT Navigation system, iCAT co., Japan). The maximum insertion torque values of all implants were recorded with the torque meter (Digital force gauge HTG2-200NC, IMADA co., Japan). Multiple linear regression analysis was carried out to test the relationship between maximum insertion torque and other factors such as bone density, diameter and length of the implant.

Results: The mean maximum insertion torque and bone density were 31.1 ± 16.0 Ncm and 652.1 ± 88.0 HU for 20 implants. The maximum insertion torque was differed significantly according to implant diameter and implant length. Multiple linear regression analysis showed that maximum insertion torque was significantly associated with bone density (standardized partial regression coefficient: ß = .56, $p<0.01$), implant diameter (ß = .35, $p<0.05$) and length (ß = .68, $p<0.01$). In this regression model, the coefficient of determination (r square) was 0.78.

Conclusion: In this experimental study there was a significant association between the maximum insertion torque and the bone density from CT examination, controlled for diameter and length of implants. These results may assist clinicians to predict the maximum insertion torque and implant stability in clinical decision making.

46

Force Distribution Beneath Implant Supported Overdentures: An In Vivo Study

Ando, T.,*, Gonda, T., Maeda, Y.
Osaka University Graduate School Of Dentistry
Department of Prosthodontics and Oral Rehabilitation
Osaka, Japan

Purpose: Although implant overdentures have been one of effective treatment options for edentulous patients, the load bearing ratio between implant and underlying mucosa is still unknown. The purpose of this study was to determine the force-supporting ratio between mucosa and implant beneath implant overdentures in vivo.

Methods & Materials: Three male and 1 female overdenture patients (average age 72) with at least 3 implants each and who gave informed consent participated in this study. Approval of the ethics committee was also obtained. An experimental chromium-cobalt metal framework was fabricated on a plaster model for each patient (2 for maxillary and 2 for mandibular arch), which connected to and rested on each implant. Miniature strain gauges (KFG-03-120-C1-11; Kyowa Industry Co. Japan) were attached on the occlusal surface of the framework close to each implant. Loads were applied through a force transducer (LMB-A-50N; Kyowa Industry Co. Japan) located in the center of the framework, and the output from strain gauges were recorded. Recordings were performed with only the metal framework and with the metal framework and denture-base. Loads were applied progressively to a maximum of 5 kg, and the resulting strain value was recorded from each strain gauge. For each patient, loads were applied 5 times. The mean strain value for each patient was calculated and the results between the patients were compared.

Results: The baseline condition was considered as implant support only and its value corresponded to 100%. When the denture was supported by both implants and soft tissue, the strain values decreased significantly to about 60 to 70% ($p<0.05$). There were no statistically significant differences in the decreasing rate of strain value under loading between the anterior and posterior regions.

Conclusion: Within the limitation of this study, results indicate that approximately 30 to 40 % of occlusal forces were distributed through the denture base to the soft tissue beneath the implant supported overdentures.

47

Patient Evaluation After Treatment With Maxillary Complete Dentures In Combination With Mandibular Overdentures Supported By One Or Two Implants Placed According To The Immediatel Loading Protocol

Kronstrom, M.*, Davis, B., Loney, R., Gerrow, J.
University of Washington
Restorative Dentistry
Seattle, WA, USA

Purpose: To evaluate patient satisfaction among edentulous individuals after treatment with complete upper dentures and mandibular overdentures using the immediate loading protocol with one or two un-splinted titanium dental implants to augment denture retention and support.

Methods & Materials: The study included edentulous subjects who reported problems related to loose dentures, soreness, and problems when chewing. A total of 36 edentulous subjects (16 men and 20 women) received Branemark System® TiUnite GroovyTM implants after new conventional dentures in the maxilla and mandible had been fabricated. Using a randomized procedure, 17 subjects received one implant and the other 19 had two dental implants placed in the mandible supporting an overdenture. The mandibular dentures were relined and delivered with the retentive components attached the day of surgery. Patients were scheduled for a one week post op follow-up and were seen for 3, 6 and 12-month examinations. Subjects were asked to fill out the OHIP questionnaire with 19 questions related to chewing ability, oral comfort, and oral health related quality of life before starting the treatment and also at the 6, and 12-month follow

up. The questionnaire questions had five response alternatives ranging from “very often” to “never”, which were later coded from 1 to 5 where a higher number indicated a more affirmative opinion.

Results: Nine subjects with 10 failing implants were excluded from the study. Additionally, three subjects with successful implants declined to continue participating in the study for personal reasons after the 6 month follow-up. Twenty four subjects, (11 men and 13 women) were thus available for the 12-month follow-up. Fourteen subjects had one implant and 10 had two implants. The mean value for all questionnaire questions increased from 46.9 before treatment to 81.7 at the 6-month follow-up and a mean value of 83.5 were reported at the 12-month follow-up examination. No statistically significant differences were observed between those with one or two implants or between the genders.

Conclusion: The results from the present study indicate that edentulous subjects improved their chewing ability and also reported higher values for oral comfort and oral health related quality of life factors after treatment with a new complete denture in the maxilla and a mandibular overdenture supported by one or two implants. The fact the no significant differences were observed between the two groups could indicate that only one implant may be a viable option when restoring the edentulous mandible with an overdenture.

48

Effect Of Framework Modification And Veneering Techniques On Damage And Reliability Of Y-Tzp Crowns

Guess, P.C.,* Coelho, P.G., Thompson, V.P.
Albert-Ludwigs-University New York University College of Dentistry
Department of Prosthodontics, Department of Biomaterials and Biomimetics
Freiburg, Germany
New York, NY USA

Purpose: To evaluate the effect of framework design modification and different veneering techniques on mouth-motion-step-stress-fatigue behavior and failure modes of veneered Y-TZP crowns.

Methods & Materials: A FEA based crown preparation was fabricated by rapid prototyping and served as a master die. Y-TZP cores (VITA In-Ceram YZ**, **Vita Zahnfabrik) in regular (0.5 mm uniform thickness) or anatomically shaped design were veneered with a hand-layered (VM9**) or pressable (PM9**) veneering ceramic. Crowns (n=84) were cemented on aged dentin-like composite replicas of the die (Z100*, *3M/ESPE) with resin cement (RelyX Unicem*). Crowns were exposed to mouth-motion fatigue by sliding a WC indenter (r= 3.18 mm) 0.7 mm down the mesio-lingual-cusp utilizing three different step-stress-profiles. Stress-level probability curves and reliability were calculated for completion of a mission of 50 000 cycles at 200 N load (Alta 7 Pro, Reliasoft)

Results: Irrespective of the applied framework design and veneering technique crowns failed from veneer chip-off fractures. Delamination of the veneering ceramic occurred without exposure of the Y-TZP core ceramic. No crowns exhibited Y-TZP core fractures (checked by embedding and sectioning). Anatomically supported crowns revealed significantly reduced chip size with both veneering techniques. Reliability for 200 N x 50K cycle mission is presented in the Table.

Reliability	PM90.5 mm	PM9Anatomical	VM90.5 mm	VM9Anatomical
Upper 90% CB	0.65	0.99	1	1.00
Value	0.50	0.98	0.99	1.00
Lower 90% CB	0.33	0.87	0.98	0.99

With regular core design the reliability of hand-layered crowns was significantly higher than the press veneered crowns. The confidence bounds (2 sided @ 90%) revealed no overlap. Framework design modification providing anatomical support of the veneering ceramic resulted in increased reliability for both veneering techniques but was significant with press veneered crowns.

Conclusion: Hand-layer veneered crowns with regular core design were less susceptible to mouth-motion-step-stress fatigue than press veneered crowns. Anatomical support of the veneering ceramic resulted in reduced chip size and significantly increased reliability with press and hand-layer veneering ceramics and appears to be a promising tool to optimize long-term performance of veneered Y-TZP crowns in clinical application. Fatigue loading reproduced failure modes observed clinically

49

Fracture Resistance Of Porcelain Fused To Metal Restorations With Two Different Margin Designs After Exposure To Masticatory Simulation

Michalakis, K., Stratos, A., Hirayama, H., Kang, H., Touloumi, F., Oishi, Y.
Tufts University School of Dental Medicine, Boston, MA, USA
Aristotle University of Thessaloniki, Greece
Division of Graduate and Postgraduate Prosthodontics
Boston, MA USA, Thessaloniki, Greece

Purpose: Although the esthetic outcome of the collarless porcelain fused to metal restoration is better than the one with the metal margin, its mechanical strength has not been evaluated. The purpose of this study was to evaluate the fracture resistance of porcelain fused to metal restorations with metal margins, as well as that of porcelain fused to metal restorations with circumferential porcelain margins after exposure to masticatory simulation, and make a comparison between the two.

Methods & Materials: Twenty four porcelain fused to metal restorations were fabricated and paired with twenty four cobalt-chrome tooth analogs. Twelve of the specimens had metal margins, while the rest had circumferential porcelain margins. The restorations were cemented on the metal tooth analogs with a resin modified glass ionomer luting agent. All specimens were subjected to a cycle loading by a texture analyzer. A total of 600,000 loading cycles in an aqueous environment was performed, with a minimum load of 0 N and a maximum load of 200 N. Controlled loads were then applied to the teeth, until they fractured, by use of a stainless steel rod, with a 2-mm- width flat rounded end, mounted on a universal testing machine. Descriptive statistics and 1-way analysis of variance (ANOVA) (a=.05) tests were used to determine the effect of failure loads among the tested groups.

Results: One-way ANOVA revealed statistically significant differences among the two tested groups ($F=53.71$, $P<.0001$). The two groups presented different failure modes. Porcelain fused to metal crowns with metal margins presented cohesive failures starting from the point of load application. Porcelain fused to metal crowns with circumferential porcelain margins demonstrated adhesive or a combination of adhesive and cohesive failures, starting from the point of load application and extending to the highest point of the proximal margins.

Conclusion: Porcelain fused to metal crowns with metal margins required statistically significant greater loads ($P<.0001$) to fracture than porcelain fused to metal crowns with circumferential porcelain margins. Porcelain fused to metal crowns with metal margins should be preferred over porcelain fused to metal crowns with circumferential porcelain margins, when heavy occlusal loads or parafunctional activity are anticipated.

50

CAN THIS IMPLANT BE SAVED – BIOMECHANICAL IMPLANT REPAIRS

Barzilay, I.
Division of Prosthodontics and Restorative Dentistry
Mount Sinai Hospital
Toronto ON CANADA
University of Toronto, Faculty of Dentistry
Toronto ON CANADA

Due to inherent differences between implant and tooth based restorations; one must pay special attention to occlusal related issues which can damage implant restorations or in extreme cases the implants themselves. Occlusal or iatrogenically induced forces can damage implant based restorations due to the osseointegrated nature of the implant connection and its lack of movement.

This presentation will discuss why restoration breakdown occurs, how breakdown can be corrected, and how it can be avoided. Special attention will be given to mechanically damaged fixtures and how they can still be used to support dental restorations.

51

The Influence Of Cantilever Length And Implant Inclination On Stress Distribution For Implant-Supported Full Fixed Prostheses.

Pera, P.*, Pera, F., Tealdo, T., Bevilacqua, M., Menini, M.
University of Genoa
Department of Prosthetic Dentistry
Genova, Italy

Purpose: Many clinical studies have reported high survival rates for tilted implants. However, tilted implants can transmit increased stress to bone when compared to vertically placed implants. Theoretical (computer-based), laboratory and clinical studies are warranted to effectively address this issue. In this study, a 3-dimensional finite element analysis was performed to analyze the stress values surrounding tilted versus vertical implants.

Methods & Materials: A 3D edentulous maxilla model was created using customized computer software (FEMAP 8.3, UGS). The mesh value was 140,000 units. Four cylindric screw-type implants were virtually placed simulating clinical treatment of an edentulous patient with a full fixed prostheses (FFP). The FFP, with a virtual metal framework (10 mm2 in cross-section), was designed with first molar occlusion and connected to the implants. The connection between the superstructure and the implants was projected as rigid. A vertical load (150 N) was applied on a distal cantilevered segment to simulate biting force. The von Mises stress values of the peri-implant bone of the FFP were evaluated according to 4 configurations, with the framework length held constant. In the first configuration, the bilateral distal implants were placed vertically and the cantilevers were 13 mm long. In the second, third and fourth configurations, the posterior implants were inclined 15, 30, and 45 degrees distally and the cantilever extensions were 9, 5, and 0 mm, respectively.

Results: The results revealed biomechanical evidence that distal tilting of implants, splinted in full fixed prostheses without cantilevers, reduced the amount of stress generated around the peri-implant bone when compared to the levels of stress seen in peri-implant bone with vertical implants and cantilevered segments in similar FFP. The 45 degree configuration (associated with 0 mm cantilever extension) reduced the stress on the distal implants, mesial implants and metal framework up to 73,5%, 77,7% and 85,6% respectively.

Conclusion: The cantilever length reduction associated with the FFP design on tilted implants plays a key role in decreasing the stresses around the implants and the metal framework.

52

Transformation Of Periodontal Into Periimplant Tissues By Immediate Intrasocket Implant Placement: A Five Year Retrospective Clinical And Volumetric Radiographic Evaluation Of Periodontally Compromised Sites

Tripodakis, A.P.*, Mastoris, M.
National and Kapodistrian University of Athens
Fixed Prosthodontics
Athens Greece

Purpose: This approach has successfully been used for single or multiple adjacent teeth involving compromised sockets, restored by ceramic abutments and crowns, thus immediately transforming the compromised periodontal tissues into healthy periimplant tissues (Tripodakis 2001, 2002). The positive results have also been confirmed microbiologically (Tripodakis & Nakou 2004). Long term clinical and radiographic evaluation results concerning the labial hard and soft tissue stability have not been so far documented. Aim: The aim of the present retrospective study is the volumetric radiographic evaluation of the relationship between the height labial crestal bone and the overlying soft tissue profile five years postoperatively.

Methods & Materials: Twenty anterior incisors of sixteen as it relates to the head of the implant of healthy individuals non smokers successfully restored with implant restorations by the above mentioned surgical protocol evaluated at least five years postoperatively. Three-dimensional volumetric analysis was accomplished by the Morita Accuitomo tomographic system, after covering the labial surface of the clinical crown of the restoration and the surrounding soft tissues with radiopaque tin foil. Sagital slices were made parallel to the long central axis of the implant and the distances of the soft and hard tissue margins to the head of the implant were measured. Thus the height of the unsupported by bone soft tissue adaptation around the ceramic abutment was assessed.

Results: The soft tissue height above the head of the implant was found to be equal or greater than 5 mm labialy. It was therefore exceeding the 3 mm found in the normal natural dentition or implant restorations after wound healing of an open flap surgical approach. The labial bone plate was found to be present and in most cases exceeding the implant abutment interface.

Conclusion: The volumetric evaluation results led to the conclusion that the immediate post extraction one-stage flapless surgical approach combined with immediate provisionalisation, even in periodontally compromised sites successfully manages to maintain the preoperative soft and hard tissue morphology surrounding the single implant restoration.

53

Case Report: Rapid Prototype Technology Used To Rehabilitate And Edentulous 55 Year Old Male With Severe Alveolar Resorption

Preiskel, A.*, Balshi, S.F.
CM Ceramics, NJ USA
London, United Kingdom

Purpose: This report involves the rehabilitation of a patient of a male aged 55 who had been edentulous for some 30 years. The patient had a severely resorbed maxilla and mandible. He was maladapted to well made complete dentures and had become dour. He was extremely self conscious of his edentulism yet he managed a busy personal and business life.

Since the patient was unwilling to be seen without his dentures any treatment plan that would leave him without his prostheses for even a short time would not be countenanced. Techniques requiring multiple surgical interventions were therefore inappropriate.

Methods & Materials: A virtual surgery planning system was employed to guide alveolar and zygomatic implant placement. The system simplifies the surgical placement of implants and enables prostheses to be fitted at the time of surgery. The patient was referred to a clinic in the USA with a high level of experience with virtual surgery planning and zygomatic implant surgery. The pre surgical prosthetic planning was carried out in London. 3D scans of the patient and planning prostheses were sent digitally from London to the USA together with jaw relation records. Once the planning had been completed, a transitional prosthesis was constructed prior to surgery, based on CAD/CAM files and rapid prototyping technology. The patient travelled to the USA for implant placement and delivery of the transitional prostheses. He returned to London for his post operative care. The definitive restorations were milled titanium/ceramic fixed prostheses that were manufactured in the USA and fitted in London.

Conclusion: This patient's prosthodontic treatment has transformed his life. Modern digital technologies allied with good communication can harness expertise from around the globe improving the quality of life for our patients. The use of an immediately placed prosthesis can help to stabilise implants placed in minimal amounts of bone in carefully selected situations. This example underscores the dynamic relationship between surgical and prosthodontic rehabilitation. Careful, advanced treatment planning can avoid multiple surgical sessions with their associated morbidity providing benefits hard to imagine a generation past.

54

Dental Materials in Underserved Areas

Ewoldsen, N.
Parke County, IN USA

Dental caries, the most common preventable childhood disease, affects children around the world. Caries disproportionately affects socioeconomically disadvantaged and underserved children. Failure to control caries in children produces adolescents with poor dental health and adults requiring dental rehabilitation. Preventive and restorative dental care is impractical without a modernized infrastructure to support the treatment equipment. In addition to the infrastructure requirements, delivery of comprehensive oral health care requires money, time and trained care providers. Together these factors explain why tooth extraction is most common caries management strategy in developing countries and other underserved settings.

With globalization, infrastructure modernization and increased emphasis on oral health the scope of dental services is changing. Even in the poorest settings, patients without regular care providers consider edentulism the least desired dental outcome. This presentation previews and reviews materials and techniques suitable for caries prevention/control, tooth restoration and oral rehabilitation within the constraints imposed by time, money and manpower.

From topical treatments which arrest caries to restoration of teeth in field settings, the management of common dental problems including long-term prosthodontic solutions will be shown with an emphasis on material selections appropriate for outreach dentistry.

Learning Objectives: After attending this presentation dental clinicians will be able to:

-name two topical treatments for arresting caries outside of the modern dental operatory
-list the required clinical steps and materials for placing dental restorations without modern dental equipment
-cite one advantage acetal resin holds over nylon when used in removable prosthodontic devices

55

Oral Neurophysiologic Characterization Of Patients With Sjögren'S Syndrome

Laing-Gibbard, L.P.
University of Toronto
Discipline of Prosthodontics, Faculty of Dentistry
Toronto, ON, Canada

Purpose: Sjögren's Syndrome is an autoimmune disorder with an extensive list of oral complications and neurological involvement, which have a profound impact on patients' quality of life (QOL). In addition to dry mouth and dry eyes, SS patients often report tingling or altered sensations (AS) in their fingers, toes, and in facial areas. The objective of this clinical study was to examine the extent of the oral neurological involvement, in terms of quantitative sensory testing (QST).

Methods & Materials: Psychophysical QST was measured in patients with SS, in patients with medication- and/or radiation-associated xerostomia, and in healthy age- and gender-matched controls. QST thresholds for touch detection (TD), moving 2-point discrimination (2-PtD), were determined using von Frey monofilaments and McKinnon-Dellon Disk-Criminator, respectively, and for warm/cold sensation (WS/CS) and heat/cold (HP/CP) with a Thermal Sensory Analyzer-II. Study participants completed QOL questionnaires such as Medical Outcomes (SF-36), Oral Health Impact Profile, and a modified McGill Pain Questionnaire.

Results: The results of psychophysical QST indicate that discrete differences exist between patients with SS, those with xerostomia unrelated to SS, and non-xerostomic control patients. These differences had a significant effect on the patients' QOL.

Conclusion: Xerostomia, whether radiation- or medication-induced or as a result of an autoimmune disorder such as SS, has a negative effect on the patients' QOL. However, the extent of the AS associated with the orofacial neuropathies experienced by SS patients has an even more debilitating effect. Implications of the outcomes of prosthodontic care will be discussed. Sponsored by the Rosenstadt Endowment Fund and the University of Toronto Connaught Research Fund.

56

Biomechanics Of Prosthetic Facial And Lips Support

Calvani, P.L.
Tufts University School of Dental Medicine
Postgraduate Prosthodontics and Operative Dentistry Division of Graduate and Postgraduate Prosthodontics
Boston, MA USA

Purpose: Implant-Retained Fixed Prostheses, crafted to rehabilitate partially or fully edentulous patients, may naturally or negatively support and affect the overlying lower one third of the face. The purpose of this presentation was to review the anatomic, physiologic and prosthetic factors which may develop different possibilities of cheeck and lip support upon the insertion of the final prosthetic rehabilitation.

Methods & Materials: The shape and position of both natural and prosthetic maxillary and mandibular teeth together with the surrounding bone and gingiva were investigated to assess their impact on the overlying facial tissues. Two original research studies were carried out on two samples of about three thousand patients and the outcoming results were investigated. In this presentation they will be shown and explained since huge differences arose and therefore were evaluated, discussed and classified.

Results: Within the limitations of these studies it was concluded that moderate to severe maxillary anterior ridge resorption, thin lips, wide smile capability together with the delivery of Implant-Retained-Fixed-Prostheses which do not fully replace and naturally resemble the bone-gingiva-teeth complex lost anatomy, may lead to variously severe unpleasant esthetic tissue defects which develop mainly in the skin in the upper lip phyltrum area.

Conclusion: Due to the amount of bone atrophy, to the position of implant fixtures on the edentulous ridges and to lips anatomy, poorly treatment planned and designed Implant-Retained-Fixed-Prostheses may not satisfactorily support the lower one third of the face. The gravity of these esthetic facial and lip defects was found to be directly related and proportionate to both the shape and position of the posterior prosthetic support and to some other individual anatomic factors, all involved to create a non-esthetic Split Philtrum Groove Syndrome.

57

Orofacial Dysfunction In Ectodermal Dysplasias Measured With The Nordic Orofacial Test-Screening

Bergendal, B.* Mc Allister, Anita Stecksén-Blicks, C.
The Institute for Postgraduate Dental Education
National Oral Disability Centre
Jönköping, Sweden

Purpose: To screen orofacial function in individuals with various ectodermal dysplasia syndromes using the Nordic Orofacial Test-Screening protocol and compare with the screening of a healthy reference sample.

Methods & Materials: The ectodermal dysplasia group comprised 46 individuals, 30 males and 16 females (mean age 14.5 years, range 3–55). Thirty-two had hypohidrotic ectodermal dysplasia and 14 had another ectodermal dysplasia syndrome. The reference sample comprised 52 healthy individuals, 22 males and 30 females (mean age 24.9 years, range 3–55). The Nordic Orofacial Test-Screening protocol contains 12 orofacial function domains (maximum score 12 points).

Results: The total Nordic Orofacial Test-Screening score was higher in the test group than in reference individuals (mean 3.5 vs. 0.4; $P < 0.001$). The dysfunctions most frequently recorded in test individuals occurred in the chewing and swallowing (82.6%), dryness of the mouth (45.7%) and speech (43.5%) domains. Individuals with other ectodermal dysplasia syndromes scored higher than individuals with hypohidrotic ectodermal dysplasia (mean 4.6 vs. 3.0).

Conclusion: Individuals with ectodermal dysplasia scored higher in all Nordic Orofacial Test-Screening domains compared with healthy reference individuals. Orofacial function areas and treatment and training outcomes need to be more closely evaluated and monitored.

58

Current Trends In Advanced Education In Prosthodontics: 2000-2009

Wright, R.F.
Harvard School of Dental Medicine
Restorative Dentistry and Biomaterials Sciences Director
Advanced Graduate Prosthodontics
Boston, MA USA

Purpose: This study consisted of two parts. Part 1, a survey of program directors, was conducted to examine current trends in advanced education in prosthodontics in the United States. Part 2 reported on the survey results distributed to the deans of US dental schools to evaluate their observations of trends in prosthodontics. The original survey was 2000-2004. An update is currently being conducted performed to provide more recent 10 year data.

Methods & Materials: A national e-mail survey of 45 program directors was used to collect enrollment data for years 1 to 3 of prosthodontics training for US and international dental school graduates, the total number of applicants and applications considered, and the trends over time of applicants to prosthodontic programs for US dental school graduates and for international graduates. In addition, the program directors were asked to rank 13 key factors that may have contributed to any changes in the prosthodontic applicant pool. Comments were accepted on why more or less US or internationally trained applicants have applied. Program directors were also asked for information on student financial incentives, whether their programs were federally funded, and whether their sponsoring institution was a dental school.

A national, electronic survey of 55 dental school deans was distributed by e-mail to evaluate an interest in specialty training, an interest in specialization in prosthodontics, faculty shortages, and programs to address faculty shortages, predoctoral curriculum in prosthodontics, opinions regarding dental specialties, and the administrative position of prosthodontics within the schools.

Results:
Of the 45 program directors, 39 responded, for an 86.7% response rate. Respondents reported that 64% of their enrollments were graduates of US dental schools. Between 2000 and 2004 the applicant pool in prosthodontics increased by 23%, with 41% of program directors reporting an increase in US-trained applicants, 46.2% reporting no change, and only 12.8% reporting a decrease. Using the Spearman correlation, there was a moderate, positive statistically significant correlation that the following factors contributed to an increase in the number of US dental graduates applying to prosthodontic programs: (1) mentoring by prosthodontists at the predoctoral level, (2) interest in prosthodontics among US dental students, and (3) society's demand for a higher level of training and credentialing, (4) data depicting current and projected income for dental specialists, and (5) number of trained prosthodontists full- or part-time faculty at the predoctoral level. Only five programs offered no financial packages to offset tuition. The remaining 34 respondents reported some financial package. Among the respondents, there were 25 state-sponsored programs, 9 sponsored by private universities, and 5 sponsored by hospitals or federal agencies.

Of the 55 deans, 44 deans responded, an 80% response rate. Only five deans reported a decrease in the number of students seeking specialty training after dental school. The remaining 39 deans reported a large increase, slight increase, or no change in those seeking specialty training. In 29.6% of the deans' responses, an increased interest in prosthodontics was reported, whereas 16 deans reported no change in the level of interest. One or more open faculty positions in prosthodontics existed at 29 dental schools, and 28 schools offered at least one incentive or a variety of incentives to recruit faculty. The respondents to the deans' survey revealed predoctoral student exposure to prosthodontists was high, and exposure to postgraduate prosthodontics students was low. A survey of internal school programs that might have an impact on an increased interest in prosthodontics revealed the presence of a predoctoral mentoring program for prosthodontics in 80% of the institutions. The clinical curriculum included treatment of a variety of cases, including complex cases as defined by a diagnostic classification system. The response to whether dental specialties should be combined or remain individual provided some interesting data. A follow-up survey being conducted currently will give us 10-year data from 2000-2009.

Conclusion: An increased applicant pool and more US-trained applicants to programs create a more competitive applicant pool for our specialty. Program directors reported that factors such as mentoring, society's demand for a higher level of training and credentialing, data depicting current and projected income for prosthodontists, exposure to

prosthodontic faculty at the predoctoral level, the dollar value of prosthodontic training, and advances in implant, aesthetic, and reconstructive dentistry have all had some impact on increasing the applicant pool to prosthodontic training in the United States. Dental school deans reported an increased interest in specialty training. Predoctoral student exposure to prosthodontics was high due to the nature of their clinical experience and due to the exposure to full-time prosthodontics faculty. Many dental schools have programs, such as mentoring and new technology, which might have an impact on predoctoral students' increased interest in prosthodontics. The original data will be combined with the current survey being conducted to give us 10-year data.

59

The Clinical Study Of Full Ceramic Restorations With Cad/Cam Zirconium

Sun Feng*, Wang Huan, Liu Feng, Mao Hong, Huang Ling
Peking University School and Hospital Of Stomotalogy
Clinic Department
Beijing, China

Purpose: To evaluate the effects of full ceramic restorations with CAD/CAM Zirconium in clinic. .

Methods & Materials: The 513 crowns (include 87 abutments of tooth discoloration) and 49 bridges (include 3-6 units) on natural teeth and implants with Everest CAD/CAM Zirconium were made in clinic. Total is 562 restorations. The color and marginal fitness of all restorations were checked in clinic after them were adhesive. The fracture and loosing were followed-up in clinic in 1-4years. Average 2.9 years. The preparation of CAD/CAM Zirconium full ceramic restorations was summarized.

Results: The fracture in veneer of 9 posterior restorations and 2 anterior restorations were found in 1-4years. The fracture in veneer rate is 1.96%. No fracture of Zirconium frameworks was found. 2 posterior crowns were loosed on short teeth. The color in good grade was 510 pieces in 562 restorations. The rate of good grade is 90.9%. The marginal fitness of crows in good grade was 513 pieces. The rate of marginal fitness of crown in good is 100%. The marginal fitness of bridges in good grade was 45 pieces. The rate of marginal fitness of bridges in good is 91.8%. The 4 bridges that marginal fitness is not good were long bridges (more than 4 units).

Conclusion: The marginal fitness of CAD/CAM Zirconium full ceramic crows was perfect. The long bridges should be careful. The color of Zirconium full ceramic restorations is good. It is good choice to using Zirconium full ceramic restorations for tooth discoloration in anterior region. The fracture rate is low.

60

Non-Contact Collinear Optical Probe Scanner For Porcelain Fused To Zirconia (Pfz) Restorations Production

Tarazi, E.*, Sirat, G.Y.
The Hebrew University - Hadassah School of Dental Medicine
Tel-Aviv University
Oral Rehabilitation
Tel-Aviv, Israel

Purpose: Zirconia copings are replacing metal copings as the standard of care for single, and multiple all-ceramic restorations. Porcelain fused to Zirconia (PFZ) restorations are superior to All-ceramic restorations due to exceptional physical qualities. The production of zirconia copings can be done with a copy milling machine by hand, or with a CAD/CAM technology. The precision that provides the best adaptation to tooth margins depends mainly on the data

acquired by a 3D scanner.

In this study we compare in a theoretical model the performance of optical non - contact probes for the measuring of 3D objects. The analysis is designed for the positive and negative forms, such as gypsum models or impressions for copings production.

Methods & Materials: We compare two different concepts of optical non-contact probes, triangulation and collinear probes. The differentiation between the two technologies and the inherent limitations of each technology has been detailed and quantified.

The ratio of depth to diameter based on a statistically relevant sample of prepared teeth for production of All-Ceramic restorations, including both anterior and posterior teeth. The values have been computed from a random sample of prepared teeth in which the measure had been taken manually with an evaluated precision of 0.1 mm.

Results: For the statistical sample of teeth used, collinear technologies will be able to measure more then 90% of the teeth without tilt. Triangulation systems do not fulfill this requirement, even for very moderate depth to diameter ratios. For a 40° triangulation angle, necessary for high precision measurement, only a single tooth can be measured. For a 20° triangulation angle, 31% of the teeth of the sample can be measured.

Conclusion: In our analysis it was shown that collinear optical probes are able to measure the bottom of the holes for relatively high depths to diameter ratios such as prepared anterior teeth.

61

Prosthodontic Decision Making: What Information Do Dentists Seek Before Recommending Treatment?

R Omar, R.* Akeel, R.
Faculty of Dentistry, Kuwait University
Department of Restorative Sciences
Kuwait

Purpose: This study explored the nature of, and variance in, the unprompted information that dentists, with different levels of experience and/or education, seek in order to make a treatment decision when presented with the same clinical situation, and whether the treatment chosen could be seen as a logical extension of the information sought.

Methods & Materials: A Paper Patient Case (PPC) of partial edentulism was presented to groups of interns, general practitioners and prosthodontists (n=70, mean age 33 years, range 23-68). They were asked to make a treatment recommendation, and could ask any questions that they felt relevant. A list of 48 question/answer items thought to be comprehensively related to the PPC was available to the interviewer with which to answer participants' questions. When ready, they made their treatment recommendation.

Results: 38 of the predicted 48 questions were asked which were allotted by author consensus into four categories: patient's treatment preferences; clinical and radiographic information; patient's personal and social attributes; history of, and complaints about the condition. Mean numbers of questions asked by groups did not differ significantly, but prosthodontists asked significantly more questions in the 'clinical and radiographic information' category than GPs ($p=0.0001$) and interns ($p=0.003$). For the #16 space, a 3-unit fixed dental prosthesis was most frequently recommended, but for the #36/37 space, they were more varied. To examine whether treatment prescribed and questions asked were related, treatment options for each space were dichotomized into 'possible' or 'not possible', based on the authors' interpretations of the case history. Although prosthodontists prescribed treatments that were 'possible' more frequently than GPs and interns, the finding was not statistically significant (Pearson Chi-square 0.083 and 0.108 for upper and lower spaces, respectively). Those who prescribed a 'possible' treatment asked significantly more questions in the 'clinical and radiographic information' category than those who chose an inconsistent treatment option: upper jaw ($p=0.0001$), lower jaw ($p= 0.003$).

Conclusion: Clinicians with more education showed more agreement in treatment recommendations as well as seeking more information before prescription.

Saturday, September 12th
Concurrent Session C
Maxillofacial Rehabilitation

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

The ICP reserves the right to cancel or modify its program as circumstances might dictate.

62

Nasoalveolar Moulding and Infant Cleft Care

Brecht, L.
Cleft Palate Team at the Institute of Reconstructive Plastic Surgery
New York University Medical Center
New York, NY USA

Very often, the efficacy of a treatment intervention for an infant with a cleft lip, alveolus and palate anomaly cannot be assessed until that patient has reached adulthood. The first infants treated by nasoalveolar molding and columella elongation are now approaching that developmental milestone.

Interest in nasoalveolar molding (NAM) and columella elongation has grown steadily over the past 15 years since it was introduced by the Cleft Palate Team at the Institute of Reconstructive Plastic Surgery at New York University Medical Center. What was once an obscure and highly controversial technique is now practiced predictably at cleft centers throughout the world.

This presentation will provide a review of the current state of nasoalveolar molding (NAM) and columella elongation. The current longitudinal research on NAM and developments in the technique and how it has changed over the years will be discussed. It is hoped that those attending this presentation will have a greater understanding of the advantages of NAM as studied closely at NYU from infancy through early adulthood.

63

Functional Assessment: Choosing So That You Don't Lose

Rieger, J.
Functional Outcomes
Institute for Reconstructive Sciences in Medicine (iRSM)
Edmonton, AB, Canada

This presentation will address the topic of functional assessment techniques that are specific to prosthodontic rehabilitation in patients with maxillary and mandibular deficits secondary to surgical intervention.

A review of current practices reported in the literature will lead the audience into consideration of best practices. Practical solutions for functional assessment, whether they be low-tech or state of the art, will be offered.

The presentation will close with a view to the future by highlighting recent developments in the advancement of functional assessment.

64

The Use of Zygomatic Implants in Midface Reconstruction after Trauma and Oncological Resection

Howes, D.
Department of Prosthodontics, School of Oral Health Sciences
Faculty of Health Sciences
University of the Witwatersrand
Johannesburg, South Africa

Tumours of the craniofacial region comprise 3% - 5% of all tumours affecting approximately 30:100,000 people in the USA. It could be said that these patients suffer the greatest morbidity and quality of life disruption of all cancer patients. This is due to often grotesque facial disfigurement by the tumour and / or the surgical intervention. Treatment often alters the life supporting functions of eating and speaking due to the excision of the bony and soft tissue skeleton. Trauma such as gunshots often leave similar ablation injuries begging similar treatment protocols.

Challenges faced in the treatment of these cases are significant even in first world countries where financial constraints are less restrictive and advanced surgery is more accessible. In South Africa, it is not only the financial and socio-economic constraints that prevent them from receiving the appropriate care. Cultural and spiritual beliefs also cause communities to hide these patients from society due to embarrassment or even beliefs of curses due to witchcraft. Tumours therefore escape early detection, diagnosis and treatment that exacerbate these challenges.

The Zygomatic Implant, first introduced by P-I Brånemark has revolutionized the reconstruction of these cases where surgical reconstruction is not possible or contraindicated. This implant has been modified for maxillary reconstruction and facilitate the prosthodontic reconstruction with redistribution of maxillary forces through to the facial skeleton and offer resistance and retention for the replaced dentoalveolar prostheses and obturators.

This lecture will cover our protocols of maxillary reconstruction using the zygomatic and oncology implants with effective use of modern CAD CAM technology and the surgical and prosthodontic techniques in rehabilitation.

65

In Vivo Application of Modal Analysis to Maxillofacial Prosthodontics

Taniguchi, H.
Tokyo Medical and Dental University
Tokyo, Japan

Modal analysis is one of vibration analyses and is basically applied to rigid substances in engineering fields. In the dental research field, basic investigations have been reported on the protective effects of mouthguards and the vibratory characteristics of metal frameworks or removable partial dentures with metal frameworks. In maxillofacial prosthodontics, in vitro investigations have been done on the vibratory characteristics of obturator prostheses from various viewpoints such as metal framework designs and bulb designs.

However all of these in vitro studies did not shed any light on how the vibration of the retainers affects the abutment teeth in practice. This prompted us to investigate the vibratory characteristics of living human maxillary dentition. Recently we could successfully apply modal analysis to maxillary dentition of nomal subjects, cleft lip and palate patients and maxillectomy patients. This time in vivo application of modal analysis will be introduced with the outcome of the effect of bone grafting in the CLP patient and the effect of lateral wall height of the obturator bulb in the maxillectomy patient on maxillary dentition.

66

Treatment Outcomes with Implants in Head and Neck Oncology Patients

Reintsema, H.*, Schoen, P.J., Raghoebar, G.M., Bouma, J., Vissink, A., Sterk, W., Roodenburg, J.L.N.
University Medical Center Groningen
Department Oral Maxillofacial Surgery and Maxillofacial Prosthetics
Groningen, The Netherlands

Surgical treatment of tumours in the head and neck area and sometimes subsequent radiotherapy in general result in an anatomic and physiological condition unfavourable for prosthodontic rehabilitation. The use of implants to retain prostheses has improved the possibilities to obtain rehabilitation and as such might improve quality of life.

The outcomes of implant treatment in head and neck oncology patients have been reported sparsely, especially because the groups of patients are very small and diverse.

The general outcomes available and multi-disciplinary procedures will be discussed. In a prospective study regarding implant treatment in the edentulous mandible during ablative surgery for malignancies in the oral and orofaryngeal area the effect on treatment outcomes (condition of peri-implant tissues, implant survival, oral functioning and quality of life) of prosthodontic rehabilitation with implant-retained lower dentures was obtained over a five year period of follow up.

As well as the outcomes regarding the effect of implant treatment after prevoiusly applied radiotherapy, in which the use of hyperbaric oxygen treatment for preventive reasons was taken into account also.

Results of our study can be included here regarding:
- numbers of patients surviving after 5-year
- implant survival and clinical parameters
- QoL-data obtained with several tools, like the EORTC-lists, OHIP a.o.
- HBO effects on implant treatment after Radiotherapy

67

Implants in the Irradiated Tissue

Beumer, J.
Division of Advanced Prosthodontics, Biomaterials and Hospital Dentistry
UCLA School of Dentistry
Los Angeles, CA USA

Tumoricidal doses of radiation results in hyocellular and hypovascular and hypoxic tissues. Osteoprogenitor cells in the bone marrow are either killed or rendered non functional. Therefore osseointegration in the usual sense does not occur at high doses. These changes and the compromise of the remodeling apparatus predispose implants in heavily irradiated tissues to a higher long term failure rate. The purpose of this presentation is to review the tissue changes and clinical data regarding use of implants irradiated tissues.

68

Facial Prostheses at the Crossroads: Lessons of the Past and Future Horizons

Davis, B.
Otolaryngology - Head and Neck Surgery
Medical University of South Carolina
Charleston South Carolina

Facial prostheses provide a great service to the facially disfigured patient. The anatomical replacement of missing body parts can be dated back as far as pre-2500 BCE and are reflective of the artistic ability of the clinician. It was not until the 1500s that Ambrose Pare, the father of facial prostheses, made significant progress in the development and advancement of facial prostheses.

Within the last 50 years, facial prostheses have seen marked improvements in materials science and osseointegration techniques. Even with these advances, the contour or shape of the final prosthesis was still a reflection of the artistic ability of the clinician. The recent development in 3D modeling has the potential to aid the clinician in developing the contour or the waxup.

By creating a 3D model from the CT scan, valuable clinician and patient time in the fabrication process can be reduced resulting in a quicker rehabilitation process. The role of technology has the potential to transform the field of facial prostheses through 3D data collection and modeling and computerized skin color formulations.

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

The ICP reserves the right to cancel or modify its program as circumstances might dictate.

69

UNDERSTANDING DENTAL CERAMIC FLAWS AND CLINICAL RISK

Malament, K.
Tufts University
Postgraduate Prosthodontics
Boston, MA USA

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. All-ceramic materials were developed to improve ceramic color and marginal fit. Despite substantial improvements in these different ceramics, material strength and toughness, all-ceramic crowns still may fail particularly on molar teeth. Ultimately crown performance is a complex set of interactions between crown material and geometry, the characteristics of the support structure of the cement and crown, and the clinical loading history.

This presentation will provide a comprehensive look at failure modes and effects in bilayer all-ceramic crown-cement-tooth systems, tying together the influences on resistance to fracture initiation and propagation of ceramic material properties and thickness; crown/tooth geometry; cement modulus and layer thickness; damage induced by shaping, fabrication, clinical adjustments, and sandblasting; and fatigue in the wet intraoral environment. Some counter-intuitive findings will be addressed including changes in fracture behavior with different geometry and the influence of the compliant cement layer beneath stiff cores.

Factors that influence tooth preparation design for teeth with little structure due to wear or incomplete passive eruption include the need for resistance and retention form. Treating the vital or non vital tooth may require a core to replace lost tooth structure and a ferrule preparation placed below the margin of the core. Tooth structure can be gained through the apical repositioning crown lengthening procedure or one may chose to have teeth endodontically treated to improve retention and resistance form or when the risk of non-vital pulp or involved pulp is inevitable.

A discussion of physical factors that may impact long term restoration survival as well as original research that demonstrates how different core materials directly impact the survival of different all-ceramic materials.

70

Comparing the Perception of a Korean and a Westerner to Altered Dental Esthetics in Upper Anterior Dentition

Oh, SC
Sanbon Dental Hospital
Wonkwang University
South Korea

The concept of beauty is a growing concern in our society and words like cosmetics and esthetics are more frequently used in restorative dentistry. The meaning of beauty is slowly changing. The change is created by an era passing and a new era beginning. People are developing new ideas within individual tastes and their cultures.

Each individual usually has their own personal taste in beauty. Many proverbs explain this quite nicely, such as "Beauty is in the eye of the beholder" and "One man's trash is another man's treasure". In addition, if members of societies share the universal culture like Hollywood movies, people living in different countries would become more familiar with an attractive face of an entertainer despite geological distance. On the other hand, there are people who have different ideas of what is beautiful. For example, an extended neck in Thailand or triangular shaped incisors in West Africa are yearned for by people to express their individual beauty within their race and traditional culture, which is not a universal concept. Consequently, our perceptions of facial beauty are based on a complex mix of both individual characteristics and the social environment in which we live in. These subjective characteristics regarding dental beauty have been well documented by dentists. Successful therapy in esthetic dentistry depends mainly on good interaction between the

clinician and patient. The discrepancy between the patient's and dentist's perception of dento-facial esthetics could create problems in communication and lead to difficulties in treatment.

The geometric norms used in the esthetic restorative treatment of the anterior dentition for Asian patients might not truly reflect the patient's esthetic needs because of the norms intended usually for Caucasians. Therefore, patients of different ethnicity might not agree with the esthetics of the new restorations based on their own culture. Social acceptability by peers having the similar culture often plays an important role in achieving an ideal esthetic goal. Although many studies of dentofacial esthetics have been reported, a few studies have evaluated the esthetic perception of a different ethnic group.

I have recently done some studies to compare esthetic perceptions of a Korean and a Westerner for the upper anterior restoration. I have obtained some useful results from these studies. Although limited, this presentation should be able to show that the Korean's perception is different when compared to a Westerner's perception in some aspects and we might need to further customize the criteria for the esthetic treatment of the patients who have a different and unique culture.

71

A Complete Denture Method for Disadvantaged and Remote Communities

Owen, P. [1]
MacEntee, M.I. [2]
[1]**University of the Witwatersrand, Faculty of Health Sciences**
Johannesburg, South Africa
[2]**Faculty of Dentistry, University of British Columbia**
Vancouver, BC Canada

The need for complete dentures remains very high globally, especially in poor, disadvantaged and remote communities. This current need approximates the distribution of edentulousness in mainstream populations during the 1950s. Complete dentures can be made in many ways, but the current consensus on how best to replace all of the natural teeth has moved remarkably from the relatively innocuous conventions of prosthodontics towards the complicated invasiveness of oral implants as the standard of care for the edentulous patient.

There remains, nonetheless, an urgent need to improve access to healthcare for populations with severe economic limitations; consequently, we have developed an "appropriatech" method for making complete dentures in three clinical sessions employing a mix of interdependent clinical and technical procedures.

To date, we have refined the method and tested it successfully by using readily available and relatively inexpensive materials. It requires some changes in clinical and laboratory techniques from those traditionally recommended in standard texts, yet it conforms to the principles set out for a minimum acceptable protocol for the construction of complete dentures. Moreover, we find that patient satisfaction is similar to that reported for more complicated techniques.

We will describe the method and place the implications of our experiences in the context of prosthodontic problems, real or imagined, that demand major social, psychological and financial commitments globally because of their disruptive nature and effect on quality of life.

72

Long-Term Outcomes of Early Loading Protocols for Implant Overdentures

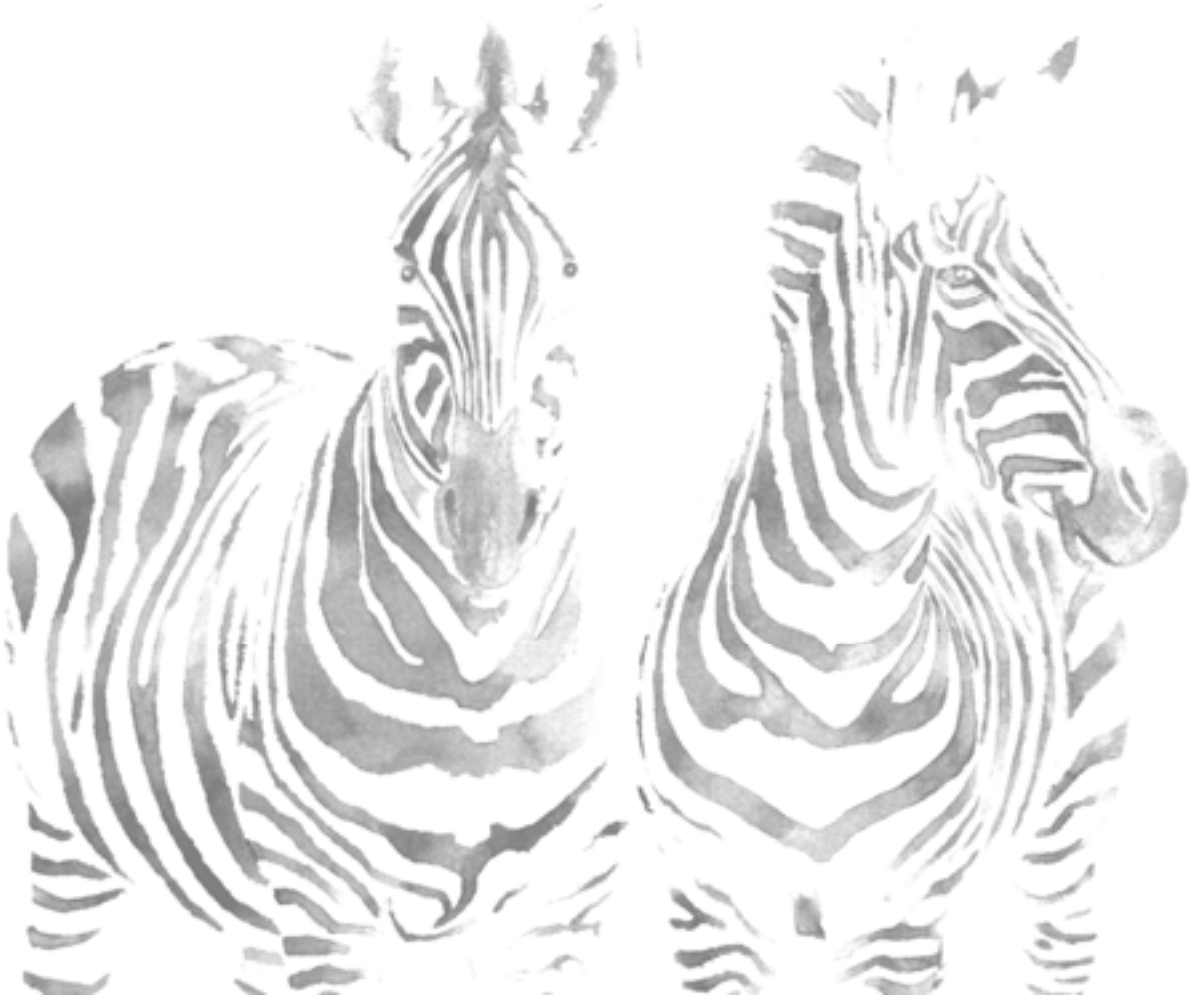
Payne, A.G.T.
Oral Implantology Research Group
Sir John Walsh Research Institute
School of Dentistry, University of Otago
Dunedin, New Zealand

An educational conviction that the current standard of complete denture service to resolve the edentulous predicament would involve implant overdentures in both jaws will be reviewed from a prosthodontic perspective.

Short- medium- and long-term outcomes using implant overdentures for both edentulous patients as well as Kennedy I partially dentate patients will be discussed. The impact of the introduction of different loading protocols and various attachment systems will be compared, together with specific prosthodontic and patient outcomes related to maintenance and repair. A re-appraisal of the plethora of treatment options for the edentulous maxilla, specifically opposing mandibular implant overdentures will prelude revealing outcomes of early loaded splinted and unsplinted narrow diameter implants supporting overdentures. An inevitable paradigm shift towards unsplinted prosthodontic designs for maxillary overdentures will be proposed against a background of nuisance peri-implant mucosal outcomes and the legacy of traditional preferences bar designs.

Concluding remarks will reveal perspectives of current research for the limited application of both novel surgical sites, as well as ceramic implants to support both maxillary and mandibular overdentures. The combination of plastic attachment systems for the overdentures will reveal another treatment option for those maladaptive elderly patients specifically requesting a metal-free approach.

Thursday, September 10th
Poster Presentations



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

The ICP reserves the right to cancel or modify its program as circumstances might dictate.

73
Table 1

Immediately Restored Single Implants With A Novel Design In The Anterior Maxilla

Brown, S.D.K.*, Payne, A.G.T., Purton, D.G., De Silva, R.K.
School of Dentistry, University of Otago
Oral Implantology Research Group Sir John Walsh Research Institute
Dunedin, New Zealand

Purpose: To evaluate early surgical, prosthodontic and aesthetic outcomes of ceramic crowns immediately restoring single, tapered implants placed in fresh extraction sockets in the anterior maxilla.

Methods & Materials: Twenty-eight consecutive participants requiring a maxillary anterior single tooth extraction and meeting specific inclusion criteria, were selected (range: 21-71 years mean age: 46.9 years). Tapered, external hexed, roughened-surface implants with a novel design (Co-Axis 12d, Southern, Irene, South Africa) were placed in extraction sockets using a flapless surgical procedure. Optical impressions were made at surgery for provisional CAD-CAM, ceramic, screw-retained crowns, attached to 4 mm (n=15) and 5 mm (n=13) diameter implants within 4 hours using an immediate restoration protocol. Definitive, screw-retained, all-ceramic crowns were placed in occlusion at 8 weeks (baseline). Surgical, prosthodontic and aesthetic outcomes were assessed using established criteria at surgery, baseline and at 1 year.

Results: All implants were surviving at the 1-year review except for two that were excluded at surgery due to lack of primary stability. The mean marginal bone levels between surgery-baseline and baseline-1 year were stable. Implant stability values were acceptable at surgery, baseline and 1 year. The mean vertical height of the mid-buccal mucosa remained stable over the test period and according to the Jemt Index, at 1-year, 90% of papillae scored 2 (n= 20) or 3 (n=25). The prosthodontic maintenance for the provisional, ceramic, screw-retained crowns was one loose retaining screw and one fractured crown at the baseline appointment. Two all-ceramic definitive crowns experienced ceramic veneer fracture; one on loading and the other 5 days after loading. Two zirconia abutments fractured; one within 5 days of loading and another fractured at 6 months.

Conclusion: Early treatment outcomes suggest that immediate restoration of tapered, roughened-surfaced, implants, placed in fresh extraction sockets, may be possible.

74
Table 2

Innovative Ideas For The Rehabilitation Of Edentulism With Maxillary And Mandibular Implant Overdentures

Ma, S.*, Payne, A.G.T
University of Otago
Discipline Of Prosthodontics
Dunedin, New Zealand

Purpose: Planned implant overdenture treatment has both high success rates and satisfactory patient outcomes. Implant failures due to the poor bone quality in the maxilla and “ad hoc” replacement with “rescue implants” of incompatible designs will always challenge the prosthodontist’s clinical skills during patient rehabilitation. This case report highlights innovative ideas used to rehabilitate an edentulous patient selected for maxillary and mandibular implant overdentures.

Methods & Materials: A 61-year old male with long-term edentulism presented for implant-supported prostheses treatment. Four Southern ø3.75mm implants and two ø4.1mm Straumann implants were placed in the maxilla and mandible respectively. The surgical approach in the maxilla was according to an angled implant concept with the distal implants placed against the medial borders of the sinus to avoid augmentation and to reduce the cantilever distance during prosthodontic rehabilitation. Poor bone quality combined with the surgical learning curve of a graduate student in Zone II of the maxilla resulted in early failures of both distal implants before loading. These were immediately replaced successfully with Straumann TE ø6.5mm implants, which were the only replacement implants available at the time. A conventional loading protocol was followed.

Results: Due to the incompatible implant designs between the originally placed maxillary implants and the replacements, as well as lack of prosthodontic components in the ø6.5mm range to correct the severe angulation of the distal implants, there was a need for innovative ideas to overcome the prosthodontic rehabilitation challenges. A platform switching concept was used by selecting components from the ø4.1mm range which had the identical internal features to be compatible with the Straumann TE ø6.5mm implants. Extension metal sleeves were used as intermediate connections between the angled abutments and Dolder bar abutments. Implants in each quadrant of the maxilla were connected by egg-shaped Dolder bars with the matrices housed in a cobalt-chrome framework for the maxillary 4-implant overdenture. Two single retentive anchors and elliptical gold matrices were used to support the mandibular 2-implant overdenture. A physiologic occlusal scheme using anatomic 33-degree acrylic resin teeth facilitated a successful outcome.

Conclusion: Innovative ideas used to achieve implant component compatibilities allowed completion of the prosthodontic rehabilitation with implant overdentures.

75
Table 3

Implant Supported Reconstruction Following Surgical Resection Of A Maxillary Ameloblastoma

Naidoo, LM
University of The Witwatersrand
Prosthodontics
Parktown, SA

Purpose: Ameloblastomas account for 1% of all oral tumours, with 20% affecting the maxilla (Lagares et al. 2005). Post-surgical defects involving the maxilla often lead to difficulties with speech, deglutition, mastication, as well as facial deformities (Zemann et al. 2007). These are often in proportion to the size of the tumour: unfortunately in developing countries, patients are unable to seek help and eventually present at tertiary facilities with extensive destruction. This case report describes the rehabilitation of such a case, in a male patient aged 41 years, who was diagnosed with a solid maxillary ameloblastoma. The size of this lesion was such that after resection, grafting would not be possible and the resulting defect would not accommodate a prosthesis. The patient would be left post operatively with minimal function and a very dubious quality of life. Fortunately in South Africa, although a developing country, we do have access to high technology for deserving cases, and therefore an implant-supported reconstruction was planned.

Methods & Materials: Extensive diagnostic planning included the production of a stereo-lithographic model to simulate surgery, plan implant placement, and enable diagnostic waxing. Virtual planning software (Mimics, Materialise, Leuven, Belgium) was also used to assist with prosthesis design. All these aids allowed for a creative and unconventional design which included implant placement into the orbital rim on one side, and the remaining maxilla and zygoma on the opposite side. Eight implants (Southern Implants, Irene, South Africa) were placed at the time of initial surgery and left in situ for 12 weeks. To prevent cosmetic deformity in the mid-facial region during healing, a replica prosthesis was created using rapid prototyping and attached to the superior orbital rim. An interim denture was in turn attached to the mid-facial replica. The definitive prosthesis comprised a metal framework which supported the mid-facial region and provided an intra-oral restorative platform for the final removable obturator and denture.

Results: The prosthesis has been observed and maintained for 16 months. During that period no major complications were found. However, the removable obturator was relined 3 times as a result of fluid leakage into the nasal cavities.

Conclusion: The management of this case and the use of high technology has allowed for a remarkable and profound improvement in this patient's quality of life.

76
Table 4

Face Motor Cortex Neuroplasticity Associated With Occlusal Modifications

Avivi-Arber, L., Lee, JC, Sessle, B.J.
Faculty of Dentistry, University of Toronto
Prosthodontics and Oral Physiology
Toronto, Ontario, Canada

Purpose: Modifications to the dental occlusion are associated with changes in oral sensorimotor functions. The face primary motor cortex (face-M1) plays a crucial role in orofacial motor control and adaptation to alterations in orofacial sensorimotor functions but it is unclear whether face-M1 plays a role in adaption to alterations in the dental occlusion. We used electrical intracortical microstimulation (ICMS) and recordings of evoked muscle electromyographic (EMG) activities to test if jaw (left and right anterior-digastric, LAD, RAD) and tongue (genioglossus, GG) motor representations within the histologically defined face-M1 are changed following dental occlusal alterations induced by trimming or extraction of a mandibular incisor of adult male Sprague-Dawley rats.

Methods & Materials: Under local and halothane anaesthesia, an “extraction” group (n=8) had extraction of the mandibular right incisor; a “sham-extraction” group (n=6) had surgery with no extraction; “trim” (n=6) and “trim-recovered” (n=6) groups had the mandibular right incisor trimmed 1-2mm out of occlusion every 2 days for 1 week; a “sham-trim” group received incisor trimming that did not affect the occlusion; a ”naïve' group (n=6) had neither extraction nor trimming. Systematic ICMS mapping was carried out bilaterally under ketamine anaesthesia. Any cortical site from which ICMS evoked EMG activity in LAD, RAD and/or GG was counted as a “positive site” and the values of the onset latencies of the evoked EMG activities were noted. Statistics included repeated-measures ANOVA followed by post-hoc Bonferroni comparisons as necessary, $p<0.05$.

Results: Compared to naïve and sham rats, incisor trimming was associated 1 day later with a significantly shorter GG onset latency in contralateral than in ipsilateral face-M1, but this change was no longer observed 1 week later in the trim-recovered group, although the number of GG positive sites was significantly larger in contralateral than in ipsilateral face-M1. Dental extraction was associated with a significantly increased number and shorter onset latency of RAD positive sites along with a lateral shift of the RAD and LAD centres of gravity within face-M1.

Conclusion: These novel findings suggest that face-M1 may undergo neuroplastic changes that may play a role in orofacial motor control and adaption to alterations in the dental occlusion.

77
Table 5

Implant Restoration In Patients With Vascular Malformation In Maxillofacial Region

Bae, H.E.K.*[1], Kim, CH [2], Lee, J. [3], Han, DH[4], Cha, IH[5]
[1 2 3] Seoul St. Mary's Dental Hospital, Catholic Univeristy of Korea
[4 5] Yonsei Univeristy College of Dentostry
[1 3] Department Of Prosthodontics [2] Depatment Of Oral And Maxillofacial Suregry [4] Department Of Prostho [5] Depatment Of Oral And Maxillofacial Suregry
Seoul, South Korea

Purpose: Uses of osseointegration in restoration for various edentulous areas have been widely reported. However, use of osseointegration in patient with vascular malformation has been rarely reported. This presentation is to report few

successful uses of endosseous implants in such patients.

Methods & Materials: One partially edentulous female patient and complete edentulous male patient, with vascular malformation had been placed with endosseous implants at the areas of alveolar bone which were free from vascular malformation. The surgical and the healing periods were with no complications. After minimal healing duration of 6month, the implants were assessed and the restoration was delivered.

Results: The implants placed in both patients have successfully osseointegrated. Despite some clinical limitation due to vascular malformation, patients were satisfied with their restoration.

Conclusion: With careful assessments, a successful use of osseointegration is possible in patients with vascular malformation.

78
Table 6

Double Chamfer Preparation. An In Vitro Research

Baldi, D.*, Bonica, P.
Genoa Univeristy
Fixed and Implant Prosthodontics
Genoa, Italy

Purpose: The aim of this research is to test in vitro a new preparation for metal-ceramic collar-less crowns, with an innovative double chamfer design. This new preparation presents a coronal chamfer intended to hold the metal and a cervical chamfer for the ceramic margin.

Methods & Materials: Traditional collar-less sample crowns with a rounded shoulder and others with the innovative double chamfer design have been realized. These crowns have been tested in a masticatory robot previously validated1-2, that is able to reproduce the mandibular movements in three dimensions and the forces exerted during mastication, in order to evaluate the crowns resistance under loading.
Additional crowns for each type were realized and cemented on extracted premolars. The crowns and teeth were dissected and observed with a Scanning Electron Microscope (SEM) in order to evaluate the crowns precision.
A photoconductive method for measuring light transmission through the cervical ceramic margin was applied on other sample crowns for each type.

Results: The sample crowns with the new double chamfer design showed a greater resistance under loading. The crowns precision was comparable to that of traditional crowns, as observed with SEM. The light transmission was improved with the new double chamfer preparation.

Conclusion: The new double chamfer design has improved the esthetic result of the restoration with a greater light diffusion through the metal-free ceramic border, providing a greater resistance against occlusal forces thanks to the coronal metal with respect to the traditional rounded shoulder.

79
Table 7

Evaluation Of The Silent Period In Mandibular Overdenture Before And After Anchorage On Two Implants

Bassi, F.*, Notaro, V., Rolando, M., Ferretti, F.
Turin University
Department of Biomedical Science and Human Oncology, Prosthodontic Section
Turin, Italy

Purpose: The silent period (SP) is the phenomenon by which a given stimulus causes either electromyographic silence

(a pause of activity) or inhibition. This event is observed in masticatory muscles (mainly the masseter and the temporalis) in response to diverse stimuli. In literature the most widely used technique is a mechanical stimulation of the teeth. Periodontal receptors create a SP which is mediated by an oligosynaptic circuit, which in this case is at least disynaptic, as it involves an inhibitory neurone acting on masseteric motoneurones. A broad range of works has shown that it is not possible to evoke the silent period in completely edentulous patients, whilst it can still be evoked if at least one dental element is retained in the arches. The SP reappears in edentulous patients after wearing complete denture. In this case, the oral mucosa receptors give rise to different nervous circuits with a longer SP respect to the one mediated by the periodontal ligament. The aim of this study was to assess whether implant anchorage in completely edentulous subjects induces modifications of the SP that could be ascribed to changes in mandibular function.

Methods & Materials: At present, the study involved 20 completely edentulous patients who had been rehabilitated with complete dentures. The latter had been anchored to 2 implants placed in the interforamina area. The EMG activity from masseter muscles was recorded through surface electrodes. Every patient was asked to open and close the mouth so as to cause a rapid occlusion of the maxillary and mandibular denture. Subjects were also asked to exert an extra slight pressure in the final part of the closing movement, before they could open again. The process was repeated 3 times for each patient in order to extract the average characteristics of the SP. The procedure was repeated after implant anchorage and recordings were taken again after 1 day, 1 week and 1 month.

Results: After the implant anchorage, silent period decreases ($p<0.005$): 21.6% at the anchorage, 23.2% after 1 week and with 14.5% after 1 month. The measurements are more stable.

Conclusion: The anchorage of the mandibular overdenture on 2 implants shows a neater and shorter SP which is similar to that of dentates.

80
Table 8

Kinesiographic Evaluation Of The Motor Performance Of The Mandible Based On “Reaching” Tasks

Bassi, F,*[1]., Notaro, V. [1], Rolando, M. [1], Roatta, S.[2]
Turin University
Biomedical Science and Human Oncology Department and Prosthodontic Section[1], Neuroscience Department and Physiological Section[2]
Turin, Italy

Purpose: Mandibular motor control may be impaired in the presence of jaw-oral dysfunctions above all in patients with functional damage as consequence of trauma or ablative surgery for head and neck cancer. There is a lack of tools for assessing the quality of fine motor control of the mandible. Aim of this project is: to present a system for the evaluation of the motor performance of the mandible based on “reaching” tasks; to assess its reliability in a group of healthy subjects and to define a protocol useful for head and neck cancer patients.

Methods & Materials: The instrument is based on a kinesiograph which provides the analog outputs; these data are acquired and processed by a software which is able to visualize the instantaneous position of the jaw (cursor on the screen). To evaluate the system 19 healthy subjects (10 men; 9 women) were first asked to perform the maximal jaw movements on the frontal plane, in order to delineate their “range of movement”: maximum opening and laterality movements. A motor task was then realized in which the subject was asked to control the cursor position so as to match the position of a sequence of displayed targets (after 5 minute of training). Targets were randomly generated within the range of movement, according to a uniform probability density function (30 targets, everyone remaining displayed for 7 seconds with 3 seconds rest). The task was repeated three times, separated by 5-min rest, and the whole sequence was repeated after one week. The individual performance was assessed by means of the two following parameters: the mean cursor-target distance (MD) and the distance between the mean cursor position and the target (Offset error, OE). Repeatability analysis was based on ANOVA for repeated measures. The protocol for pathological subjects is still under debugging. The protocol version was lither for pathological patients because of the physiological difficulty of the exercise: 15 targets, everyone remaining displayed for 5 seconds with 5 seconds rest. The task was repeated three times, separated by 10-min rest, and the whole sequence was repeated after one week.

Results: OE and MD did not show a significant dependence neither on the trials nor on the day. OE is always minor than MD (OE=1.7 +/-0.3 mm vs MD=2 +/-0.3 mm, $p< 0.05$). The error appeared to be bigger when the target was close

to the limit of the “range of movement”, although this was not specifically investigated. The presented technique allows to detect different motor ability in the different subjects and show a good repeatability (inter subject coefficient of variation: OE=17 +/- 6%, MD=16 +/-5%). The inter subject variability is OE=24 +/- 8%, MD=22+/-5% with a range between 1,4 mm and 2,9 mm (OE). At the moment time for the patient protocol development is needed.

Conclusion: The ease and the good repeatability of this procedure allow to evaluate the motor control performance in different clinical situations. Ones developed, it could provide an important tool for monitoring and support of the maxillofacial rehabilitation giving an objective assessment of the therapeutical improvements.
This study has been financed by grants from Regione Piemonte. The described technique is under a patent by the University of Torino.

81
Table 9

Evaluation Of Masticatory Performances Of Edentulous Patients Needing New Complete Dentures

Berteretche, M.V.* [1,2]; Mrejen, M. [1]; Nicolas, E. [2]; Hennequin, M. [2]
[1] Université Paris Diderot, Service D'Odontologie Garancière Hôtel-Dieu
[2]Université Clermont1, Ea 3847, Chu Clermont-Ferrand
Department of Prosthodontics
Paris, France

Purpose: Masticatory performances are influenced by the wearing of removable dentures. The renewal of dentures is motivated in the majority of cases by patients' functional complaints. The aim of this study was to characterize the masticatory efficiency of complete dentures and the oral health related quality of life of denture wearers requiring new complete dentures.

Methods & Materials: A convenience sample of 10 edentulous patients requiring renewal of denture (mean age:xx) treated at the Garanciere-Hôtel Dieu hospital (Paris, France) was included. Fit, retention, stability, and occlusion were the clinical criteria for need for denture renewal. Chewing parameters were measured during chewing sequences using samples of peanuts and carrots. Chewing time, number of chewing cycles and chewing frequency were video recorded during the mastication of the test foods. Masticatory performances were characterized by the 50th percentile (D50) particle size of the expectorated bolus. The Global Oral Health Assessment Index (GOHAI) was used to assess oral health related quality of life. The patients were asked to answer 12 questions relating to oral function, pain, and psychosocial discomfort with the old denture.

Results: The clinical evaluation of the complete dentures showed a lack of stability of mandibular dentures, with poor fit related to the bearing area, and poor occlusion. Denture wearers needing a new set of complete dentures showed longer chewing duration, more chewing strokes and less particle size reduction than denture wearers with well adapted dentures. The Gohai score showed poor oral quality of life.

Conclusion: The tested group of denture wearers showed impaired masticatory function. Characterization of chewing efficiency and oral health related quality of life confirmed the patients' complaints. With the same parameters, a new prospective study could be proposed to evaluate the impact of denture renewal.

82
Table 10

Sinus Floor Elevation Using Osteotomes And Piezoelectric Surgery- A New Approach

Bonica, P.*, Baldi, D., Menini, M., Ravera,G., Pera, P.
Genoa University
Department Fixed and Implant Prosthodontics
Genoa, Italy

Purpose: The aim of this paper is to describe a new technique for sinus floor augmentation with a 1-step crestal approach where the residual bone is = 7.5 mm.

Methods & Materials: Thirty-six implants were inserted in 25 patients in the atrophic posterior maxilla immediately after sinus floor elevation. The residual alveolar bone height was 3-7.5 mm. Sinus floor elevation was performed with a crestal approach using either osteotomes and burs or piezosurgery. Standardized intraoral radiographies were taken prior to surgery and 1 year after surgery.

Results: The mean gain of sinus elevation was 6.78 mm (range 3.5-10 mm) at 1 year post surgery. There were 2 dropouts. One implant failed, while the remaining 33 implants were stable 12 months post surgery (CSR, 97.05%). An higher bone increase was found where tapered implants have been inserted ($P<0.05$) with respect to cylindrical implants. No differences were found in bone level using osteotomes or piezosurgery.

Conclusion: The technique described was found to produce satisfactory results in the sinus floor augmentation with a crestal approach and immediate implant placement in cases where the residual bone is = 7.5 mm.

Key words: sinus lift, piezosurgery, osteotomes, crestal approach.

83
Table 11

Effect Of Immediate And Delayed Post Preparation On Apical Leakage Using Different Filling Materials And Obturation Techniques

Canay, S.*, Sukuroglu, E., Nagas, E., Sahin, C., Uyanik, O., Sukuroglu, E.
Hacettepe University, Faculty of Dentistry
Prosthodontics
Ankara-Turkey

Purpose: The aim of this study was to compare the effect of immediate versus delayed post space preparation on the apical seal using three different endodontic sealers and obturation techniques.

Methods & Materials: A total of 216 decrowned single-rooted human teeth were used. Following preparation of the root canals with 0.06 taper NiTi rotary files to size 30, the roots were randomly assigned into three experimental groups according to the obturation material: 1. AH plus/Guta-percha, 2. Sealite Ultra/Guta-percha, and 3. Epiphany/Resilon. In all groups, the specimens were randomly assigned into three sub-groups according to the obturation technique (n=8): 1. Single cone, 2. Cold lateral compaction, and 3. System B+Obtura. Post space preparation was performed immediately (group 1), 24 h (group 2), and 7 days (group 3) after root filling. Leakage was measured by the fluid-filtration method. Statistical analysis was performed using Kruskal-Wallis and Wilcoxon signed ranks tests at $p<0.001$.

Results: Delayed post space preparation achieved significantly better sealing than immediate post preparation at the apical end, regardless of obturation techniques and materials ($p<0.001$). The following statistical ranking of fluid filtration values was obtained for obturation materials: Epiphany/Resilon > Sealite Ultra/Guta-percha > AH plus/Guta-percha ($p<0.001$).

Conclusion: The tested obturation techniques had no significant effect on the leakage values

84
Table 12

Immediate Loading Of Osseointegrated Dental Implants: A Literature Review And Meta-Analysis Of Randomized, Controlled Clinical Trials

Carossa, S., Rolando, A.
Turin University
Biomedical Science and Human Oncology Department and Prosthodontic Section
Turin, Italy

Purpose: According to the conventional technique, osseointegrated dental implants are inserted and loaded with a two-stage procedure. Implants are kept load-free during the healing period, and patients are rehabilitated with a temporary prosthesis. Immediate and early loaded implants have been used to shorten the healing period. However, these methods are based on clinical suggestions rather than scientific evidence, hence it would be useful to know if there is any difference in osseointegration and clinical performance between immediately and early loaded implants compared to conventionally loaded implants. Aim of the study is to compare the success rate of osseointegration and to evaluate the influence of occlusal functional loading and prosthesis design on immediately, early and conventionally loaded implants.

Methods & Materials: Search strategy. Randomized and controlled clinical trials (RCTs) were identified mainly through databases (PubMed, Cochrane Central Register of Controlled Trials) using selected keywords. Furthermore, cross-checking of bibliographic references and handsearching on dental journals were carried out.

Selection criteria. Randomized and controlled clinical trials (RCTs) aimed at comparing the results obtained applying immediately, early or conventionally loaded implants, with a minimum follow-up of 6 months were included in this meta-analysis. The clinical parameters taken into consideration were the success of osseointegration, the outcome of prosthetic rehabilitation and horizontal peri-implant bone resorption during the follow-up period. 69 randomized controlled studies were identified through the literature search. Of these, 18 RCTs were selected and included in the meta-analysis. The meta-analysis involved 745 patients, for a total of 1500 implants.

Results: Main results. The collected data were divided according to type of surgical protocol used, type of prosthetic rehabilitation and type of occlusal loading applied, in order to highlight relevant differences between different groups. In patients treated with immediately loaded implants and rehabilitated with single crown there was a variation (+0.19 mm) of peri-implant bone level, that was statistically significant when compared with the results obtained in patients treated with early loaded implants and rehabilitated with single crown. In patients treated with immediately loaded implants with occlusal loading there was a statistically significant difference in peri-implant bone level (+0.19 mm) when compared with patients treated with early loaded implants without occlusal loading.

In the other comparison groups, the study has not shown statistically significant differences in clinical results obtained at the end of follow-up, using immediately loaded compared to early or conventionally loaded implants. Among the factors considered, the application of occlusal loading and the type of prosthetic rehabilitation may not influence the success of osseointegration or peri-implant bone level variations. On the contrary, the following clinical aspects, although relevant, were not analyzed, since at present there is no enough studies to perform a meta-analysis: implants located in the maxilla or mandible, implants placed in partially or totally edentulous patients, implants placed in the anterior or posterior parts of the jaw or the mandible, number of implants placed, size and type of implants used (smooth or modified surface).

Conclusion: The meta-analysis confirmed that immediately and early loaded dental implants can be used in selected patients. However, a high degree of primary stability is required in order to obtain a proper osseointegration process. Primary stability can be obtained in patients with adequate bone quantity and quality using a high torque of insertion, both in fresh extraction sockets, both into intact alveolar bone. The meta-analysis highlights the need for further randomized and controlled clinical trials (RCTs) to determine the effective influence of prosthetic and occlusal factors on the osseointegration process. These studies must be conducted according to the Consort guidelines and respecting the parameters set by the Cochrane Collaboration.

85
Table 13

Responsiveness Of Lava Zirconia Ceramic To Different Surface Treatments

Casucci, A., Mazzitelli, C., Papacchini, F., Osorio, E., Borracchini, A., Giovannetti, M., Ferrari, M.
University of Siena
Fixed Prosthodontics
Siena, Italy

Purpose: To analyze the surface morphology of Lava zirconium ceramic after different chemo-mechanical treatments.

Methods & Materials: Twenty-one discs of sintered Lava zirconium oxide ceramic (Ø 10x1 mm height) were used for the study, divided in seven groups (n=3) and conditioned with: 1. 9.5% hydrofluoric acid for 90 s (HF); 2. Airbone particle abrasion with 125 µm Al2O3 particles (S); 3. Experimental hot etching solution applied for 10, 20, 30 and 60 min (ST); 4. Selective infiltration etching (SIE). Average surface roughness of conditioned specimens were measured by Atomic Force Microscope (AFM) at two fields of view: 5 x 5 µm and 100 x100 µm. Data were statistically analyzed with the One-way ANOVA and the Games-Howell tests ($p<0.05$). The same discs were observed under a Scanning Electron Microscope (SEM) for a bi-dimensional zirconia surface ceramic evaluation.

Results: The surface treatment significantly influenced the surface topography and roughness of Lava zirconia. The experimental hot etching solution increased the surface roughness of the specimens, independently of the application time ($p<0.05$). Moreover the roughness means obtained in hot etched discs treated for more than 20 min revealed statstical differences with all tested groups ($p<0.05$).

Conclusion: Within the limitations of the study, Lava zirconia ceramic showed different responsiveness to the chemo-mechanical treatments. The application of the experimental hot chemical etching solution may represent effective methods for conditioning zirconia surfaces, ideally enhancing mechanical interlockings.

86
Table 14

Changes Of Co-Cr-Mo Alloy Surface And Composition After Biocorrosion In “Plaque” And “Saliva” Solutions

Celebic, A.*, Klaic, B., Malina, J., Svetlicic, V., Baucic, I., Vojvodic, D., Catovic, A., Poljak-Guberina, R.
School of Dental Medicine, University of Zagreb; Dental Polyclinic Zagreb, Institute Rudjer Boskovic Zagreb, School of Metallurgy, Zagreb
Department of Prosthodontics
Zagreb, Croatia

Purpose: Corrosion behavior in oral fluids is strongly influenced by microstructural characteristics and surface properties of any dental alloy. The aim of the study was to examine the surface of a cast CoCrMo alloy prior and after exposure into different solutions mimicking oral conditions.

Methods & Materials: The cast and electropolished specimens of CoCrMo alloy (Wironit®, extra hard) were examined by SEM with EDS and by AFM prior and after immersion into two solutions simulating saliva („saliva“) and dentobacterial plaque („plaque“) for 30 days at 37 ºC. To find the same surface after immersion, each sample was marked prior AFM imaging and soaking.

Results: The surface of cast and electropolished specimens prior the contact with corroding solutions was characterized

with at least 3-4 different phases on AFM images: undulating surface corresponding to dendrites (matrix), clusters of nanocrystallites (islands) corresponding to interdendritic phase and some high conical crystallites emerging from both, interdendritic space and the matrix. Also some very small crystallites could also be observed. The undulating surface (matrix) was twice richer with Co than Cr, while the interdendritic phase had almost equal contents og Co and Cr. However, some cristallytes were dissolved after corrosion, but some new phases (dense sprinkles of very small crystallites) appeared. The respective alloy peaks in the EDS spectrum revealed that new phases are the result of a corrosion - primarily of metal dissolution, break-down of an oxide layer and metal salt formation. The presence of some elements from the corroding solution was registered on the alloy surface, as well. We assume that metal salts (anions from corroding solutions) were binded at the surface as a new phase.

Conclusion: Electrochemical behaviour of CoCrMo alloys is clearly affected by pH and composition of the fluids. It is obvious that some complex mechanisms involving reactions between ionic species are dominating the interfacial processes, which in turn affect the morphology and the composition of the phases formed.

87
Table 15

Effects Of High Speed Grinding With Diamond Burs On All-Ceramic Veneering Porcelain

Chang, C.W.*, Waddell, N., Swain, M.V.
School of Dentistry, University of Otago
Department of Oral Rehabilitation
Dunedin, New Zealand

Purpose: Due to dimensional errors arising through the fabrication of all-ceramic restorations, clinicians often need to make adjustments in vivo. This adjustment leads to surface and subsurface damage which may predispose to premature failure through fracture or chipping.

Methods & Materials: Four commercially available porcelains used for veneering a variety of ceramic core structures (WA (Wieland ALLUX), WZ (Wieland ZIROX), EC (IPS e.max Ceram), EV (IPS Empress Esthetic Veneering)) were examined. Discs of 10mm diameter and 2mm thickness were fabricated according to manufacturer instructions followed by an auto-glaze cycle, and then abrasively ground using three different grit-size polishing diamond burs (fine (46µm), extra-fine (25µm) and ultra-fine (8µm)) using an air turbine dental handpiece. The grinding parameters were standardised with regard to the magnitude of the force applied, rotational speed of the diamond bur, and flow rate of the water coolant. The ground surfaces were examined with SEM, and the discs subject to biaxial flexure testing.

Results: Grinding with the fine bur resulted in the greatest decrease in biaxial flexure strength compared with controls for all porcelains ($p=0.05$). Grinding with extra-fine burs also decreased the flexural strength of WA, WZ and EC, but not EV ($p=0.05$). Grinding with ultra-fine burs also caused a statistically significant decrease in the flexural strength of WA and WZ, but not for EC and EV. Thermal shock cracks were detected under SEM for the samples ground with fine burs; caused by rapid heating of the porcelain surface during grinding, followed by quenching from the water coolant spray from the handpiece.

Conclusion: Within the limitations of the study, grinding with fine grit burs under the aforementioned parameters has the potential to induce thermal shock damage in the porcelains investigated. The results also suggest that the biaxial flexure strengths of the porcelains tested are adversely affected by grinding with fine burs. WA and WZ are affected by grinding with extra- and ultra-fine burs, while EC is only further affected by extra-fine burs. EV does not appear to be affected by grinding with extra- or ultra-fine burs.

88
Table 16

The Microscopic Characteristic Of The Dentine Adhesive Interface Of Luting Resin To Fiber Post

Chen, L.
Shanghai Jiao Tong University
Department of Prosthodontics
Shanghai

Purpose: To compare the bonding strength of the etch-and-rinse adhesion system and the self-etch adhesion system to the fiber post and study the microscopic characteristic of the dentine adhesive interface under a confocal laser scanning microscopic (CLSM).

Methods & Materials: 10 extracted upper central incisors were cut at the level of 1mm above the cementum-enamel junction, and the root canals were endodontically treated. Then the roots were randomly divided into two groups with 5 for each. Each root was bonded with a fiber post after the canal was prepared with a drill. One group was bonded with one-step, a type of etch-and-rinse adhesion system, and another was bonded with Panavia F , a type of self-etch adhesion system. Then all specimens were sectioned into slices with thickness of 2mm .The bonding strength was evaluated by testing the shear strength through a push-out test at crosshead speed of 0.5mm per min. The bonding interface was observed under a confocal laser scanning microscopic to evaluate the primer penetration into the dentine. All data was analyzed with SPSS13.0 software.

Results: The shear strength of the group bonded with the one-step system was 15.130±1.545 Mpa, and that of the Panavia F system was 10.385±1.335 Mpa. There were significant difference in the shear strength between the two groups($p<0.05$).The CLSM observation showed there were much more longer resin tags in the specimens of the one-step group than of the Panavia F group.

Conclusion: Etch-and-rinse adhesion system create higher bonding strength than self-etch adhesion system.

89
Table 17

Effects Of Two Different Bonding Techniques On Root Dentin Adhesion

Cui, H., Shanshan, D., Guorong, T., Xiangrong, C.
School and Hospital of Stomatology, Wuhan University
Prosthodontics
Wuhan, Hubei Province, China

Purpose: To investigate the influence of two different bonding techniques on the adhesion of experimental hydrophobic and commercial hydrophilic adhesives to root dentin.

Methods & Materials: Fifty-four single-rooted integrate human premolars were selected and sectioned. 108 specimens were obtained. 88 specimens were divided into two groups (n=44): water-wet bonding and ethanol-wet bonding. The specimens of each group were subdivided into four subgroups according to different adhesives: two experimental hydrophobic adhesives (Bis-GMA/TEGEMA, BT & UDMA/TEGDMA, UT) and two commercial hydrophilic adhesives (SingleBond, SB & PrimeBond NT, NT). The root surfaces were ground, acid-etched, rinsed and constructed with composite resin. After 24 h storage in distilled water at 37?, shear bond strength (SBS) of each specimen was measured. A sample from each group was prepared for scanning electron microscopy (SEM) analysis randomly. The remaining 20 specimens were used in the contact angle (CA) experiment and the values of CA were measured. The SBS were analyzed with two-way ANOVA/Tukey multiple comparison test and CA with independent sample t-test (a= 0.05).

Results: A significant increase of SBS to root dentin was observed in ethanol-wet bonding group compared with

traditional water-wet bonding group (p=0.000). The experimental hydrophobic adhesives (UT group) with ethanol-wet bonding technique presented the highest SBS (22.44±3.32 MPa). CA increased significantly after the dentin surfaces were dried, especially for the water-saturated group (p<0.05).

Conclusion: The adhesion to root dentin surface with ethanol-wet bonding technique might be superior to water-wet bonding technique.

90
Table 18

Prosthodontic Production In Sofia, Bulgaria

Damyanov, N.*[1], Witter, D.[2], Gerritsen, A.[2], Creugers, N.[2]
[1] Faculty of Dental Medicine, Medical University-Sofia, Bulgaria; [2] College of Dental Science, Radboud University Medical Centre Nijmegen, The Netherlands
[1] Department of Prosthetic Dental Medicine; [2] Department of Oral Function And Prosthetic Dentistry
[1] Sofia, Bulgaria; [2] Nijmegen, The Netherlands

Purpose: Data on prosthodontic production can be used to appraise prosthodontic care and to explore preferred treatment modalities. The purpose of this study was to describe prosthodontic production related to mutilated dentitions in Sofia, Bulgaria.

Methods & Materials: Five considered representative commercial dental laboratories in the city of Sofia were asked to record prosthodontic production delivered during a two-week period at the end of 2007. To relate prosthetic restorations with dentitions, only complete sets of upper and lower casts were analyzed. Dentitions were classified based on the jaw with the lowest number of teeth before and after 'treatment' as follows: (1) shortened, (2) slightly interrupted (> 10 teeth present in each jaw); (3) reduced/interrupted (10 teeth or less present in either upper or lower jaw); and (4) upper or lower jaw edentulous.

Results: The total prosthodontic production consisted of 243 crowns (64% of all restorations), 16 post and core restorations (4%), 18 full dentures (5%), and 105 tooth replacements (27%). Of all tooth replacements, 82 were fixed dental prostheses of which 62 (76%) replaced posterior teeth only. The majority of the removable partial prostheses (n=23) were acrylics (n=18; 78%). Sixty-four replacements were made in sets of full-arch casts and thus could be linked to the dentition characteristics before and after 'treatment'. Before 'treatment' 14 (22%) dentitions were shortened, 25 (38%) were slightly interrupted, 19 (29%) were reduced/interrupted, and 7 (11%) were with one jaw edentulous. After 'treatment', 11 of the shortened dentitions (79%) remained shortened, while 3 (21%) were elongated to the level of completeness. Three slightly interrupted dentitions (12%) were transferred to shortened, 11 (44%) into complete, while 11 (44%) remained slightly interrupted. Finally, 10 (53%) of the reduced/interrupted dentitions were restored to shortened, 5 (26%) to complete and 4 (21%) to slightly interrupted.

Conclusion: The results of this study demonstrate a preference of dentists in Sofia towards fixed restorations. The majority of tooth replacement requests were not aiming at complete dentitions. Relatively often, incomplete dentitions were restored to the level of shortened dentitions, which indicates that moderately and slightly shortened dentitions are considered acceptable treatment goals.

91
Table 19

Emg Activity Of Masticatory Muscles In Implant-Retained Overdenture Weares

Del Río, J. (UCM Madrid), Barrio, P., Gil Lozano, J. (UPV Bilbao) Spain, Moreno H., I. (UCM Madrid)
Faculty of Odontology, University Complutense De Madrid
Department Estomatologia I , Protesis Bucofacial
Madrid, Spain

Purpose: The aim of this poster is to describe the activity of masticatory muscles and the muscular adaptation process for the protheses stabilisation.

Methods & Materials: Twenty implant-retained overdenture weares were selected for this study. We measured the EMG activity of both masseter muscles, anterior and posterior temporalis and digastric muscles in jaw movements, chewing and rest position.

Results: Muscular activity is poor but better than in conventional denture wearers. Cicle patterns appear while chewing probably to increase masticatory efficiency and to avoid movements of the denture. The maximum bite force is also increased when compared with conventional dentures.

Conclusion: All masticatory muscles present low muscular activity during chewing, except for digastric muscles. Posterior temporalis are EMG-active in rest position. Chewing patterns are similar to rumiants.

92
Table 20

Development Of Inorganic Polyphosphate-Adsorbed Interconnected Porous Calcium Hydroxyapatite As A New Bone Regeneration Material

Doi, K.*[1], Kubo, T.[1], Morita, K.[1], Hayashi, K.[1], Takeshita, R.[2]Akagawa, Y.[2]
Hiroshima University
[1]Clinic of Oral Implant
[2]Department of Advanced Prosthodontics
Hiroshima, Japan

Purpose: This study evaluated the possibilities for poly(P) adsorbed onto interconnected porous calcium hydroxyapatite (Poly(P)/IP-CHA)as a new bone regeneration material.

Methods & Materials: 1%, 5%, 25% and 50% Poly(P)/IP-CHA composites were prepared by soaking IP-CHA(Ø: 3 mm, L: 5 mm)(NEOBONE®, Covalent Materials Co., LTD., Tokyo, Japan) into sodium polyphosphate solution (polyphosphate concentration: 1%, 5%,25% and 50%). After evaluating the porous structure of each Poly(P)/IP-CHA by SEM, they were evaluated about dynamic elution of adsorbed poly(P). Then, each Poly(P)/IP-CHA and IP-CHA were placed into the bone sockets (Ø: 3 mm, L: 5 mm) prepared in the femur of ten male New Zealand white rabbits (Young adult, weighing 2.0-2.5 kg). After 2weeks of placement, new bone formation in the socket was examined histologically and histomorphometrically.

Results: Histologically, new bone formation was observed in all groups, especially in 25% and 50% Poly(P)/IP-CHA groups, more regenerated bone was clearly detected. Histomorphometrically, new bone formation area was superior in the 50% Poly(P)/IP-CHA and it was significantly higher than those of 1%, 5% Poly(P)/IP-CHA and IP-CHA groups ($p < 0.05$).

Conclusion: These results indicate that interconnected porous structure of IP-CHA well remained with poly(P) absorption and most of the adsorbed poly(P) was initially eluted from Poly(P)/IP-CHA in vitro and 25% and 50% Poly(P)/IP-CHA accelerated bone regeneration at initial stage in vivo. Within the limited results of this study, it may conclude that 25% and 50% Poly(P)/IP-CHA could be expected to enhance initial bone regeneration as new bone regeneration material.

93
Table 21

Evaluation Of The Dimensional Accuracy Of Three Impression Materials Used In Fixed Implant-Supported Prostheses

Donadio, A., Casucci, A., Francini, F., Giovannetti, M., Mazzitelli, C., Borracchini, A.
University of Siena
Fixed Prosthodontics
Siena, Italy

Purpose: To evaluate the dimensional accuracy of three different impression materials used in fixed implant-supported prosthesis.

Methods & Materials: A maxilla acrylic master model was used for the study and four Astra Tech abutment analogues were placed in 13, 23, 17 and 27 positions. . Three impression materials were used (n=15): 1 Polyvinylsiloxane; 2. Polyether; 3. Plaster. Impression procedures were standardized by means of a stainless steel testing device. All the impressions were taken with a pick-up open tray tennique and mechanical mixing, and finally poured with type III gypsum. Casts were stored for 48 hours at 23±2°C and relative humidity (50±10%). The measurements of the master model and working casts implant's position were performed using a HB 350 machine. The implant position was reported in the three space coordinates (x, y, z axis). Linear distances between transfers in position 13 and 23 (D3) and 17 and 27 (D7) were measured on the acrylic master cast and on the casts obtained from the different impressions, in order to analyze the distortion. Data were statistically analyzed with one-way ANOVA and Tukey tests ($p<0.05$).

Results: No statistically significant differences were found in terms of distortion between the three impression materials investigated when taking into account the D3 and D7 distances ($p>0.05$).

Conclusion: The three impression materials investigated revealed the same dimensional accuracy. Clinicians could select the impression material for fabricating implant-supported prostheses according to their personal preference and skill.

94
Table 22

A New Technique Of Fixed Partial Denture Without Tooth Preparation

Dong, J-K [1], Kwon, O-D [2]
Wonkwang University, School of Dentistry
Department of Prosthodontics [1] and Department of Periodontics [2]
Iksan, South Korea

Purpose: When one or two teeth are missing, conventional fixed partial denture (FPD) has been the treatment of choice before the arrival of implant treatment. Despite the advantage of implant treatment, most patients cannot afford the expensive procedure of implant treatment and are exposed under risk of its nature of surgery complexity and potential complication. Hence, the conventional FPD is still viable treatment to many patients. However, this conventional FPD has disadvantage of prepping sound adjacent teeth. There is another method available which is resin bonded FPD, which has advantage of less reduction of teeth but has low success rate in clinical use. Therefore, this presentation is to introduce a new technique of non-invasive FPD in characteristics of clinical use.

Methods & Materials: This system is designed to avoid tooth reduction except for some cases, in which slight occlusal reduction may require. This system consists of two retainers and a pontic. Retainers cover proximal half of adjacent teeth with thin layer of gold alloy that has high elasticity. Retainers do not insert parallel to the path of insertion, but inserted in oblique direction to each other. And pontic is then connected to the male parts at both retainers. Resin cement is recommended and used connecting all three parts.

Results: Clinical procedure is relatively simple and patients have shown satisfied results both functionally and esthetically. Cementation procedure is technically sensitive. This system can be also applied in anterior case but with less esthetics by possible transmitting of metal. This system would be the first choice of restoration for handicapped or geriatric patients since it requires non-invasive procedure and does not need temporary restoration. This system has potential to serve many patients in various situations, however, there needs long-term clinical data to accept this system as a one of the permanent restorative system.

Conclusion: This fixed partial denture system has a merit of non-invasive and relatively simple procedure, however, there needs long term clinical study.

95
Table 23

Analysis Of Tmj-Function In Prosthodontic Treatment Planning

Dubojska, A.M.
Lodz Medical University
Orthodontic Department
Poland

Purpose: Masticatory system disorders and lack of aesthetics are most often a result of a vicious circle: too-little sleep, permanent stress, rushing, or unhealthy food. These days there is absolutely no need that patients should suffer or feel uncertain.
A faulty tooth intercuspation not promoting mandibular stability could overload the TMJ in many ways. Dysfunction of the TMJ and muscles can occur at any time. Growth, function and treatment of one part of the craniomandibular system influence the others. Therefore a careful treatment planning should include all data concerning all parts of the system.

Methods & Materials: Investigated were 36 patients in 18-54 range of age. On the base of mandibular movements tracings defining mandibular central position, defining mastication muscles participation in each movement and observing habitual mandibular position was made. Occlusion related condyle positions in their glenoid fossae and TMJ function was instrumentally analyzed using Gerber System. For each case proshodontic TMJ-protective treatment planning was proposed.

Results: Analysis of the mandible movements gives a possibility to define muscle participation and muscle activity during mandible movements. Defining differences between mandible central position and habitual mandible position is also very important for treatment planning. Very often good, long term results require pre-treatment for prosthodontics involving other dental disciplines.

Conclusion: Our treatment plan should build-up a relationship of trust with our patients, ease our work and satisfy our patients' expectations. This given effort, should protect the physiological state of TMJs and the masticatory system, even in implant-supported dental work. Occlusion coordinated with TMJs is our goal, avoiding future TMJ disturbances and problems for both dentists and patients.

Key words: occlusion, TMJ, TMD, treatment planning, condylar position registration, aesthetics, orthodontics, pre-treatment for prosthodontics

96
Table 24

Microleakage Of Posterior Composite Restorations With Self-Adhesive Resin Cement Liners

Fenton, A.*, Al-Saleh, M., El-Mowafy, O., Tam, L.
University of Toronto
Faculty of Dentistry
Toronto, Ontario, Canada

Purpose: The objective of this study was to determine the microleakage of Class II composite restorations lined with new self-adhesive resin cements (SARC's) compared to a conventionally bonded liner/resin composite, and a new liner/low-shrinkage (LS) resin composite.

Methods & Materials: Fifty-four extracted sterilized human molars had Class 2 MOD preparations made with a gingival seat in dentin on one side, and enamel on the other. Six groups of 9 each had a liner placed consisting of one of 4 SARC's (RelyX, Breeze, Panavia, Monocem), Scotchbond MP (a total etch 3-step adhesive), or Filtek LS (a new liner/restoration). All were photopolymerized, restored with Filtek-Z250 except for FiltekLS liner/composite, thermocycled 5-50 C 1,000x, immersed in fuchsine-red for 24 hours, and sectioned. Dye penetration into the tooth at the restoration interface was assessed at 60x magnification by 2 examiners on a 5-point scale. Data were analyzed with Kruskal-Wallis test ($p<0.05$).

Results: Cement thickness ranged from 23-100 microns, except for SBMP which was not detected under light microscope. No/low leakage was observed for dentin/enamel Filtek, RelyX, Breeze, and SBMP enamel only. High leakage was observed for SBMP on dentin only, and Panavia and Monocem on dentin and enamel. Microleakage mean scores for dye penetration at the respective dentin/enamel restoration margins were, in ascending order: FiltekLS 0.0/0.4, RelyX 0.6/0.7, Breeze 0.6/1.0, ScotchBondMP 3.3/0.8, Panavia 3.5/3.1, and Monocem 4.0/4.0.

Conclusion: Within limits of this in-vitro study of microleakage, new SARC's had variable results. RelyX(3M) and Breeze(Pentron) performed well; Panavia(Kuraray) and Monocem(Shofu) did not. ScotchbondMP(3M) exhibited minimal dye leakage when bonded to enamel; but not dentin. A new liner/composite FiltekLS(3M) had minimal leakage. Other factors than microleakage may influence clinical performance.

97
Table 25

Reproducibility Of Box-Depth Estimations Of Restorations Using X-Rays

Fokkinga, W.A.*, Kreulen, C.M., Witter, D.J., Creugers, N.H.J.
Department of Oral Function and Prosthetic Dentistry, College of Dental Science
Radboud University Nijmegen Medical Centre, Nijmegen
Nijmegen, The Netherlands

Purpose: Generally, crowns are indicated if teeth have large direct restorations with deep boxes. Therefore, estimation of the restoration size is a major criterion for crown indication. The objective of this study was to assess reproducibility of estimations of box-depths on the basis of a simple categorization by means of x-ray prints.

Methods & Materials: Eleven randomly selected bitewing x-rays of the premolar/molar region of a dental school population were printed in gray-scale (96 dpi, printed size: 73 mm by 93 mm). From a total of 39 restorations, 60 boxes were selected (30 in molars, 30 in premolars; 33 in the upper jaw, 27 in the lower jaw; 31 composites, 29 amalgams). Five observers, all prosthodontists, were instructed to estimate the vertical box-depth and to categorize them into one of three categories. Box-depth was estimated related to the distance of the proximal cemento-enamel-junction to the

proximal marginal ridge of the restoration (CEJ-MR). Three categories of box-depth were defined: A='(very) deep box-depth': cervical margin of the box in the lower third of CEJ-MR; B='average box-depth': cervical margin in the middle third of CEJ-MR; C='shallow box-depth': cervical margin in the upper third of CEJ-MR. After at least one week the observers were asked to repeat the assessment. As a measure of the reproducibility, Cohen's Kappa of inter- and intra-observer agreements was determined.

Results: The inter-observer agreements for box-depth estimations varied from K=0.35 to 0.61 (mean K=0.50, sd=0.08). The intra-observer agreements were K=0.47, K=0.48, K=0.70, K=0.71 and K=0.71 respectively.

Conclusion: This study indicates moderate reproducibility for box-depth estimations by means of simple categorization using x-ray prints. Crown indication solely based on box-depth estimation would result in a large variation among dentists and is observer dependent.

98
Table 26

Effect Of Denture Cleansers On Titanium Surface: A Gloss And Electron Microscope Study

Frangou, M.*, Pantopoulos, A., Zinelis, S., Polyzois, G.
Dental School, University of Athens, Greece
Department of Prosthodontics and Department of Biomaterials
Athens,Greece

Purpose: Since titanium is considered to be a biocompatible material, its use expands more and more in many different aspects of clinical dentistry. Magnets are used today extensively in removable and maxillofacial prosthetics. Recently the housing of magnets is made from cpTi instead of stainless steel. Titanium is well known for its self-passive behavior. Because of this, titanium is instantly oxidized when exposed to oxygen. The purpose of the study was to examine the effect of a commercial denture cleanser and NaOCl 5,25% on the surface of cpTi used for magnet housing.

Methods & Materials: Commercial pure Titanium (CpTi grade IV) and stainless steel (330) in sheet form have been used to study the surface effect of two different denture cleansers: Polident Partial Dentures (GSK) and NaOCl 5,25%. Water served as control group and cleansers were used for 100 days. Surface effect on materials tested was detected with elemental analysis X-ray EDS method and X-ray difraction (XRD). Also specimens' gloss was measured with a Horiba IG-320 Gloss Checker and compared statistically before and after cleansers use. The results were subjected to two-way ANOVA and Scheffe's post hoc test at confidence level a=0,05.

Results: Comparing quantitative and qualitative changes of chemical elements detecting (scanning) with EDS on specimens' surface before and after cleansers use, elemental analysis on the specimens' surface revealed severe contamination on cpTi as well as on stainless steel's surface. Statistical analysis of surface gloss measurments presented significant interaction between materials and cleansers used. Stainless steel surface was significantly more stable than Ti with all cleanser solutions used. Polident had no significant difference compared to water. NaOCl 5,25% induced severe tarnish and also quantitive and qualitative elemental changes on all cpTi and stainless steel specimens tested.

Conclusion: Under the limitations of this in vitro study CpTi performance was poor compared to stainless steel with all cleansers tested. Cleanser specifically desinged for partial dentures seem to act more gently on both metals tested. Powerfull cleansers, such as NaOCl 5,25%, should not be used in daily basis with the metals tested.

99
Table 27

Assessments Of Anatomical Inclinations Of Glenoid Fossa From Ct Data Base In Taiwan

Fuh, LJ.*, Shen, YW., Wu, CK., Fu, MC.
Hsu, JT., Huang, HL.
China Medical University
School of Dentistry
Taichung, Taiwan

Purpose: Articulators are usually recommended for prosthodontic rehabilitation to increase the accuracy of the laboratory procedures and reduce the clinical adjustments. One of the key components in articulator is the setting of condylar inclinations (both horizontal and lateral). The often used articulator usually chooses the average inclination setting of 30 degrees horizontally and 15 degrees laterally, based on the Hanau's mathematical calculation. The inclination will change if the reference plane is not the same. Thus the anterior reference point for face bow transfer is also an important determinant. Aims of this study were to measure 1. Angle difference between SN and Frankfurt plane; 2. Average inclination for anterior, medial and posterior walls of the glenoid fossa.

Methods & Materials: One hundred 3-D reformatted CT scan skull images (GE BrightSpeed-16MDCT) were retrieved from the Department of Radiology, China Medical University Hospital. Images with defects in the cranium and complete edentulism were excluded. Measurements for anterior, posterior, medial and lateral inclination of the glenoid fossa to either Sella-Nasion or Frankfurt planes were then performed with Mimics 10.01 (Materialise NV, USA). Two-sample t-test and Wilcoxon rank sum test for gender and ANOVA statistical analyses for age differences were performed respectively

Results: One hundred skull images (54 female and 46 male) were included with patient age ranging from 11 - 81 (mean age 39.3). The average angle between S-N and Frankfurt plane was 5.8 degree. Mean inclinations of the glenoid fossa to different references were: Right side: Ant (S-N; FH:42.7; 38.1); Post (S-N; FH: 28.3;36.2); Lat (S-N; FH: 19.9; 20.9); Med (S-N; FH: 38.5; 37.2). Left side: Ant (S-N; FH: 43.6; 38.3); Post (S-N; FH: 29.8; 37.5); Lat (S-N; FH: 19.8; 20.2); Med (S-N; FH: 38.5; 36.8) The right anterior inclination based on both FH and SN planes and the left anterior wall based on SN plane in male demonstrated a statistically higher value than female.

Conclusion: This study provide anatomical measurements for the inclinations in the Glenoid fossa related to different reference planes. A mean angle of 5.8 degrees between S-N and Frankfurt Horizontal plane was found. The horizontal inclination in this study was 8 degrees steeper than the average 30 degrees when the Frankfurt plane was used. This information provide useful insight for the application of articulators in clinical dentistry.

Acknowledgement:
This study was partially supported by a grant from National Science Council, ROC, NSC 97-2314-B-039 -024 -MY3.

100
Table 28

Determination Of Daytime Clenching Behavior And Regulation Using A Newly Developed Portable Electromyogram Biofeedback System

Fujisawa, M.[1]*, Gohdo, Y. [2], Watanabe, A. [2], Kanemura, K. [2], Tanabe, N. [2], Iizuka, T. [1], Iwase, N. [1], Satoh, G. [1], Ishibashi, K. [2]
Meikai University[1], Iwate Medical University [2]
Division of Fixed Prosthodontics [1], Department of Fixed Prosthodontics [2]
Sakado, Saitama Japan[1], Morioka Iwate Japan [2]

Purpose: A surface electromyogram (EMG) device was used to record characteristics of clenching behavior during the daytime, and then to differentiate between subjects with and without clenching behavior (Experiment 1). The effect of

EMG biofeedback on clenching behavior was then determined (Experiment 2).

Methods & Materials: Experiment 1. Temporal muscle EMGs were recorded for five hours in 13 clenching subjects (clenching group: 27.5±3.8 years old) and 12 non-clenching subjects (control group: 28.6±7.1 years old). All EMG data were recorded and stored on a newly developed EMG recording apparatus.

Experiment 2. EMG activity was determined before (Day 1) and after (Day 4) a two-day biofeedback training session (Days 2,3) in 10 masticatory muscle pain subjects having daytime clenching behavior (30.7±3.7 years old). Small alert sound reminded the subject of undesirable clenching when excessive EMG activity was generated with certain burst duration. The EMG device was comparable to the size of a hearing aid, and was suitable for recording during the daytime without restriction of daily activities.

Results: Experiment 1: The numbers of clenching events were 192.8±228.8 and 24.8±26.5, in the clenching group and the control group, respectively ($p<0.05$, Mann-Whitney's U-test) under a clenching event was defined as muscle activity exceeding 10% of the maximum voluntary contraction. There was no significant difference between the groups in the number of functional events recorded.

Experiment 2: Clenching event numbers decreased by 62.7% after the biofeedback session (Day 4) ($p<0.05$, Wilcoxon signed-ranks test).

Conclusion: Clenching events were detected by EMGs recorded during daytime activities. Since the number of EMG events associated with clenching decreased after the biofeedback training session, the system could be used to regulate habitual clenching. Reduction of clenching behavior is essential in prevention of unexpected failure of restoration and also temporomandibular disorders caused by excessive loading. A longitudinal study should be performed in the future

101
Table 29

Research Protocol: Realization Of Cad-Cam Edentulous-Ridge Models For Mechanical Tests Application

Auricchio, G.**, Mordini, L.**, Grilli, L.**, Bortolini, S.**, Malaguti, G.**, Bertuzzi, G.*
**University Of Modena And Reggio Emilia, Italy. *Bologna University Italy
**Prosthodontics Department, *Diem Department
**Modena, Italy. *Bologna, Italy

Purpose: The aim of this present research protocol is the realization of a digital test model that could be used in various studies in which mechanical tests are carried out on hemi-arch mandible simulations. This model, reproduced in series identical to the original one in shape, dimension and precision, can be built using various materials thanks to CAD-CAM technology.

Nowadays, several experimental studies employ various handicraft devices manufactured in laboratories as test models, to evaluate dental materials mechanical properties: implant attachments, zirconia structures, clasps for RPP etc. The handicraft production in laboratories, the use of various materials that compose the models, the taking of individual impressions, and in-vivo tests that involve patients' cooperation are all factors that can determine both variability and difficulty of final results and test models reproduction. In order to reduce these disadvantages it becomes necessary to start an experimentation from a standardized, reproducible in series and digitally monitored model.

Methods & Materials: An occlusion wax rim has been used to simulate a hemi-arch edentulous mandible before fixing it to a PMMA block with adhesive wax. The rim has been divided in two hemi-arches and the distal portion has been positioned parallel to the block major axis. Opaque spray has been used in order to facilitate the model scanning. The handicraft has been secured into the scanner to the specific support. The scanner-block connection apparatus enables their coupling in the same initial position, so that the scansion and the CAM model copies can be identical every time an experimentation takes place.

Results: The software sends the informations to the driller machine (CAM) that produces an exact copy of the digital image of the model. In this case three models have been produced to summarize the various experimental applications.

Conclusion: The model will be potentially completed with implant abutments and dental elements. This model fits for numerous applications thanks to the precise control on every dimensional parameter after its scannerization. Depending on the research purpose, CAD-CAM technology will be able to realize various solid models using different workable materials in order to execute mechanical tests that the operator would like to perform.

102
Table 30

The Vietnamese Short Version Of The Oral Health Impact Profile

Gerritsen, A.E.,[1]*, Nguyen, T.[2], Witter, D.J.[1], Bronkhorst, E.M.[3], Creugers, N.H.J.[1]
[1]College of Dental Science, Radboud University Nijmegen Medical Centre
[2]Department of Prosthodontics, Faculty of Dentistry, Can Tho University of Medicine and Pharmacy
[3]College of Dental Science, Raboud University Nijmegen Medical Centre
[1]Department of Oral Function and Prosthetic Dentistry,
[2]Department of Prosthodontics
[3]Department of Community and Restorative Dentistry
[1]Nijmegen, The Netherlands [2]Can Tho, Viet Nam [3]Nijmegen, The Netherlands

Purpose: To translate a Vietnamese short version of the Oral Health Impact Profile (OHIP-VN14) and validate its use for an epidemiological study on oral function, following accepted guidelines.

Methods & Materials: The original English-language version was translated into Vietnamese, back translated into English, and tested for its psychometric properties. Construct (convergent and groups) validity was tested on a random sample of 740 adults (mean age 44.6yr (SD = 14.6), females 51.2%) participating in an epidemiological study. Convergent validity was tested by investigating associations between OHIP summary scores and self-reported general satisfaction with dentition, satisfaction with esthetics (yes/no) and satisfaction with chewing ability (yes/no). The ability to discriminate between groups was evaluated by comparing summary scores of subjects having >6 or =6 molars present. Test-retest reliability was investigated in a convenience sample of 55 subjects (mean age 44.2yr (SD = 12.6), females 43.6%) by kappa scores per question. Internal consistency was demonstrated by Spearman's rho and inter-item correlation coefficients.

Results: Convergent validity was excellent; general satisfaction with dentition: mean difference = 3.1, 95% CI = 1.61-4.59, p<0.001; satisfaction with esthetics: mean difference = 3.11, 95% CI 1.53-4.69, p<0.001; and satisfaction with chewing ability: mean difference = 3.83, 95% CI = 2.03-5.64, p<0.001. Group validity was good: mean difference = 2.39, 95% CI = 1.28-3.50, p<0.001). Test-retest reliability was fair to moderate (weighted kappa ranging from 0.34 – 0.62). Internal consistency was good (Spearman's rho ranging from 0.41 - 0.62, p<0.001, mean inter-item correlation for OHIP summary score was 0.48).

Conclusion: The short version of the Oral Health Impact Profile (OHIP-VN14) can be considered a valid and reliable instrument to measure oral health-related quality of life in Vietnam. However, the cause of the relatively low test-retest reliability needs further investigation.

103
Table 31

Correlation Between Crown-Implant Ratio And Marginal Bone Resorption

Gil, L.J.*, Del Rio Highsmith J.D.R., Gomez Polo M.
University Complutense of Madrid, University of The Basque Country-Bilbao
Prosthodontics
Bilbao,Spain

Purpose: The crown-implant ratio is defined as the physical relationship between each individual restoration's parts located inside and outside the bone. This relationship represents the physical concept of a type I lever which may be of biomechanical importance in implant treatment outcomes.

Methods & Materials: Specific patient data related to fixed implant prostheses was retrieved and studied in an effort to clinically and radiographically correlate crown/implant ratios.

Results: Recorded marginal bone resorption around the implants (2.11±1.30 mm) at the end of a defined observation period, did not correlate with the crown- implant ratio within the values 0.43 and 1.5 ($p>0.05$).

The mechanical determinants of implant success or failure are still not defined. It has been postulated that an increase in both crown/tooth and comparably crown/implant ratios would lead to a resultant increase in magnitude of non-axial forces transmitted to the tooth or the implant. This could then lead to an increased vulnerability of either tooth or implant to implant abutment to supporting bone loss. However, additional factors appear to impact upon long-term bone maintenance behaviour around either type of abutment.

Conclusion: Within the limited scope of this study, crown-implant ratios between 0.43 and 1.5 were not associated with recorded peri-implant bone loss.

104
Table 32

Assessing The Frontal Teeth Set-Up In Maxillary Complete Dentures: A Biometric Study

Giovannetti. M.*, Casucci, A., Marrazzo, M., Borracchini, A.
University of Siena
Department of Prosthodontics and Dental Materials
Siena, Italy

Purpose: To investigate the relation between the amular notches, the interincisive papilla and the position of the upper frontal teeth in natural dentition.

Methods & Materials: Sixty-four subjects were divided into three groups (n=10): 1) fully dentate students (S); 2) Upper complete denture wearer patients with correct frontal teeth set up (CD); 3) Upper complete denture wearer patients with crestal frontal teeth set up group (CCD). Impressions of each upper jaw were taken and casts realized. Photographs of the casts were taken in standardized conditions; the upper prostheses of groups CD and CCD were also photographed. On the pictures of group S reference points were signed: interincisive papilla (P), right and left amular notches (ANr, ANl), right and left canine cuspid (Cr ,Cl). The intersection point between the palatal midline and the line passing on the vestibular aspect of central incisors (MVI). a angle (Cr-MVI-Cl), ß angle (Anr-P-ANl), P-MVI and the a/ß ratio (k) were measured. The picture of each complete denture has been made translucent at 80% by a software and then overlapped on the picture of the corresponding edentulous cast, as to see the reference points and the denture. The statistical analysis was performed with the One-Way ANOVA and Tuckey tests ($p<0.05$).

Results: Mean values of k were 2.51±0.11 (S), 2.41±0.19 (CD) and 2.86±0.14 (CCD). The CCD and S data were equivalent and they showed statistically significant differences when compared to the CD group. Mean values of P-MVI were 8.86mm±0.71 (S), 9.78mm±1.09 (CD) and 4.76mm±0.83 (CCD) and statistically significant differences were found among the three groups.

Conclusion: Within the limits of this study it can be speculated that, in natural dentition (S), a constant relation exists between the interincisive papilla, the amular notches and the position of upper frontal teeth. Discovering the correct maxillary canines position in complete dentures can help in choosing frontal teeth with a correct mesio-distal diameter.

105
Table 33

Tissue Reactions Around Implants In Fixed Partial Dentures And Evaluation Of Healing Times, 1- Year Results From A Randomized Controlled Study

Göthberg, C. [1 3], André, U. [1], Slotte, C.[2 3]
The Institute For Postgraduate Dental Education, Jönköping, Sweden [1 2]
The Institute For Clinical Sciences, Sahlgrenska Academy, Gothenburg University, Gothenburg [3].
Departments of Prosthodontics [1] and Periodontology [2] Department of Biomaterials, Institute For Clinical Sciences [3], Jönköping, Sweden

Purpose: •Study healing of the peri-implant mucosa after immediate loading, loading <24 hours post-surgery, compared with loading after a healing time of 3-4 months.

•Examine soft and hard tissue conditions around implant units with rough or smooth abutments, or without abutment.

•Study bone healing around implants either loaded immediately or after 3-4 months.

•Study factors that may influence the primary variables , e.g. general health status, periodontal disease experience, smoking, oral hygiene level, bone quality.

•Evaluate patient experience and satisfaction of treatment.

Methods & Materials: In this 5-year prospective study, 50 partially edentulous patients each received three implants. Two implants were fitted with abutments; one abutment with a TiUnite® surface (Nobel Biocare) and one abutment with a machine-milled surface. At one implant the suprastructure was attached directly at implant level. After randomization, the implants were either immediately loaded with a fixed temporary bridge (test) or left unloaded for 3-4 months (control). Most patients received the treatment in the posterior maxilla.

Results: So far, 45 patients have been examined after one year. Two implants were lost in 2 patients in the control group while 4 implants were lost in 3 patients in the test group. In six test and one control patient, one implant showed lowered stability after 2-4 weeks and was therefore unloaded. Thereafter, the implant stability improved allowing loading within 3-4 months. All other implants remained stable throughout the first year. Soft tissue conditions and patient experience will be presented later.

Conclusion: This study showed acceptable success rates for immediate and delayed loading of implants in partially edentulous patients after one year. However, this treatment modality mandates considerable supervision of the patients.

106
Table 34

Effects Of Chlorine Donors On Cobalt-Chromium Alloys For PRP

Grilli, L., Franchi, M.*, Molinari, C.*, Bortolini, S.**, Graziani, A.*, Andreotti, C*.**
*** Oral Medicine Department, University of Ferrara, Italy. ** Prosthodontics Department, University of Modena and Reggio Emilia, Italy**
*** Oral Medicine Department University of Ferrara ** Prosthodontics Department, University of Modena and Reggio Emilia, Ferrara, Italy, Modena , Italy**

Purpose: Chlorine donors create a practice and effective chemical disinfection of prostheses preventing denture stomatitis phenomena. However they determine corrosion, when used on partial removable prostheses (PRP) with metal components. A few studies have documented protocols about application times and concentrations of chlorine donors that can reduce disadvantages, preserving their efficacy. The aim of this study is to assess the effects of the application

of sodium hypochlorite on a cobalt-chromium alloy (Remanium GM 800+ Super cast) used for the realization of PRP.

Methods & Materials: Cylindrical melted samples of 20 mm diameter and 1 mm thickness were polished on one side only with electrolytic baths (E group = 20 samples) or with electrolytic baths associated with mechanical procedures (C group = 20 samples). 10 specimens for each group were submerged in medical sodium hypochlorite 1% solution (pure solution) while another 10 were submerged in 0.023% solution (dilution known for its bactericidal and bacteriostatic effects and recommended for the disinfection of babies' feeding-bottles and teats). The specimens were examined at 1st-6th-13th day with the naked eye and by 1:1 photos and at 21th day also by optical metallographic microscope in reflected light.

Results: The results of the study show that already after the 1st day all the samples in 1% and 0.0023% solutions present variations in the liquid's colour and only superficial, predominantly oxidative macroscopic alterations. These become increasingly more evident as days pass by. Not polished surfaces resist against corrosion and oxidation created by the chlorine less than the polished ones. When associated with mechanical procedures, electrolytic polishing seems to be more effective in countering the superficial alterations.

Conclusion: Therefore our conclusions are that the disinfection of cobalt-chromium metal components is not recommended with sodium hypochlorite at concentrations and times adopted. More studies are needed to assess the corrosive effects of hypochlorite when applied at lower concentrations.

107
Table 35

Research Protocol: Analysis Of The Influence Of Divergent Implants On The Wear Rate Of The Retention System Of A Two-Implant-Retained Overdenture

Grilli, L. *, Mordini, L., Ferrari Barboza, J., Natali, A., Malaguti, G., Bortolini, S.
University of Modena and Reggio Emilia, Italy
Department of Prosthodontics
Modena , Italy

Purpose: The success of a removable prosthesis supported by two implants is determined by various factors, one of which is the wear of implant attachment system. The purpose of this study is to evaluate the correlation between implant various angulation and wear of an overdenture attachment system supported by two implants. The research protocol is based on the creation of a perfectly reproducible and standardised system that permits a three-dimensional analysis of the relationship between the position of the two implants and the wear of the prosthesis, as well as the extrapolation of this relationship to values not directly tested.

Methods & Materials: The implant attachment system, provided by Keystone Dental ®, will be represented by implant analogues positioned in 26 models, produced with CAD-CAM technology in different angular combinations, connected to prostheses simulators by two ball attachments. Prostheses processes of insertion and removal by a patient throughout the period of one year will be simulated in vitro. At predetermined intervals, the variation of retention and the related wear of implant attachment system will be evaluated by precise measurement of the force required to remove the implant. During this study, 1460 cycles of insertion/removal will be carried out manually on the experimental models, corresponding to the usage undergone by a prosthesis throughout a year. An average of 4 manoeuvres of prosthesis insertion/removal will be considered per day. An Instron Machine will be used to evaluate the variation of retention of the implant attachment system. The data obtained will be validated by ANOVA statistical analysis.

Results: Tests are on the way of development. There are no data available at the present time due to the extended length of the testing period.

Conclusion: The test results will be represented by means of tables, 2D and 3D graphs. The data will be related to results derived from a study by the same authors on the variation of retention of implant-supported overdentures at various implant angles. In this way, a general overview on the behaviour of implant-supported overdentures at various implant angulation and of the wear related to their usage should be obtained.

108
Table 36

Validation Of The Bitestrip© For Sleep Bruxism Diagnosis Using Polysomnography As A Gold Standard

Grossi M.I.*, Drummond L.G.R., Saueressig A.C., Mainieri V.C., Fagondes S., Grossi P.K., Ficht D.M.,
Faculty of Dentistry Catholic University of Rio Grande Do Sul
Clinical Department
Porto Alegre, RS, Brazil

Purpose: Sleep bruxism is one of the major causes of tooth grinding and the loss of prosthesis and implants. However, the diagnosis of bruxism by clinical means is not accurate and polysomonography, which is expensive and time consuming, is still the gold standard (Lavigne et al., 1996). BiteStrip© is a new diagnostic tool for measuring bruxism, and only one study showed its correlation with polysomnography (Shochat, 2007). Therefore, the objective of this study is to validate the BiteStrip© against polysomnography as a diagnostic tool for sleep bruxism.

Methods & Materials: Fourteen patients, 5 male and 9 female, with clinical history sleep bruxism (tooth grinding and clenching as well as confirmation with the bed partner), with no TMD complaints, and less than five tooth losses, were selected for the study approved by the Ethics Committee of the Catholic University of Rio Grande do Sul Dental School and São Lucas Hospital. These patients spent two consecutive nights at the sleep laboratory, undergoing polysomnography in the second night with the concomitant use of the BiteStrip© placed on the left masseter, comparing it with the EMG electrode on the other side.

Results: Our results have shown a 50% observed agreement between the BiteStrip© diagnosis of sleep bruxism (positive for scores of 2 or 3) and the polygraphic diagnosis as described by Lavigne et al., 1996. The kappa index was even lower, 33% with a chance agreement of 25%.

Conclusion: Based on our finding, it can be concluded that the BiteStrip© can be used at best as a screening tool for bruxism, but the diagnosis of sleep bruxism can only be determined by polysomnography.

109
Table 37

Titanium & Laser Welding -The Finest Combination

Hanatani, S. [1], Ohkubo, C. [1], Ema Muraishi [1], Hayashi, D. [1], Tokue, A.I [1], Mizuno, Y. [1], Togaya, T.[2]
[1] Tsurumi University School of Dental Medicine [2] Kyoto University
[1] The 1St Department of Prosthetic Dentistry
[2] Institute For Frontier Medical Sciences
[2-1-3] Tsurumi Tsurumi-Ku, Yokohama, Japan

Purpose: Although titanium dentures have many advantages, some clinical and laboratory problems were remained. Thus, titanium dentures have not been widely used compared to Co-Cr dentures. This case presentation will describe the reform procedure of titanium dentures using laser welding as the finest combination.

Methods & Materials: 20 years ago, titanium denture with lingual bar was placed in Kennedy Classification I mandibular jaw. The use for 20 years brought the rotational subside and some malfunction, namely, pain of soft tissues under the connector. Therefore, the lingual bar had to be replaced to the lingual plate. The impression was made including the titanium denture with silicone impression material. After working cast was fabricated, the lingual plate was cast with CP titanium. The lingual plate and original titanium framework of the existing denture were provisionally fixed and laser-welded using conventional manner.

Results: The advantages of the titanium denture fabrication or repair using laser welding are as follows: 1. Titanium is very easy to melt by laser beam because its energy absorption ratio is extremely large. 2. The heat conductivity of titanium is low. Since the laser energy does not spread from the irradiated area, the temperature can rise up easily at the melting point. 3. Low heat conductivity does not make the denture base resin or artificial teeth spoil. From above reasons, difficulty repair of titanium appliance can be performed using laser welding.

Conclusion: Titanium denture used for long-term could be repaired using laser welding without damage of the denture base resin and artificial teeth. The remodeled denture was well fitted and the denture function was perfectly recovered by the finest combination.

110
Table 38

Dental Implants Fatigue Strength Evaluation - Finite Element Study

Hedzelek, W. [1], Lodygowski, T. [2], Zagalak, R. [3],
Wierszycki, M. [2], Lukaszewska, M.[1]
[1] University of Medical Sciemces [2] Poznan University of Technology
[3] University of Medical Sciences
[1] University of Medical Sciemces [2] Department of Structural Mechanics
[3] Foundation of University of Medical Sciences
[1 2 3] Poznan, Poland

Purpose: To determine the correlation between fatigue strength of implant and abutment components and bone loss around the implant body and bone density.

Methods & Materials: Three dimensional models of two-piece implants (Osteoplant) embedded in different bone levels were used to simulate 4 years of physiological function. The tests were performed using finite element analysis (Abaqus, Fe See). The effect of each variable was expressed as a factor of strength distribution.

Results: The results confirm that there are no significant differences in bone quality influencing the fatigue strength. In case of bone quality change, extension of area exposed to fatigue damage is visible only when the implant is completely embedded in the bone. Bone loss around implants and its value change the stress distribution affecting the slight increase of fatigue damage risk of implant components. When the implant is completely embedded in the bone, the area exposed to fatigue damage is limited to the first thread and to the base of screw's head. In the case of 3mm bone loss pattern, area of fatigue damage risk significantly expands and covers almost all of the length of the abutment screw shaft and 5 consecutive threads. When the implant body exposure is 6mm below the bone level area of fatigue damage, significant portion of screw's shaft along its entire length and substantial width becomes the area of risk.

Conclusion: 1. Bone loss around implant may pose real threat to implant durability. 2. Slight bone loss does not portend severe complications, but substantial bone loss significantly changes the quality of implants' mechanical functioning which might result in increased risk of fatigue damage.

111
Table 39

Effect Of Surface Treatment On The Bond Strength To Zirconium

Hikita, K.*, Maida, T., Ikeda, Y., Kawakami, T.
Health Sciences University of Hokkaido, Personalized Health Science Center
Department of Dental Science
Sapporo, Japan

Purpose: The purpose of this study was to examine the effect of two silica-coating methods on the shear bond strength to zirconium with adhesive resin cement.

Methods & Materials: This study used zirconia ceramic disks (yttria-stabilized zirconia) with a 15 mm diameter and 10 mm thickness and stainless steel rods with a 5 mm diameter and 3 mm thickness. The ceramic samples were embedded in epoxy resin and the surface of the ceramic material was wet-ground sequentially to 600 grit using SiC and paper. All samples were ultrasonically cleaned in water for five minutes. The surface of the zirconia ceramic disks was treated in one of four different ways ; (a) ground to 600 grit, (b): (a) + air-abraded with 150 µm alumina at 2.8 bar pressure at a distance 10 mm for 10 seconds, (c) : (a) + (b) + tribochemically silica-coated using the Rocatec system (3M ESPE), (d) : (a) + (b) + silica-coated using the Silano-Pen (Bredent). After ultrasonically cleaning in water for five minutes, zirconia ceramic disks and stainless steel rods were bonded with Linkmax (GC), GC ceramic primer (GC) and Metal primer (GC). All specimens were stored in 37 °C water for 24 before shear bond strength test (n=6). The bonded specimens were subjected to shear testing using a Universal testing machine with a notched shear blade and a crosshead speed of 0.5 mm/min. Load at failure was recorded in Newtons and converted into shear bond strength in MPa. Data were analyzed by one-way ANOVA and Turkey-Kramer post-hoc test at $p<0.05$.

Results: Shear bond results were : (a); 7.7(4.5)a, (b); 20.5(1.4)b, (c); 32.9(2.8)c, (d); 40.5(5.8)d. There were significant differences among four groups.

Conclusion: These results suggest that the application of silica-coting to zirconia ceramic appears to be effective for bonding between zirconia ceramic and an adhesive resin cement.

112
Table 40

Effect Of Body Posture And Capsaicin Intake On Swallowing Evaluated With An Mi Sensor-Oriented System

Hongama, S.*, Toko, S., Nagao, K., Ichikawa, T.
University of Tokushima, Institute of Health Biosciences
Department of Oral and Maxillofacial Prosthodontics and Oral Implantology
Kuramoto, Tokushima City, Japan

Purpose: The dysphagia is being focused on with severe population aging. Posture adjustment was found to be key in alleviating dysphagia. Moreover, oral administration of capsaicin improved the swallowing reflex in the elderly. The purpose of this study was to examine the effect of body posture and capsaicin administration on swallowing behavior using an innovative system.

Methods & Materials: The participants were young and old people with stable physical status. A repetitive saliva swallowing test (RSST) was conducted for each participant wherein they were asked to swallow as many times as possible for 30 s in the following 6 body postures: upright, inclined at 60° or 30° with a neutral head position and in the chin-down posture. Young people were assigned to the program for the supplementation with water solution containing 0.0025% capsaicin examined before RSST. Swallowing behavior was examined by using an MI sensor-oriented system; a permanent magnet assembly (length, 4 mm; f, 5 mm; 420 mT) was attached to the skin on the thyroid cartilage and an MI sensor (MI-CB-1DS, Aichi MI Co.; sensitivity, 160 V/mG; 10 × 35 × 6.5 mm; battery drive) was attached to the skin at the breastbone. The deviation of the magnet, which moved forward during swallowing, was detected with the MI-sensor,

which functions on the basis of magnetic impedance and can detect minute changes in a magnetic field.

Results: Body posture affected the swallowing time in the case of older people. Swallowing time was significantly decreased by ingestion of capsaicin before examination in the case of young people.

Conclusion: Body posture and ingestion of capsaicin affected swallowing time. The results suggested that a suitable a body posture and oral intake of capsaicin improves swallowing. These results can be applied for swallowing training and rehabilitation in the case of dysphagia.

113
Table 41

Analysis Of Hygienic Advices On The Biofilm Development On Intaglio Of Removable Dentures

Hue, O.
Dental Faculty "Garancière" Denis Diderot University
Prosthodontic Department
Paris, France

Purpose: The oral cavity presents numerous surfaces as teeth, mucosae, and tongue for microbial colonization. This one creates the "Biofilm" which is a natural and biological phenonenom. So, the surfaces of removable dentures especially the intaglio are also concerned by its colonization particulary when acrylic denture bases are used.But the biofilm induces many troubles on the health of mucosae bearing area. The purpose of this study is to evaluate the surface covered by the biofilm on intaglio of removable dentures and mesure its stretch and its growth when some hygienic advices (denture brush) are prescribe to patients

Methods & Materials: 28 patients with 38 removable dentures were randomly recruited. At each appointment, the removable dentures were put in a fluoresceine solution in order to clearly obvious the surfaces covered with the biofilm on the intaglio of dentures.A picture of intaglio was made with a digital camera in dark box lighted by with black light.Three pictures were made 1st: time 0 - 2nd Time 2 (8 days after) - 3rd time 3 (15 days after). Then, these pictures were analyzed with the software "Mesurim" in order to evaluate and compare the biofilm stretch. All the results were analyzed with SPSS 11.4 software.

Results: At time 0 the biofilm covered 58.23% (+/- 22.56) of the intaglio surface. After the patients had used the denture brushes the surfaces covering with biofilm were reduced at time 1 to 26.70% (+/-13.81), at time 2 to 12.4% (+/- 7.64).

Conclusion: This study allowed concluding that the use of denture brushes as hygienic advices had an important influence to reduce the stretch and the development of the biofilm. We have going to teach and prescribe these brushing advices to patients when we deliver a new removable denture in order to maintain a good health of mucosa bearing area

114
Table 42

Effect Of Mandibular Control On Posture Control In The 3-D Virtual Space

Iizuka, T.*[1], Iwase, N.[1], Fujisawa, M.[1], Akimoto, T.[2] , Terada, N.[2]
Meikai University School of Dentistry[1], Toyo University School of Engineering[2]
Prosthodontics[1], Department of System Robotics[2]
Sakado, Saitama Japan

Purpose: It is known that there is a feedback-loop between the faculty of sight and posture control against gravity fluctuation (GF). However, the effect of masticatory muscle contraction on posture control is not well understood. We used 3-D motion pictures in a virtual space with GF, to examine changes in GF with different mandibular positions. Tooth

contact positions included light clenching (LC) and mandibular rest position (RP).

Methods & Materials: Five male volunteer subjects (mean age of 22.4 years old) with no history of temporomandibular disorders (TMD) were recruited. Subjects included students at Meikai University. Electromyograms (EMGs) from both sides of the masseter, tibialis anterior (TA) and gastrocnemius muscles (GM) were recorded with an active electrode unit. Subjects were asked to stand on a GF sensor board in the virtual space. EMGs and GF were recorded during the display of a 3-D “roller coaster” animation (80sec duration). Alternation of LC and RP was performed by each subject. Prior to the experiments, all the subjects were trained to maintain 10% of maximum voluntary contraction as controlled LC under visual EMG feedback. They were then asked to maintain this position at the beginning of the LC experiment. No tooth contact was required during the RP session. Integrated EMG values were analyzed from the time point when the most significant postural change associated with the display occurred. The area of GF was also analyzed to determine the relationship between body balance and LC.

Results: Except for R-GM, integrated EMG showed a significant increase ($p<0.05$; Wilcoxon test) under LC when compared with RP (R-TA, 154%; L-TA, 148%; L-GM, 206%). The area of GF decreased significantly under LC (4.7cm2) when compared with RP (10.2cm2) which indicated well controlled body balance ($p<0.05$; Wilcoxon).

Conclusion: Since tibialis anterior and gastrocnemius muscles were activated significantly more in regulating body balance under light clenching conditions than in the mandibular rest position, tooth contact could contribute to the postural regulation system.

115
Table 43

Sinking And Fit Of Abutment Of Locking Taper Connection Implant System

Jeong, JH.*, Kim, HJ,, Son, MK., Moon, SJ.
College of Dentistry, Chosun University
Department of Prosthodontics
Gwangju, Korea

Purpose: Unlike screw-retention type, fixture-abutment retention in Locking taper connection depends on frictional force so it has possibility of abutment being sinking. PURPOSE: In this study, we used Bicon Implant System® which is one of the conical internal connection implant system and applied loading to the abutments connected to the fixture and measured the amount of sinking. Also we observed adaptiveness at abutment-fixture connection part.

Methods & Materials: We used 10 Bicon implant fixtures. We applied loads in the clinical order of connecting locking taper connection type abutment to the fixture. First, we connected the abutment to the fixture using finger force. Then we tapped with a mallet for 3 times and loads of 20kg corresponding to masticatory force using loading application instrument were applied successively. The state of abutment being slightly connected to the fixture with no pressure was considered as a reference length, and every length was measured after each load was added. The amount of abutment sinking (mm) was gained by subtracting the length of abutment-fixture under each loading condition from reference length. Unsaturated polyester (Epovia, Cray Valley Inc, Jeonju, Korea) was used to mount implants and it was polymerized completely. We used High Speed Precision Cut-Off (Accutom-5, Struers, and Ballerup, Denmark) for cutting off resin block, Automatic Specimen Polisher (Rotopol 2, Struers, Ballerup, Denmark) for polishing and ultrasonic cleaner for washing. FE-SEM (field emission scanning electron microscopy) was used to analyze and compare the adaptiveness of connection of abutment-fixture.

Results: The amount of abutment sinking in Bicon Implant System® was shown to be increasing as loads were added. When loads of 20Kg were applied more than 5-7times, sinking stopped at 0.45±0.09mm.

Conclusion: Even though locking taper connection type implant shows good adaptiveness against occlusal force, it has potential for abutment sinking as loads are given. When we use locking taper connection type implant, setting force of 5 or more times is recommended for precise abutment location.

116
Table 44

Study On The Relationship Between State Of Occlusal Support And Activities Of Daily Life In Aged Group

Jiang T.; [2], [1] Wu, MJ.; [2] Feng, HL[2]
Peking University, School and Hospital of Stomatology
[1]Department of Second Clinic [2] Department of Prosthodontics
Beijing, China

Purpose: This study is to investigate the relationship between state of occlusal support and activities of daily life (ADL) in elders from 65-74 years old.

Methods & Materials: Cross section study was adopted and questionnaire was designed to collect the information about state of occlusal support and relevant ADL of 1219 elders from 65 to 74 years old living in urban area of Beijing city. The statistic dependence and the degree of relationship between the above two criteria were analyzed using the method of multivariate logistic regression analysis.

Results: The elders among this group lost average 9.1 teeth, and 343(28.1%) of them had no any occlusal contact. 93 elders had trouble to care of themselves life. There were significantly negative relevant correlations between the state of occlusal support and ADL ($P<0.05$). With the increasing of number of occlusal support area, the dependency of ADL decreased. The index of ADL was lower with less number of occlusal support areas than those with more number of occlusal support areas.

Conclusion: ADL had correlation with the number of occlusal support areas.

117
Table 45

Photoelastic Analysis Of Supporting Tissue Under The Complete Dentures With Lingualized Occlusion

Jiao, T.*, Jin, WZ.
Shanghai 9Th People's Hospital, Shanghai Jiao Tong University
School of Medicine, Prosthodontics
Shanghai,China

Purpose: To compare the stress distribution of supporting tissue under the complete dentures with lingualized occlusion and anatomic occlusion.

Methods & Materials: Photoelastic models were fabricated according to the standard edentulous model and alveolar mucosa was simulated by silicone rubber about 2mm in thickness. A remount record was fabricated to ensure that the anatonic and lingualized artificial teeth were arranged at the same positions. 1 kilogram force was vertically applied by the bite force loading device which had fixed the models and dentures in centric occlusion and lateral occlusion. After stress frozen, photoelastic model slices in posterior teeth area were observed and stress value was measured by fringe order per unit thickness. Photos of stress fringes were taken by a digital camera and then the stress curves were drawn with Illustrator software.

Results: The results showed that force was mainly concentrated in the first molar area. The maximum stress was not observed at alveolar ridge crest, but on buccal and lingual side. Lingualized occlusion obtained a more lingual stress distribution in centric occlusion. In lateral occlusion, the stresses of these two kinds of occlusal forms both concentrated

buccally no matter working side or balancing side. However, the maximum stress of lingualized occlusion distributed more uniformly in the middle part of buccal alveolar bone, while that of anatomic occlusion was closer to vestibular groove far away from alveolar ridge crest. In anatomic occlusion, higher stress was observed on working side than on balancing side while in lingualized occlusion, higher stress was observed on balancing side than on working side.

Conclusion: (1) The first molar region was main force bearing area and the extent of complete denture base should be enlarged in this area as much as possible. (2) Besides the place where the denture teeth were set up, whether the force can be transferred to the main bear area may also lie on the cusp inclination and teeth contact location.(3)In lateral occlusion, lingualized occlusion can transfer more force from the working side to the balancing side, which may explain that lingualized occlusion can provide more stability than anatomic occlusion.

118
Table 46

Effect Of Platelet-Rich Plasma On Bone Regeneration In Ovariectomized Osteoporotic Rats

Kim, JS.*, Cho, JM., Suh, KW., Shin, SW., Ryu, JJ.
Korea University
Prosthodontics
Ansan, Seoul, South Korea

Purpose: The aim of this experimental study is to observe the effect of platelet-rich plasma (PRP) on early bone regeneration or healing activity of both normal rats and rats induced to osteoporosis by ovariectomy.

Methods & Materials: Total 40 Sprague-Dawley female rats were prepared and divided into 4 groups. 20 rats were 2 months old in normal and healthy general condition. Another 20 rats had been induced to osteoporosis by having been ovariectomized 7 weeks before. Then, we divided each into 10 rats respectively. An 8-mm-diameter calvarial critical-sized defect (CSD) was made by intentional drilling with trephine bur at the center of calvaria in cranium of every rat. And this artificial bone defect was augmented with an osteoconductive synthetic alloplastic substitute (MBCPTM) with or without PRP as follows.
Group A ; 10 non-ovariectomized rats grafted with only MBCPTM
Group B ; 10 non-ovariectomized rats grafted with MBCPTM and PRP.
Group C ; 10 ovariectomized rats grafted with only MBCPTM.
Group D ; 10 ovariectomized rats grafted with MBCPTM and PRP.

Results:
1. In non-ovariectomized (normal) groups, PRP showed a positive effect on bone regeneration somewhat. But statistically it was not significant ($p>0.05$).
2. In ovariectomized (osteoporotic) groups, PRP showed a positive effect on bone regeneration. And statistically it was significant ($p<0.05$).
3. In PRP untreated groups, ovariectomy diminished bone regeneration. And statistically it was significant($p<0.05$)
4. In PRP treated groups, ovariectomy diminished bone regeneration somewhat. But statistically it was not significant ($p>0.05$)

Conclusion: Within the limitation of this study, it can be concluded that PRP in combination with an osteoconductive synthetic alloplastic substitute has an effect on bone regeneration more significantly in ovariectomized osteoporotic rats than in normal rats.

119
Table 47

Effects Of The Polycaprolactone Scaffolds, Mesenchymal Stem Cells And Rhbmp-2 On Mandibular Bone Regeneration In Dogs

Jung, YS.*, Oh, JS., Lee, JH., Ryu, JJ., Shin, SW.
Institute For Clinical Dental Research (ICDR)
Department of Prosthodontics
Graduate School of Clinical Dentistry Korea University
Seoul, Korea

Purpose: The aim of this study was to evaluate the effects of polycaprolactone-20% tricalcium phosphate (PCL-TCP) scaffolds, recombinant human bone morphogenetic protein (rhBMP-2), and allogenic canine mesenchymal stem cells (MSCs) on the alveolar bone regeneration, and to assess whether the combination of rhBMP-2 and MSCs synergistically enhances osteogenic potential.

Methods & Materials: Surgically induced mandibular alveolar ridge defects (2 defects on each left and right side) in four beagle dogs were assigned to receive PCL-TCP (control), PCL-TCP/MSCs, PCL-TCP/rhBMP-2, and PCL-TCP/MSCs /rhBMP-2. Two dogs were euthanized in the fourth week and the other two in the eighth week postoperatively. Block sections of the defect sites were collected for radiographic, histological, and immunohistochemical analysis. Bone density data obtained by dental CT analysis were analyzed by Student's t-test ($p<0.05$).

Results: Dental-computed tomography showed that the three-dimensional structure of the PCL-TCP scaffolds was maintained without deformation or collapse during 8 weeks postoperatively. Radiographic observations revealed more substantial bone filling in the rhBMP-2 and MSCs/rhBMP-2 group than the control and MSCs group. At 4 weeks, bone density in the rhBMP-2 group was significantly higher than that in the control group ($p<0.05$). Histologically, the new bone formation of the rhBMP-2 group was the highest at 8 weeks postoperatively. The colonies of the well differentiated ostoblasts were specially observed in the grafting material of the MSCs and MSCs/rhBMP-2 groups at 8 weeks. However, the osteogenic activity in the combined group of MSCs and rhBMP-2 was low than that in the rhBMP-2 group in this study.

Conclusion: It is suggested that the PCL-TCP scaffold with rhBMP-2 can stimulate new bone formation in alveolar bone defects.

120
Table 48

Aesthetic Anterior Restoration Cases Using Porcelain Laminate Veneers

Juwon Song*, Lee, JW., Ryu, JJ, Shin, SW
Korea University
Advanced Prosthodontics
Seoul, Korea

Purpose: Aesthetic factor seems to be the most important one for the success of anterior restoration operation. Recently, patients can access easily to the dentistry information than before and they want more aesthetic satisfaction. Therefore, aesthetic anterior restoration is putting greater challenge to dentists.

Restoration with porcelain laminate veneer has several advantages. The first one is that the method can avoid the damage of pulpal tissue, which is the defect of the existing restoration with all ceramic crowns and is originated from the excessive tooth preparation. Also, this method can release the difficulty of appropriate proximal contact formation and marginal discoloration, micro-leakage. Furthermore, restoration with porcelain laminate veneer is superior to ones with

all ceramic crown or resin in aesthetic aspects. Thus, this restoration will be a great medical treatment which can satisfy both patients and dentists, only if proper case selection and practice are implemented.

Development of dental materials has enhanced the hardness and aesthetic of ceramic. Improvement of bonding dentistry has enabled more PLV application cases to succeed with fortified bonding strength, decrease of post-op hypersensitivity and aesthetic desire increase of patients.

Methods & Materials: For a proper PLV restoration, precise diagnostic wax-up is necessary for a final restoration form. In accordance with the result, porcelain restoration output with the appropriate size and form should be made through the preparation using mock-up and silicon index. The precise treatment handled step by step can deliver the longevity of restoration output, aesthetic, long-term stability of color, fracture resistance and prevention of post-op hypersensitivity.

Results:

Conclusion: This presentation is proposed because satisfying aesthetic results were obtained by the PLV restorations. The first case was diastema closing case. In order to keep the proper proportion of the teeth, gingivectomy was done before the preparation. Case 2 was designed to treat proximal caries. To avoid secondary caries and teeth staining, PLV was selected. In the last case, PLV was chosen to preserve existing teeth structure. PLV requires minimal reduction compare with conventional restorations. In these cases, patients were satisfied with their natural-looking restored teeth.

121
Table 49

Stress Analysis Of Abutment Tooth With Extracoronal Magnetic Attachment Using The Three Dimensional Finite Element Method – The Effect Of Bracing Arm

Kanbara, R.*, Nakamura, Y., Ando, A.,Ohno, Y., Kogiso, T., Muraji, N., Tanaka, S., Tanaka, Y.
Aichi-Gakuin University
Department of Removable Prosthodontics
Nagoya, Japan

Purpose: In unilateral extension partial denture treatment situations, magnetic attachments are often used as a hidden attachment retaining retentive elements providing improved aesthetics and comfort. When an extracoronal magnetic attachments is used for retention, the functional cantilever behavior effect of denture should be well understood. Solutions to cantilever stress transfer concerns include the use of splinting abutments, use of lingual bracing arms and extracoronal attachments interlocks. However, we have not discovered any significant reports or evidence regarding the relative use and merits of these different design elements for improved treatment decision making purposes.

Methods & Materials: The three-dimensional FEM model was constructed from the CT data of patients. The analysis model included connective crowns of #3, 4 and 5 based on Ando's results. As the load condition, a total of 10 N vertical loads were applied on the occlusal surface. The following are four analysis models fabricated in the present study.

1. The model with a bracing arm and an interlock incorporated into an extracoronal attachment (B-A model).
2. B-A model without a bracing arm (B-A less model).
3. B-A model with medial rests on the teeth # 4 and 5 (Rest model).
4. Lingual bar model with a twin clasp placed on the opposite side as an indirect retainer (L-B model)

Results: Stress at the distal cervical margin of the tooth #5. The B-A less model demonstrated the highest stress value, and the L-B model demonstrated the highest stress relaxation. The comparison between the B-A and Rest models revealed a slightly higher stress value in the Rest model. The distal displacement of the abutment and the vertical displacement of the posterior margin of the denture, respectively. The L-B model showed the smallest distal displacement of the abutment and vertical displacement of the denture.

Conclusion: In unilateral free-end edentulous case, the L-B model is considered to be an optimal design based upon the analysis results of the stress distribution and displacement findings. Bracing arms proved to be effective in an unilateral denture design. The analysis result of the Rest model was similar to the B-A model, suggesting that mesial rests can replace a bracing arm.

122
Table 50

An In-Vitro Study To Compare The Microleakage Of Different Composite Laminate Veneering Materials Using Sem And Eds Systems

Kar, AK*, Jain V., Parkash H. *****
***Its Centre For Dental Studies & Research, Muradnagar,Ghaziabad**
Uttar Pradesh, India
****Division of Prosthodontics, Centre For Dental Education and Research**
All India Institute of Medical Sciences (Aiims), New-Delhi, India
*****Its Centre For Dental Studies & Research,Muradnagar, Ghaziabad**
Uttar Pradesh, India
Department of Prosthodontics
***Ghaziabad, Uttar Pradesh, India**
****New-Delhi,Delhi,India**
*****Ghaziabad, Uttar Pradesh, India**

Purpose: This study evaluated the microleakage of commonly used different direct composite resin systems for veneering namely Admira, Filtek Supreme, Tetric Ceram and Esthet-X by means of SEM and Energy Dispersive X-ray Microanalysis Systems (EDS) before and after thermocycling.

Methods & Materials: Forty maxillary central incisors ,directly veneered were evaluated using SEM and EDS.Each laminated tooth was subjected to thermocycling in different heat blocks using 50% aqueous solution of silver nitrate.The samples were sectioned in two halves and examined for marginal adaptation and microleakage at two interfaces i.e cervical enamel/composite laminate and incisal enamel/composite laminate

Results: All the composite materials showed different percentages of dye penetration at both sites. Microleakage was more at the cervical margin (below CEJ) than at the incisal margin irrespective of composite materials. SEM analysis before thermocycling revealed no discontinuity in all of the composite veneers at both sites When comparing the mean percentage penetration ratio at different sites, it was found to be statistically significant when comparing a Ormocer based composite with a Bis-GMA microhybrid composite with nanofiller technology

Conclusion: Ormocer, an organically modified ceramic restorative material showed least microleakage in our study which can be used in clinical practice to have better long-term results.The Bis-GMA microhybrid composite which showed highest microleakage property should be critically evaluated for this lacunae and further research in this aspect is advocated

123
Table 51

Minimum Number Of Implants For Establishing Stable Occlusal Support In An Edentulous Maxilla; Biomechanical Rationale

Kazunori I.*, Yoshinobu Maeda, Masashi Sano
Osaka University Graduate School of Dentistry
Department of Prosthodontics and Oral Rehabilitation
Suita, Osaka, Japan

Purpose: Compare to the edentulous mandibles, the edentulous maxillae require careful evaluation for the site of implant placement due to the lower bone mineral density and anatomical limitations such as maxillary sinus. The object of this study was to determine the minimum numbers and locations of implants for establishing stable occlusal support in the edentulous maxilla.

Methods & Materials: 3D-CT data with bone mineral density of a dry skull was transferred to constructed 3D finite element model using a special soft wear (Mechanical Finder, Research center of computational mechanics Inc. Japan). Validation of the 3D model was performed by comparing between the calculated stress values and measured values using strain gauge on the bone surface under the same loading conditions. Titanium implants were also simulated in the configuration of 14 unsplinted implants throughout the dental arch (U14), 14 splinted implants (S14), 6 splinted implants (canine, premolar and molar regions, S6), 4 splinted implants (all-on 4 configuration, S4) and 6 anterior region implants (incisors and canine, A6). Distributed loads of 200N in the vertical and 60 degree inclined directions were applied on the occlusal table of superstructures.

Results: Maximum stresses in the alveolar bone for the each model were 10.7 MPa in U14, 11.4 MPa in S14, 14.3 MPa in S6, 28.4 MPa in S4 and 38.6 MPa in A6 by the vertical load, and were 26.2 MPa in U14, 29.0 MPa in S14, 21.2 MPa in S6, 99.7 MPa in S4 and 131 MPa in A6 by the inclined load.

Conclusion: Implants in the molar area significantly reduced maximum stress in the alveolar bone of edentulous maxillae. These results suggested that 6 splinted implants in canine, premolar and molar regions may be the minimum configuration for the maxillary edentulous patients from a biomechanical point of view.

124
Table 52

Functional Assessment Of Masticatory And Speech For Post Maxillectomy Patients

Kazuya, A..*, Miyamae, S., Okazaki, S., Ozawa, S., Yoshioka F., Hirai H., Tanaka, Y.
Aichi-Gakuin University
Department of Removable Prosthodontics
Nagoya, Japan

Purpose: Maxillary resections due to cancer or injury result in serious functional problems to the patients, and those are required prosthetic rehabilitation. Especially a perforation to the nasal cavity disturbs speech and masticatory function. Surgical closure is one of the choice of treatments, however, bulky flaps often hider the fabrication of the prosthesis. The aim of this study was to evaluate obturator prostheses on functional aspects.

Methods & Materials: Maxillectomy patients who had treated in our clinic participated on this study. They were categorized with or without perforation. The surgical closures include both primary closure and flap reconstruction. The masticatory efficiency test by using test foods, measuring the occlusal force, questionnaires to the patients were performed. As for speech evaluation, the speech and conversation intelligibilities and blowing tests were applied. Each test result was compare between the two groups.

Results: The masticatory ability tests which utilize a wax cube and gummy jelly demonstrated objective value of this function, which were correlated to the subjective masticatory scores from the questionnaires. For the categorized each group comparison, the masticatory performance did not show significant differences. Speech and conversation intelligibilities and blowing tests showed the significantly improvement of the speech by wearing the obturator prostheses in the group of patents with the perforation. However, the results from the speech evaluation did not show any definite differences on each group.

Conclusion: The obturator prostheses are effective on improvement of the speech function for the maxillectomy patients with perforation. Although it did not show any significant differences between the two groups for masticatory performance, further study needs for increasing case numbers and detail investigation focused on the defect characterization.

125
Table 53

Restoration Of Anterior And Posterior Teeth With Zirconia (Case Report)

Kim, HJ.*, Lee, KH., Jeong, JH., Son, MK.
College of Dentistry, Chosun University
Department of Prosthodontics
Gwangju, Korea

Purpose: Nowadays, there are many patients who want to restore their teeth more esthetically not only for the pathologic origin such as dental caries or tooth fracture but also for diastema, the simple space problem which causing unaesthetic problems. As the interest of patients over the esthetic increased, reports over the all ceramic crown manufacturing in both posterior teeth and anterior teeth got increased.

Methods & Materials: Porcelain fused to metal crown which used for conventional restoration, has some defects of inhibiting the light transparent but increasing light reflection and consequently having low transparency and if the amount of tooth preparation was not enough in cervical region, internal metal would be reflected through the thin gingival and gingival discoloration would be followed. Therefore, zirconia gets the new limelight recently. It has excellent mechanical strength as it has the feature of transformation toughened material. The patient of this case is a 21-year old female who had endodontic treatment for several caries affected teeth in both maxilla and mandible and she also had deep bite in anterior teeth and posterior wear. The needs for functional and esthetic restoration were the chief complaint of the patient.

Results: After vertical dimension of occlusion was increased about 1.5mm with consideration of anterior guidance, anatomical landmarks, facial measurements, phonetics and rest position, and assessment for provisionalization was done for 1 month adaptation period and then final restoration was performed.

Conclusion: In this case, the esthetically and functionally satisfactory results by using zirconia were obtained from the patient showing open bite in anterior teeth and posterior wear in several endodontic treated teeth.

126
Table 54

Sinking And Fit Of Abutment Of Conical Internal Connection Implant System

Kim, HJ*, Jeong, JH., Son, MK., Moon, SJ
College of Dentistry, Chosun University
Department of Prosthodontics
Gwangju, Korea

Purpose: Unlike screw-retention type, fixture-abutment retention in Locking taper connection depends on frictional force so it has possibility of abutment being sinking. PURPOSE: In this study, we used Bicon Implant System® which is one of the conical internal connection implant system and applied loading to the abutments connected to the fixture and measured the amount of sinking. Also we observed adaptiveness at abutment-fixture connection part.

Methods & Materials: We used 10 Bicon implant fixtures. We applied loads in the clinical order of connecting locking taper connection type abutment to the fixture. First, we connected the abutment to the fixture using finger force. Then we tapped with a mallet for 3 times and loads of 20kg corresponding to masticatory force using loading application instrument were applied successively. The state of abutment being slightly connected to the fixture with no pressure was considered as a reference length, and every length was measured after each load was added. The amount of abutment sinking (mm) was gained by subtracting the length of abutment-fixture under each loading condition from reference

length. Unsaturated polyester (Epovia, Cray Valley Inc, Jeonju, Korea) was used to mount implants and it was polymerized completely. We used High Speed Precision Cut-Off (Accutom-5, Struers, Ballerup, Denmark) for cutting off resin block, Automatic Specimen Polisher (Rotopol 2, Struers, Ballerup, Denmark) for polishing and ultrasonic cleaner for washing. FE-SEM(field emission scanning electron microscopy) was used to analyze and compare the adaptiveness of connection of abutment-fixture.

Results: The amount of abutment sinking in Bicon Implant System® was shown to be increasing as loads were added. When loads of 20Kg were applied more than 5-7times, sinking stopped at 0.45±0.09mm.

Conclusion: Even though locking taper connection type implant shows good adaptiveness against occlusal force, it has potential for abutment sinking as loads are given. When we use locking taper connection type implant, setting force of 5 or more times is recommended for precise abutment location.

127
Table 55

Effect Of Block Bone Graft With Rhbmp-2 On Vertical Bone Augmentation In Rabbits' Cranial Bone

Kim, JE*, Shin, HS., Shin, SW,
Korea University, Korea
Department of Prosthodontics, Korea University Guro Hospital
Institute For Clinical Dental Research
Seoul, Korea

Purpose: To assess the effectiveness of vertical bone augmentation using a deproteinized bovine blocks bone (BBB) and a cortico-cancellous human block bone (HBB) with rhBMP-2 in rabbits' cranial bone.

Methods & Materials: Two kinds of block bone graft materials (6mm diameter, 4mm height) were applied on the rabbit calvaria. The block bone grafts were used as it is or moistened with rhBMP-2 (50 ?/?) and covered with non-resorbable (polytetrafluoroethylene) membrane respectively. A total of 6 groups were tested; A) BBB alone, B) BBB/rhBMP-2, C) BBB/membrane, D) HBB alone, E) HBB/ rhBMP-2, F) HBB/membrane. After 12 weeks of healing period, the rabbits were sacrificed. The bone blocks with calvaria were prepared for histomorphometric analysis by non-decalcification technique. The vertical height of grafted bone, percentage of new bone formation area and maintained grafted bone area were measured. The two-way ANOVA test of SPSS (Ver 12.0, SPSS Inc.) soft ware was used at the 95% significance level.

Results: The histological examination demonstrated that new bone formation inside the blocks originated from the rabbits' cranial bone in all groups. The histomorphometric measurement demonstrated as follows; 1) Vertical height (mm); The membrane group was significantly higher than the rhBMP-2 group in the BBB groups ($P<0.05$). All HBB groups showed higher value than all BBB groups. 2) New bone formation (%); The rhBMP-2 group and membrane group showed high values in the BBB groups, but they were low ones compared to the HBB groups. 3) Maintained grafted area (%); The membrane group was significantly higher value than control group and rhBMP-2 group in the BBB groups, but the HBB groups showed similarly high values in all groups.

Conclusion: The HBB groups showed higher value than the BBB groups in all measurement values showing effect of vertical augmentation. As the HBB groups showed similar results in all measurements regardless of using rhBMP-2 and membrane, the effect of vertical augmentation can be expected using only the HBB.

128
Table 56

Implant Site Preparation By Low Speed Drilling. Pros And Cons

Kim, SJ.*, [1 2] Kim, MR. [2], Shin, SW,[1]
[1] Guro Hospital and Institute For Clinical Dental Research, Korea University
[2] Mok-Dong Hospital and Graduate School of Clinical Dentistry
Ewha Womans University
[1] Advanced Prosthodontics [2] Implantology
Seoul, South Korea

Purpose: Numerous studies have demonstrated the predictability of conventional speed drilling implant site preparation. However, few studies have been reported low speed drilling for implant site preparation. The purpose of this study was to evaluate pros and cons of low speed drilling by the temperature change during drilling using infra-red thermography.

Methods & Materials: Pig ribs were used to provide cortical bone of a similar quality to human mandible. Heat production by 3 implant drill systems (2 conventional drilling systems and 1 low speed drilling system) was evaluated by measuring the bone temperature using infrared thermography. Each system had 2 different bur sizes. The drill systems used were twist drill (2 mm/2.5mm) which establishes the direction of the implant and finally a 3mm-pilot drill. Thermal images were recorded using the IRI1001 system (InfraRed Integrated Systems Ltd. UK). Baseline temperature was 31±1°C. Measurement was repeated 10 times, and a static load of 10 kg was applied while drilling. Data were analyzed using descriptive statistics.

Results: Average values (n = 10 drill sequences) for maximum recorded temperature (Max T°C), change in temperature (?T°C) from baseline were as follows: The changes in temperature, ?T°C were 1.57°C and 2.46°C for the lowest and the highst respectively. Drilling at 50 rpm without irrigation did not produce overheating. Data were analyzed using descriptive statistics.

Conclusion: Within the limitations of this study, it was suggest that low-speed drilling at a drilling speed of 20-100 rpm without irrigation did not significantly increase bone temperature compared to conventional drilling at a drilling speed of 1200 rpm with irrigation. Low-speed drilling without irrigation could be used during implant site preparation. We may utilized bone which was collected during Implant site preparation by low speed drilling for bone graft.

129
Table 57

Effect Of Sandblasting And Various Metal Primers On The Shear Bond Strength Of Resin Cement To Y-Tzp Ceramic

Kim, SH.*, Yun, JY., Yang, JH., Han, JS., Heo, SJ.
College of Dentistry, Seoul National University
Department of Prosthodontics and Dental Research Institute
Seoul, South Korea

Purpose: This study was designed to evaluate the effect of sandblasting and metal primers on the shear bond strength of three commercial resin cements to Yttria-Tetragonl Zirconia Polycrystal (Y-TZP) ceramics.

Methods & Materials: One hundred and twenty Y-TZP ceramic cylinders (Ø 7 mm × 12 mm) were embedded in polytetrafluoroethylene (PTFE) molds using PMMA. The specimens were divided randomly into 12 groups (n =10), according to the surface treatments (control; sandblast-only; metal primer-only; sandblast + metal primer) and metal primer-resin cements (Alloy primer - Panavia F 2.0, V-primer - Superbond C&B, Metaltite - M bond) rendered. The mixed

resin cements were placed onto the treated zirconia surfaces in cylindrical shape (Ø 3 mm × 3 mm) using PTFE molds. All specimens were thermocycled (5 and 55?, 5,000 cycles) and subjected to shear bond strength test by a universal testing machine with a crosshead speed of 0.5 mm/min. All data were statistically analyzed (a = 0.05), and SEM images of the fractured areas were used to evaluate the fracture mode.

Results: In Panavia F 2.0, the bond strength of the specimens treated with sandblasting and metal primer (Alloy primer) was significantly higher than those of the other subgroups. In Superbond C&B and M bond, sandblasting significantly increased the shear bond strength, but the effect of metal primers (V-primer and Metaltite) was not significant and there was disordinal interaction.

Conclusion: Metal primers are not always effective for bonding between Y-TZP ceramics and resin cements. Even though a metal primer is not enough to be used alone, combined application with sandblasting seems to be an appropriate pretreatment for improving the bond strength of resin cement to Y-TZP ceramics, especially in Panavia F 2.0.

130
Table 58

Variations In Mandibular Bone Mineral Density Values Dependent On Age, Gender And Antagonistic Contacts

Knezovic Zlataric, D.*, Celebic, A.
School of Dental Medicine, University of Zagreb
Department Of Prosthodontics
Zagreb, Croatia

Purpose: The purpose of the study was to examine the mandibular bone mineral density (BMD) values on panoramic radiographs in adult population, to identify their normal ranges and to investigate their relationships with age, gender and the presence of antagonistic contacts in the distal segments of the mandible.

Methods & Materials: A total of 300 patients (18 to 82 years old; mean age 43; 129 men, 168 women) participated in the study. Using the copper stepwedge, mandibular BMD was measured on the lower cortical border of the mandible: at two points below the mental foramen (BMD1, BMD2) at antegonion (BMD3) and gonion (BMD4). The mandibular BMD measurements were expressed as the equivalents of the actual stepwedge thicknesses. The variations in measured variables between age groups (six 10-year age groups), gender (men/women) and presence of antagonistic contacts in distal segments (yes/no) were analysed.

Results: All BMD values demonstrated statisticaly significant difference between different age groups ($p<0.05$). There was a general downward trend with age until the seventh decade, when BMD values began to fall sharply compared to the mean values for the population ($p<0.05$). Men demonstrated higher BMD values than women ($p<0.05$). The patients with the antagonistic contacts of the opposing teeth in both distal segments demonstrated higher BMD values in comparison to the patients with no antagonistic contacts in the same area of the jaw ($p<0.05$). In stepwise linear regression analysis, the presence of antagonistic contacts in distal segments demonstrated a strongly significant relationship with all BMD values ($p<0.001$).

Conclusion: Mandibular BMD values showed age- and gender-related changes. The presence of the antagonistic contacts in the distal area should also be considered as a significant local factor influencing the changes of the bone density, due to the transmission of the occlusal forces and the local effects of muscle attachments.

131
Table 59

A Case Report Of The Full Mouth Reconstruction Using Magnetic Attachments

Kogiso T.*, Nakamura Y., Shoji K., Kanbara R., [1]Okada M.,[1]Tanaka T, Tanaka Y.
Aichi – Gakuin University
Department of Removable Prosthodontics
Nagoya, Japan

Purpose: A magnetic attachment is device using magnetic attractive force to provide and assist in the retention of dentures. Dentures using these special attachments have been well received by patients and treating dentists. The purpose of this report is the case presentation for a patient who presented with chief complaints of aesthetic dissatisfaction and inability to chew properly. This patient underwent full mouth reconstruction using magnetic attachments at the retaining elements. The following is a summary of treatment completed.

Methods & Materials: Clinical History. The patient was a 42-year-old female with chief complaints of aesthetic dissatisfaction and masticatory dysfunction. The patient had received implants on the right lower molar region in 1995, but they were failed after 3 years. The edentulous upper and lower molar regions were left untreated for many years, resulting in a distorted plane of the occlusion and a decrease in occlusal vertical dimension. Although the patient visited several general practitioners and municipal hospitals to seek aesthetic correction, she was dissatisfied with the treatment results, and then consulted with our department.

Initial Situation: The patient had Kennedy Class II relationship in the upper and lower arches. There was severe molar occlusal destruction with a occlusal plane discrepancy. Also present were areas of root fracture, failing restorations with ill-fitting margins, and poor periodontal tissue health. There was severe redness and swelling of periodontal tissues around the right upper lateral incisor, and right lower first premolar areas. Radiographic examination demonstrated endodontic problems of apical radiolucencies and poor endodontic fills in other areas. Clinical examination revealed the bone torus which can be an obstacle to the restorative treatment.

Results: The patient was satisfied with the esthetic results of the final restoration with magnetic attachments. The retention obtained with the attachments achieved highly satisfactory functional results. The patient was satisfied with the prosthetic retentive force.

Conclusion: The postoperative course has been uneventful. However, the design of a final restoration is complex as the ideal combination of esthetics and functionality is difficult to obtain. It is important that regular maintenance is obtained.

132
Table 60

Influence Of Mechanical Loads On Bone Surrounding Short Implants Studied By Finite Element Analysis

Kuremoto, KI.*, Maeda, T., Okazaki, J.
Osaka Dental University
Department of Removable Prosthodontics and Occlusion
Osaka, Japan

Purpose: Dental implant therapy is often limited by clinical situations such as bone deficiencies and/or the presence of anatomical structures in areas where implants have to be prosthetically placed. To treat these situations, advanced surgical procedures, such as guided bone regeneration and sinus floor elevation, or short implants are used. However, there are few reports that described how the mechanical stresses are distributed in bone surrounding short implants (SI). The purpose of this study was to observe the influence of mechanical loads on bone surrounding SI compared to regular implants (RI) using finite-element analysis (FEA).

Methods & Materials: FEA models of implants, 6.5 mm (SI) and 12 mm (RI) in length and 3.8, 4.4 and 5 mm in diameter, and the alveolar bone were created. Only half of the each model was used and their cross sections were simulated as the symmetry. Loads of 100 N were applied atop a custom abutment along the log axis of the implant (AX load) and at 30-degrees to the log axis (30-degree load). The von Mises stresses in alveolar bone were evaluated using commercial software (COSMOS Works 2007 and Solid Works 2007).

Results: Under AX and 30-degree loads, von Mises stresses concentrated in the boundary between cortical and cancellous bone and in the implant apex area. Under the loads, von Mises stresses in the boundary between cortical and cancellous bone were higher for SI compared to RI. In contrast, von Mises stresses in the implant apex area were lower for SI compared to RI. For SI, stresses in the boundary between cortical and cancellous bone and in the implant apex area decreased as the diameter increased.

Conclusion: It was reconfirmed that increasing the diameter of short implants would minimize stress concentrations in bone surrounding the implants and contribute to the good performance of short implant restorations.

133
Table 61

A Case Study: Fixed Prothodontic Restoration Accompanying Displacement Of A Condyle - Practical Application Of Provisional Restoration Effective In Transmitting Esthetic And Functional Information

Kwun, SM.*, Pae, A., Kim, HS., Kwon, KR., Woo, YH., Choi, DG.
Kyunghee University
Department of Prosthodontics
Seoul, Korea

Purpose: This case reports 50-year-old male patient with multiple dental caries and secondary caries under ill-fitting old restorations resulting in destruction of the dentition and food retention after mastication. However, he never had complaints about pain and discomfort in everyday life or when masticating. As a result of oral and radiographic examinations, and study model evaluation, majority of the teeth were involved with caries and fractures, and there were ill-fitting, esthetically poor restorations.

Methods & Materials: During initial treatment, problematic teeth were extracted: #21 with periapical lesion due to perforation of existing screw post, #34 with dental caries spread deep into a root canal, periodontically unfavorable #41 from lingual displacement and extrusion. Through analyzing the occlusion, we could assume that lower right molar areas have had displacement from existing maximum intercuspal position from dental caries and fractures of #44, #45, restoration fallen off on #46, missing of #47 Although posterior displacement of right condyle was present in TMJ series radiographic examination, there were no evident symptoms or history of TMD. Maxillary anteriors showed lingual inclination, deep vertical overbite, and steep anterior guidance. Occlusal plane followed reverse curve of spee. Fixed prosthodontic restoration was planned through various analyses to re-establish the patient's function and esthetics, restoration of the entire dentition except maxillary premolar areas.

Results: ARCUSdigma from KAVO was used to measure guidance angle to apply it to an articulator. The patient was induced of centric relation using anterior jig, and diagnostic cast model was mounted on an articulator. Since the current vertical dimension was stable, it was maintained and occlusal plane was set up with esthetic guide as the anterior standards and 2/3 of retromolar pad as posterior standards. Diagnostic wax-up was performed in regards to these factors. Lingually inclined maxillary insiors were positioned labially to their original positions in wax-up for making a provisional restoration, considering their continuity with buccal alveolar bone. The provisional restoration was adjusted and delivered to harmonize with neutral zone intraloraly. After delivering provisional restoration, stable occlusal contact was provided and consistent evaluation and adjustment was performed. However, during follow-up check, excessive contacts between lingual surfaces of maxillary incisors and buccal surfaces of mandibular incisors were present and they had to be adjusted several times. After eliminating these symptoms, provisional restoration with stable occlusal contact and optimal anterior guidance was in use for 8 weeks. As a result new TMJ series radiographic examination has showed anterior movement of right condyle in condylar fossa.

Conclusion: Sufficiently adapted and stable provisional restoration was used to record occlusion. The model for the provisional restoration and the final working cast were cross-mounted. Through the provisional restoration, both esthetic and functional factors were assessed intra-orally and they were reproduced in the final restoration. After intra-oral evaluation of the final restoration, bite was recorded and pick up impression was made to mount the models on an articulator for occlusal adjustments before final delivery. Night guard was provided to reduce influence from parafunctional habits and the patient is under regular follow-up check.

134
Table 62

Effects Of Flapless Implant Surgery On Soft Tissue Profiles: A Prospective Clinical Study

Lee, DH.*, Choi, BH. , Jeong, SM.
College of Dentistry, Yonsei University
Seoul, South Korea
Prosthodontics
Wonju Kangwon-Do

Purpose: Flapless implant surgery has been suggested as a suitable treatment modality for the preservation of soft tissue after implant placement. The purpose of this study was to determine the extent of soft tissue profile changes around implants after flapless implant surgery.

Methods & Materials: A total of 22 patients received 38 implants using a flapless implant procedure. The marginal level of the peri-implant soft tissue was evaluated using dental casts 1 week, 1 month and 4 months after implant placement.

Results: The mean soft tissue levels around implants showed 0.7 ± 0.3 mm of coronal growth 1 week after surgery. At 1 month, the levels were 0.2 ± 0.2 mm coronal growth and at 4 months the values were 0.0 ± 0.3 mm. Soft tissue profiles assessed 4 months after flapless implant placement were similar to profiles assessed immediately before implant placement.

Conclusion: Flapless implant surgery is advantageous for preserving mucosal form surrounding dental implants.

135
Table 63

Influence Of The Methods On The Strength And Constitution Of The Soldered Joint

Lee, JH.*, Lee, SY., Kim, CH.
Dental School of Dankook University
Department of Prosthodontics
Cheonan, South Korea

Purpose: The purpose of this study was to evaluate soldered joint of Ni-Cr alloy with different soldering methods by measuring the tensile strength and electro microscopic analysis.

Methods & Materials: Twenty-eight dumbbell shaped Ni-Cr alloy (REXILLIUM®V, Pentron, San Diego, USA) specimens were prepared and assigned to 2 groups according to the soldering methods. One group was soldered with infrared ray soldering machine (Quasar Plus, Zhermack S.p.A., Badia Polesine, Italy) and the other group was soldered with gas-oxygen torch. The average gap distance was 0.4mm and the diameter of the soldering point was 3.0 mm. After

the soldering procedure, ultimate tensile strength of the specimens was measured with a universal testing machine (Instron® 5582, Instron Co., Ltd., Canton, USA). Fractured surface of specimens were evaluated with SEM for the presence of porosity. Another 8 specimens were prepared for the constituent analysis and divided into 2 groups according to the soldering methods, each group had 4 specimens. The specimens were analyzed at 3 points (soldered point, 5 mm away from the soldered point, and 10mm away from soldered point) with Electron Probe Micro Analyzer (EPMA-1600, Shimadzu Co., Kyoto, Japan).

Results: In the tensile strength test, every specimen was fractured on the solder joint area and there was no significant difference between groups. The population of the porosity was also calculated and there was a negative correlation between porosity formation and tensile strength. However, the statistical analysis did not show any differences between two groups. In the EPMA analysis, the gas-oxygen torch soldering showed more composition alteration than infrared ray method. Ni was increased at soldered joint in both groups; however, the gas-oxygen torch soldered specimen showed about 17.3% higher Ni contents than infrared ray soldered.

Conclusion: From these results, the soldering methods did not show any influence on the tensile strength of the Ni-Cr alloy but the infra red soldering method gives less effect to the specimen alloy composition.

136
Table 64

Implant Restoration Of The Missing Maxillary Anterior Tooth By Immediate Provisional Prosthesis

Lee, SY.*, Pae, A., Kim, HS., Kwon, KR., Woo, YH., Choi, DG.
School of Dentistry, Kyung Hee University
Department of Prosthodontics
Seoul, South Korea

Purpose: Due to the development of advanced surgical techniques, immediate and early implant placement is now possible. However, late implant placement is preferred in many cases because of various conditions. Implant placement should be postponed in case of poor initial stability, acute inflammation, faulty extraction wound which can inhibit osseointegration and especially when fenestration or dehiscence exists in the buccal bone plate. During the bone healing period height and width of the remaining alveolar bone decreases. According to Schropp L et al. 50% of the width of the alveolar bone decreases within 12 months and 2/3 of the loss occurs within the first 3 months. Lekovic et al. reported that 40% of the bone height and 60% of the width decreases within 6 months and it also reports that bone resorption occurs more actively in the buccal bone plate. These changes may cause functional and esthetic problems in making implant restoration on late implant placement. Guided bone regeneration, an advanced bone graft procedure which uses the collagen membrane, is known to minimize the bone resorption. Lasella JM et al. reported that in natural healing, 70% of the width of the alveolar bone can change, whereas in GBR, 87% of the bone width can be preserved. Therefore, by minimizing the bone resorption and promoting bone regeneration, soft tissue around the extracted site can be prevented from collapsing. Also, according to Khoury & Happe et al. sufficient amount of keratinized tissue for marginal sealing and esthetically satisfying implant can be achieved by grafting connective tissue. Immediate placement can improve the esthetics of the implant placed site and contrives the healing procedure. Esposito et al. reports that the immediate placement can shorten the treatment period by reducing the number of surgical procedures. Also esthetical improvements can be achieved by minimizing the bone resorption.

Methods & Materials: 38 year-old female patient visited the clinic with the chief complaint of pain and pus discharge on #12 areas. #12 was decided to be extracted because the prognosis of the #12 was poor even after the standard periodontal treatment with flap operation. GBR and connective tissue graft was given. Then implant was placed and immediate placement was carried out.

Results: The result is satisfied functionally, esthetically. Now the patient is checking for 6 months.

Conclusion: With an appropriate soft tissue management and immediate placement, esthetically satisfying results can be achieved in the upper anterior area. However, many unexpected factors are intrinsically present. Therefore, evaluation on interdental bone height, soft tissue condition, width and height of the buccal bone plate, biotype of the gingiva, susceptibility to infection and so on should be carried out under strict protocol in choosing a case.

137
Table 65

A Three-Dimensional Reconstructive And Measuring System For Complete Denture Occlusion

Lu, EY* [A], Chen, XJ, [B], Zhang, FQ, [A], Wang, CT, [B]
[A] Department Of Prosthodontics, Ninth General Hospital, School of Medicine Shanghai Jiaotong University, Shanghai, P. R. China
[B] Department of Mechanical Engineering, Shanghai Jiaotong University Shanghai, P. R. China
[A] Department of Prosthodontics
[B] Department of Mechanical Engineering
[A] Shanghai, P. R. China
[B]Shanghai, P. R. China

Purpose: The purpose of this study is to design and evaluate a method of three-dimensional locating and reconstructing the occlusal relationship between maxillary and mandibular complete dentures.

Methods & Materials: The occlusal surfaces on artificial teeth of ten complete dentures were scanned by non-contact laser scanner. With the placement of six reference steel spheres, the position relationships of complete dentures were reconstructed at intercuspal position by three-dimensional digit technique. Ten marks and seven parameters on occlusal surfaces of artificial teeth for every set of complete denture were then marked and measured. Then, three pairs of results were investigated and compared respectively: the results measured by the same surveyor in different times, the results from different surveyors and the results from the three-dimensional reconstructive systematic measurement and manual measurement.

Results: 1. The three-dimensional reconstructive and measuring system of complete denture occlusion was preliminarily established in this study. 2. Except the parameter IL-IL', there was no significant difference between the results of the different time measurements by the same surveyor, between the three-dimensional reconstructive systematic measurement and manual measurement, or between those by different surveyors (P>0.05).

Conclusion: This study focused on designing a new system to quantitatively reconstruct the occlusal relationship of complete denture in centric occlusion. It could be a methodological foundation for further three-dimensional research on complete denture occlusion.

138
Table 66

Study On CAD & RP Of Complete Denture

Lü, P.*, Sun, Y., Wang, Y.
Peking University School and Hospital of Stomatology
Research Center of Engineering and Technology for Computerized Dentistry
Ministry of Health
Beijing, China

Purpose: Explore the technology route for the CAD&RP of complete denture, develop relevant programs to realize it.

Methods & Materials: 3D automatic crossing section scanner (SB-01,Accuracy: 0.04mm,Beijing ShidaiTianshi Biological Technology Co. Ltd., Beijing,China) was used to scan a set of artificial teeth and a 3D graphic database of the artificial teeth which can be aligned with parameters was established. 3D point laser scanner (D.02-L, Accuracy:

0.05mm, Peking University School and Hospital of Stomatology, China) was used to scan the edentulous jaws casts and rims made in clinic and the relationships of them were recorded with a patent instrument. On Imageware (EDS Corp., USA) software platform, a CAD route of complete denture was explored including creating the tooth-arrangement curves, the coordinate system and landmark points for each tooth positioning, boundary curves and shape controlling curves for base plate and so on. Programs developed by ourselves were applied to the three-dimensional integrated design of complete denture, including artificial teeth automatic arrangement, aesthetic and individualized designing of the base plate and artificial gum. The virtual molds of complete dentures were constructed according to above data in designing and RP technology was used to make the plaster molds. The artificial teeth were inserted into the plaster molds and the complete denture was finished by technician.

Results: A technology route of the CAD/RP of complete denture was confirmed and a special CAD software platform was developed. A complete denture was manufactured aided by RP technology.

Conclusion: Classic theory for teeth arrangement, design rules and aesthetic rules were expressed in CAD process. That the individual rims had been used in designing can realize the digital, automatic and individualized designing-manufacturing system for complete denture.

139
Table 67

Influence Of Unpleasant And Imperceptible Spots Under An Experimental Acrylic Plate Covering The Palatal Mucosa On Salivary Biochemical Stress Markers

Maeda, T.*, Furukawa, M., Ito, H., Okazaki, J.
Osaka Dental University
Department of Removable Prosthodontics and Occlusion
Osaka, Japan

Purpose: In clinical practice, patients sometimes complain about the discomfort of ill-fitting removable dentures. However, to quantify the severity of the discomfort has not been fully clarified. This study investigated the degree of discomfort induced by plates of different thicknesses placed under an experimental acrylic plate covering the palatal mucosa in an attempt to model ill-fitting denture by analyzing salivary biochemical stress markers.

Methods & Materials: Nineteen healthy participants with an average age of 25±2 years were included in this study. All subjects were seated and examined under the five experimental conditions of N (no wearing an experimental plate), D (wearing an experimental plate), DP1 (wearing an experimental plate with a 0.1-mm-thick localized pressure plate), DP2 (wearing an experimental plate with a 0.2-mm-thick localized pressure plate), and DP5 (wearing an experimental plate with a 0.5-mm-thick localized pressure plate). Subjects were asked to complete a Visual Analog Scale (VAS) for pain and discomfort scores during each condition. Saliva was collected at 0, 5,10,15,20 min after the start of each condition. Cortisol, secretory immunoglobulin A (SIgA) concentration, and alpha-amylase activity was measured.

Results: Salivary cortisol concentration and alpha-amylase activity significantly increased as the pain and discomfort resulting localized pressure increased. SIgA level increased as the thickness of the localized plate, but no statistical differences was seen between them did not significantly changed. Cortisol concentration and a-amylase activity for condition D were significantly greater than that for N.Although the pain score, as measured by VAS, was the same for condition N and D, significant differences in discomfort were found between N and D. The cortisol concentration for D1 was significantly greater than that for D. However, no significantly differences in the pain and discomfort score were seen between D1 and D.

Conclusion: Salivary cortisol concentration and a-amylase level were shown to correlate with the VAS pain and discomfort score. This result shows that subjective estimates of pain and discomfort correlate with stress in subjects stimulated by localized pressure to the palatal mucosa. Even a small level of stimulation in oral mucosa can be a source of stress.

140
Table 68

Rotational Misfit Of Implant Abutments: Influence Of Casting Procedures On UCLA-Type Abutments

Malaguti. G.*, Grilli, L., Auricchio, G., Mordini, L.,
Bortolini, S., Consolo, U.
Modena and Reggio Emilia University
Specialistic Surgeries Head and Neck, Section Of Dentistry
Modena, Italy

Purpose: The purpose of this study was to assess the influence of casting procedures on the precision at the implant interface of gold-machined UCLA-type abutments with external hexagonal connection after the cast-on procedures, when compared with the same abutments before casting procedures and titanium machined abutments.

Methods & Materials: A previous study furnished a protocol for the dimensional assessment of implant-abutment connections, based on non-contact measurement. Five gold-machined UCLA-type abutments with external-hexagonal connection and five titanium machined abutments were produced. The UCLA abutments where studied before and after the casting of the calcinable part. The rotational freedom of all the abutments was assessed to detect the precision of fit of each abutment on the top of the implant platform. Measurements of rotational freedom were compared among groups. The data were statistical processed trough t-test.

Results: The as-received gold-premachined calcinable abutments were totally comparable to the completely machined ones. Yet, the measurements on premachined abutments showed a significant decrease of the hexagon dimensions caused by the casting process. Compared to the totally machined abutments the cast-on ones ensured lower rotational misfit, but they also presented the risk of assembly interference.

Conclusion: Abutments produced by different processes exhibited substantial variations that are not yet known and controlled, but must be considered to avoid clinical failures.

141
Table 69

Psychological And Clinical Evaluation Of Social Implant Dentistry: Study Protocol

Malaguti, G.*, Grilli, L., Manicardi, A., Mordini, L.,
Bortolini, S., Consolo, U.
Modena and Reggio Emilia University
Specialistic Surgeries Head and Neck Department, Department Of Dentistry
Modena, Italy

Purpose: The purpose is to describe a project developed in the Modena and Reggio Emilia University, with the help of an implant factory (Keystone Dental Inc.). This project will evaluate the psychological modifications induced by implant therapy into a group of patients unsatisfied by their previous conventional prosthetic rehabilitation, either fixed or removable.

Methods & Materials: A total number of 30 patients will be included in the study. The patients will be selected between the patients of the dental clinic of Modena Hospital. They will be selected to be wearers of removable prostheses, and unsatisfied because of poor prosthesis stability or retention. They will receive a free implant therapy to improve the retention of their prosthesis, to transform a total removable prosthesis into an implant overdenture, and a removable partial prosthesis into an implant retained removable partial prosthesis. The patients will than answer to a questionnaire

(derived from Oral Health Impact Profile questionnaire) before and 1, 3 and 6 months after the implant therapy.

Results: The answers to the questionnaire will be statistically compared, to show if the implant therapy increased the quality of life of the patients. Other investigations will be made to search differences among other variables such as age, period of edentulism, sex, number of implants and type of prosthesis. Their surviving and success rates of the implants used will be studied too, searching a correlation between the type of prosthesis (overdenture or removable partial prosthesis) and the implant behavior.

Conclusion: This study will guarantee a free implant therapy to patients unsatisfied by their prosthetic rehabilitation and without the economic possibility to access to a conventional implant therapy. The study will evaluate the surviving and success rates of the implants placed, and the influence of various variables on the psychological impact of the implant therapy in unsatisfied patients' wearer of removable prosthesis.

142
Table 70

Analysis Of Deciding Factors For Miniimplants Loading In Complete Overdenture Treatment

Marin, M.*, Preoteasa, E., Melescanu-Imre, M.
University of Medicine and Farmacy "Carol Davila"Bucharest
Department of Removable Prosthodontics
Bucharest, Romania

Purpose: The evaluation of local and general factors that influence the possibilities of miniimplants loading in complete overdenture treatment in order to obtain a long term outcome.

Methods & Materials: Clinical and paraclinical observations followed the evaluation of factors implied over the moment and modality of loading miniimplants in complete overdenture, on a number of 18 patients, between 52-72 years old, 10 female and 8 male. Clinical exemplifications of aspects related to prosthetic treatment, corelated to mini implants aplication, presenting the advantage of old or recent dentures, established to underline durring the clinical procedures the manner and timing of mini implants load. Progresive, late or imediat loading was proceeded, corelated to general factors (age, gender, general and nutritional status) and local factors (bone characteristics, torque values).

Results: The complete edentulness treatment using overdenture on miniimplants, might be a successful one, accessible to any prosthodontist or complete edentulous patient,as long as a correlation exists between the moment and implant loading modality and bone characteristics(quantitative and qualitative).The immediate loading using the existing denture(by positioning the metal housings into the denture base)has been performed especially in male patients cases on a torque force greater than 40Ncm,in mandibular jaw with D1 or D2 bone.The progressive implants loading had been used on a torque force between 35 and 40 Ncm in maxilar or mandibular jaw with D1,D2,D3 bone quality .Delayed implant loading was used specially in female cases in the maxillary jaw with torque lower than 35Ncm.For progressive or delayed loading instead of metal housings we used temporally resilient relining material .

Conclusion: The insertion of miniimplants must not disturb the other factors implicated in denture equilibrium and in return ,the denture must not disturb the implants osteointegration.The implants loading modality must depend on the existing denture,the bone characteristics(height,torque,density),sex factor and the jaw restored(maxilar or mandibular).Overdenture on miniimplants is a relative simple alternative of conventional denture, with characteristics and advantages related with the retention system and proper loading modality in correlation with bone type.

143
Table 71

Effects Of Sodium Hypochlorite On Titanium For Partial Removable Prostheses

Mordini, L., Franchi, M.*, Molinari, C.*, Bortolini, S.**, Grilli, L.*, Graziani, A***
***University of Ferrara, Italy**
****University of Modena and Reggio Emilia, Italy**
***Oral Medicine Department **Prosthodontics Department**
*** Ferrara, Italy ** Modena, Italy**

Purpose: Chlorine donors create a practice and effective chemical disinfection of prostheses preventing denture stomatitis phenomena. However, as demonstrated by our previous investigations, they determine corrosion, when used on partial removable prostheses (PRP) with metal components. The aim of this study is to assess the effects of the application of sodium hypochlorite on a titanium alloy (Tritan) used for the realization of PRP.

Methods & Materials: Cylindrical melted samples of 20 mm diameter and 1 mm thickness were polished on one side only, either with acid solution (A group = 20 samples) or with mechanical procedures (T group = 20 samples). 10 specimens for each group were submerged in medical sodium hypochlorite 1% solution (pure solution) and another 10 were submerged in 0.023% solution (dilution known for its bactericidal and bacteriostatic effects and recommended for the disinfection of babies' feeding-bottles and teats). The specimens were examined at 1st-2nd-5th day with the naked eye and by 1:1 photos and at 21th day also by optical metallographic microscope in reflected light.

Results: The results of the study show that, since the 1st day, only group A specimens, at both concentrations, present just superficial haloes caused by a mild oxidation. Neither a real corrosion nor great variations in colour are observed. Group T specimens have no alterations on their surfaces.

Conclusion: We can conclude that titanium PRP, well mechanically polished, doesn't present any contraindication to disinfection with chlorine donors, neither at pure concentration nor at 0.023% dilution.

144
Table 72

Experimental Evaluation On Ovd Retention With Implants' Different Angulations

Mordini L., Malaguti G.**, Auricchio G.**, Grilli L.**, Bortolini S.**, Bertuzzi G.***
****University of Modena and Reggio Emilia, Italy**
***Bologna University, Italy**
****Prosthodontics Department, *Diem Department**
****Modena, Italy, *Bologna, Italy**

Purpose: This in-vitro study investigated the retention of Overdenture spherical attachments when placed on dental implants tilted at different angulations. This analysis involved the use of computer science, CAD-CAM technology and D.O.E. for the realization of solid models to test.

Methods & Materials: 52 ball attachments were applied to the corresponding implant analogues and inserted in 26 Ergal testing models. The application of D.O.E. indicated the exact number of the two implant angular combination that would be statistically relevant for the aim of the study. Implant position has been digitally controlled in each model by software (CAD) and performed by a computer-guided drilling machine (CAM). 26 Overdenture simulators assumed by resin blocks were subjected to removal tests at a rate of 120 mm/second. The maximum dislodging force values were collected and subjected to statistical analyses.

Results: 20 dislodging force values are obtained from each test. The results showed a significant statistic relationship between the two implants' inclination and the retention of the prostheses. Fisher's (F) and p values attest a statystical validity of 99.9% and p= 10-6 respectively, compared to 95% and p=10-2 of current literature. Starting from the data obtained, 9 3D-atlases were extrapolated. These diagrams are meant to serve the clinician in implant placement decision programs.

Conclusion: The realization of 3D-atlases allows the clinician to decide in advance the best implant position on the basis of anatomic structures, needs of retention and wear of the attachments. Comparing the clinical case with the corresponding 3D-atlas the operator will be able to choose the correct implant position according to the treatment plan requirements. At the present time the effect of implant angulation on wear of ball and Teflon matrices is being analysed. Another factor will be included in the atlases to describe more precisely the behaviour and survival rate of Overdentures rehabilitations.

145
Table 73

Effects Of Occlusal Splint On The Emg Activities Of Masticatory Muscles In Patients With Temporomandibular Disorders

Moreno, I.*, Sanchez, T., Ardizone, I.,
Celemin, A, Aneiros, F.
Universidad Complutense, Prosthodontics
Madrid, Spain

Purpose: The use of stabilization splints is one of the most commonly accepted treatments in temporomandibular disorders (TMD). Electromyographic (EMG) study of masticatory muscle activities is a direct and useful method to evaluate the effects of occlusal splints both quantitatively and objectively.

Chandu et al. (2004) reported asymmetric activity in TMD patients. The use of a splint significantly decreased EMG activity at rest and increased bite force at clenching. Larger symmetry was found after the insertion of the stabilization splint for masseter and temporal muscle by Ferrario et al. (2002).

Abekura et al. (2008) reported a decrease in EMG values of masseter and temporal muscles following the insertion of an occlusal splint during sleep in subjects with a bruxism habit.

Scopel et al. (2005) reported that the occlusal appliance reduced the electrical activity of masseter and anterior temporalis muscles at rest position and equilibrated muscular activity between the right and left side.

The aim of this study is to assess the effect of occlusal splint BruxFit® during mandibular rest position and maximum voluntary clenching on EMG activity of masseter, temporal and digastric muscles in patients with TMD.

Methods & Materials: At rest, EMG activity was greater before the insertion of the occlusal splint for all the analysed muscles. The use of the occlusal splint reduced the activity significantly (p=0,05) in masseter, anterior temporal, posterior temporal muscles.

Clenching with the splint increased the EMG activity of anterior temporal muscle and significantly of masseter. On the other hand, digastric and posterior temporal muscle activity was reduced by the splint.

Results: Nevertheless, the splint made activity more equilibrated between right and left side in both tasks, and between anterior temporal and masseter muscles in maximum voluntary clenching.

Conclusion: The use of an occlusal splint significantly decreased EMG activity of masseter and temporal muscles at rest. In maximum effort clenching, occlusal splint increased the activity of masseter and anterior temporal muscles and decreased the EMG activity of digastric and posterior temporal muscles. Larger symmetry was found after the insertion of the occlusal splint.

146
Table 74

Influence Of Proper Fitting Of Dentures In Partial Denture Wearers On Brain Function: Relationship Of Correctly Fitted Dentures To Emotions And Brain Function

Morokuma, M.*, Yoneyama, Y., Hosoi, T., Shibuya, N.
Tsurumi University School of Dental Medicine
Department of Removable Prosthodontics
Yokohama, Japan

Purpose: Proper denture fitting is important to brain activity for denture wearers. However we have yet to understand the relationship between denture usage and emotions. This study was to examine the effects of denture wearing, comfort during chewing and the level of satisfaction with and without wearing dentures in partial denture wearers, on brain function.

Methods & Materials: Subjects were 20 partial denture wearers (aged 54-82, Mean 67.6) that visited Tsurumi University Dental Hospital Removable Prosthodontics Department for monthly denture maintenance. For the subjective assessment of denture usage, Visual Analog Scale (VAS) was used to evaluate comfort during chewing and the level of satisfaction with mastication by all patients. Electroencephalograms taken for 3 minutes after gum chewing (Xylitol Dental support chewing gum, Lotte, Japan) with and without dentures were analyzed by Diagnosis Method of Neuronal Dysfunction for brain function assessment. The statistical analysis was performed using Wilcoxon's test and Spearman's rank-correlation coefficient.

Results: Comfort during chewing denture wearers and the level of satisfaction increased significantly in denture wearers compared to non denture wearers ($p<0.05$). Seventeen subjects ($n=20$) showed an increase in brain function activity ($p<0.05$). This result showed proper denture wearing is relevant to good mastication and a high level of satisfaction. Correlations were not found between brain function and comfort during chewing with denture wearers (correlation coefficient: 0.20, $p>0.05$). The same could be said regarding the level of satisfaction's correlation to brain fuction (correlation coefficient: 0.13, $p>0.05$).

Conclusion: In conclusion, mastication was improved by properly fitted dentures, followed by the activation of brain function after chewing. However, Comfort during chewing and bite satisfaction did not influence brain function.

147
Table 75

Clinically Relevant Anatomy In Removable Prosthodontics

Muntianu, L.A. *, Mugurel Constantin Rus,
Cristian Andrei Comes Sorin Penta
University of Medicine and Pharmacy Carol Davila Bucharest
Faculty of Dental Medicine and Faculty of General Medicine
Removable Prosthodontics, Department of Anathomy And Embriology
Department of Diagnostic, Ergonomy and Scientific Research Methodolgy
Bucharest, Romania

Purpose: The present study aimed to evaluate based upon original evidences the anatomical conditions that could alter the prosthetic medical act during removable complete denture fabrication.

Methods & Materials: Anatomically relevant structures (oral cavity related, hard and soft tissues) were investigated in clinical samples and anatomically in cadavers. The clinical analyses were performed in an aged lot (AL) and a young lot (YL) of 300, respectively 250 patients while the anatomical studies were performed in 12 adult cadavers, fixed and

unfixed. The institutional acting ethical rules were respected. The clinical studies were performed on casts, using appropriate scoring systems.

Results: 52.58%CAL, 40.23%PAL edentulous from AL (partial edentate aged lot =PAL, complete edentate aged lot=CAL) vs 49% young patients had palatine tori. OR>2 for feminine gender related to TP presence. 33.4% of the aged group vs.31.5% young patients had mandibular tori. As reffered to the Atwood classification we found Cls I=0 ClsII=42(16.7%), ClsIII=20(7.96%), ClsIV=81(32.27%), ClsV=74(29.48%), ClsVI=34(13.54%). He scoring for the maxillary tuberosities was higher for those medium (29.8%) and large retentive (27.09%). The fibrous piriform tubercles were most frequently encountered (27.49%). We found and present here several rre but clinically relevant morphologies, such as: (1) the postero-superior frenum of the buccinators muscle (1.8%) and the submucous extramandibular course of the inferior alveolar, mental and incisive nerve (0.2%). The anatomical structures thet were recorded in patients were also anatomically documented in cadavers.

Conclusion: The main relevant anatomical structures of the oral cavity in removable prosthodontics appeared to us to be the following: the edentulous ridge as volume and shape, the maxillary tuberosities as volume and consistency, piriform tubercles as consistency, volume and orientation, the presence and number of frenula and the presence of tori as volume and localisation. Nevertheless there are rare conditions that practitioners must be aware of, such as suplimentary frenula as the postero-superior frenum of the buccinators muscle, or the presence of the mental nerve underneath the mucosa of the alveolar ridge and negative ridge.

148
Table 76

Effect Of Plasma Glow Discharge On The Surface Properties Of Titanium

Muraji, N.[1], Iwata, T.[1,2], Kawai, T.[2], Asami, K.[1], Nakamura, Y.[1], Tanaka, Y.[1]
Aichi-Gakuin University
Department of Removable Prosthodontics[1]
Department of Dental Materials Science[2]
Nagoya, Aichi, Japan

Purpose: Last 3 decades implantology was recognized predictable treatment modality in replace missing teeth. The key to success of implant should be to establish “osseointegration”. The surface properties of titanium may have some influence on osseointegration of implant. The objective of this study was to investigate the effect of plasma glow discharge on improving the surface properties of titanium.

Methods & Materials: Divide to two groups of data, one for experimental group and the other for control group, were measured in this study. Each group consisted of titanium columnar shaped ingot of pure titanium (n=5), which had 30 mm in diameter and 9 mm of height and 30 g respectively. Each sample was polished with abrasive paper #1200 and buff-polished. Experimental group was treated using plasma glow discharge system (PICOTRON) for 5 minutes. The surface properties of titanium were analyzed by the contact angle measurements using of deionized water (Milli-Q) and the observation of surface structure using scanning electron microscopy and X-ray analyzer.

Results: Contact angles of experimental group were about 15.9 degree, and the control groups were about 77.1 degree. There were significant difference between experimental and control group. The clear difference was not recognized in the observation of scanning electron microscopy.

Conclusion: The wetting ability of deionized water on the surface of pure titanium was increased using the plasma glow charge system. This study suggested the plasma glow discharge could improve wetting ability and eliminate impurity on the surface of titanium.

149
Table 77

Development Of An Antibacterial Tissue Conditioner With A Micro-Biologically Derived Component

Naito, Y.*, Li, J., Hamada, K., Tomotake, Y.
Kan Nagao, Tetsuo Ichikawa
University of Tokushima, Institute of Health Biosciences
Department of Oral and Maxillofacial Prothodontics and Oral Implantology
Tokushima City, Japan

Purpose: Tissue conditioners are materials used to promote healing of the damaged tissue that supports denture structures. However, many microorganisms such as Candida albicans are known to thrive on the surface of degraded tissue conditioners, and these often induce oral stomatitis and systemic diseases, aspiration pneumonia in compromised elderly people. Some researchers have attempted to synthesize antibacterial dental materials by using metals such as copper or silver, but these metals were found to sometimes induce metal allergy. In this study, we synthesized a new antibacterial tissue conditioner by using Juncus, and subsequently carried out a microbiological and mechanical evaluation.

Methods & Materials: Juncus powder (Inada, Yatsushiro, Japan) was mixed at the concentration of 0, 2.5, 5, or 10 wt% with tissue conditioner powder (GC, Tokyo, Japan). The dimensions of the cylindrical specimens created for mechanical tests were 10 mm × 6 mm (diameter × height), while those for the disc-type specimens used for anti-microbiological tests were 10 mm × 2 mm. The anti-microbiological property of these Juncus-mixed tissue conditioners was examined as follows: The conditioners were placed on the bottom of a 24-well tissue culture plate containing liquid medium, and Candida albicans (CAD1) were cultured for 2 or 4 days in this plate. The optical densities (OD) of the bacterial culture were determined. The surface morphology of the mixtures was observed by scanning electron microscopy (SEM). To evaluate the mechanical property of the mixtures, the changes in the flow and hardness of the mixture after mixing were evaluated according to the methods certified by ISO 10139-1. All results were analyzed using one-way ANOVA and a multiple comparison test.

Results: All mixtures tested after incubation showed significant anti-microbiological activity that was concentration-dependent. The SEM observation showed that the number of C.albicans on the mixtures had drastically decreased. The mechanical properties were found to be within the regulated ranges specified by ISO 10139-1.

Conclusion: Thus, the tissue conditioners prepared using the Juncus powder has anti-microbiological properties, and its use could prevent denture stomatitis and aspiration in elderly people.

150
Table 78

Stress Analysis Of Removable Partial Dentures With Magnetic Attachments

Nakamura, Y.*, Nakamura, H., Asami, K., Kanbara, R., Kogiso, T., Muraji, N., Tanaka, S., Tanaka, Y.
Aichi-Gakuin University
Department of Removable Prosthodontics
Nagoya, Japan

Purpose: Advances in technology have resulted in improved magnets for dental applications. These improvements have increased the potential for the use of magnets as retaining elements for prostheses. The purpose of this study was to photoelastically compare the forces exerted on the supporting structures by bilateral distal extension removable partial denture designs employing magnetic attachments.

Methods & Materials: A composite photoelastic model was made of a mandible bilaterally edentulous distal to the second premolars. Individual simulant materials were used for tooth structure, periodontal ligament, and alveolar bone. The teeth, roots, and tissue contours of the model were of average size and shape. Three partial dentures incorporating magnetic attachments (MAGFIT, Aichi Steel Corp.; Japan) were fabricated.with retaining keepers in different positions: a) radicular overdenture coping keeper, b) telescopic crown with internal retaining keeper, c) full crown with distal extracoronal keeper. One direct retainer design (RPI) also was made for comparison. Simulated occlusal loads were applied to the dentures The stresses which developed in the supporting structures were photographed in the field of a circular polariscope.

Results: For all load conditions, the RPI extracoronal clasp design demonstrated the most uniform stresses about the supporting abutment tooth. Of the magnetic designs, the overdenture radicular-type coping keeper design generated the most uniform stresses, and was similar to the RPI. The telescopic crown with internal retaining keeper and the full crown with distal extracoronal keeper produced higher stress with a tendency towards distal rotation of the abutment tooth.

Conclusion: While the RPI extracoronal clasp design tended to transfer applied loads most equitably, the characteristics of the radicular overdenture coping keeper design were similar. Use of this magnetic attachment may be considered when esthetic considerations are paramount.

151
Table 79

Implant Survival Rate In Combination With Cancellous Bone Block-Allograft In The Atrophic Anterior Maxilla

Joseph Nissan, J.*, Mardinger, O., Chaushu, G.
The Maurice and Gabriela Goldschleger School of Dental Medicine
Tel Aviv University
Tel Aviv, Israel
Departments of Oral Rehabilitation, Oral and Maxillofacial Surgery
Tel-Aviv, Israel

Purpose: Evaluate the outcome of dental implants placed in the anterior atrophic maxilla following ridge augmentation with cancellous freeze-dried block bone allografts.

Methods & Materials: 34 consecutive patients were included in the study. A bony deficiency of at least 3 mm horizontally and up to 3 mm vertically according to computerized tomography (CT) served as inclusion criteria. 63 implants were inserted after a healing period of 6 months. 19/63 implants were immediately restored. Bone measurements were taken prior to bone augmentation, during implant placement and at 2nd stage surgery.

Results: 46 cancellous allogeneic bone-blocks were used. The mean follow- up was 34±16 months. Mean bone gain was 5 ± 0.5 mm horizontally and 2 ± 0.5 mm vertically. Mean buccal bone resorption was 0.5 ± 0.5 mm at implant placement and 0.2 ± 0.2 mm at 2nd stage surgery. Mean bone thickness buccal to the implant neck was 2.5 ± 0.5 mm at implant placement and 2.3 ± 0.2 mm at 2nd stage surgery. There was no evidence of vertical bone loss between implant placement and 2nd stage surgery. Block and implant survival rates were 95.6% and 98% respectively. All patients received a fixed implant-supported prosthesis.

Conclusion: Cancellous block-allografts appear to hold promises for grafting the anterior atrophic maxilla to achieve a stable, long-term esthetic final result with minimum morbidity.

152
Table 80

Trayless Impression For Implant Prosthesis To Prevent Patient'S Vomiting Reflex

Ohkubo, C.*, Shimpo, H., Hanatani S., Kurihara, D., Kokubo, Y., Miyama, Y.
Tsurumi University School of Dental Medicine
Department of Removable Prosthodontics
Yokohama, Japan

Purpose: For implant prostheses, definitive impressions have generally been made with the system's impression coping and an individual or stock tray. However, conventional trays cannot be used for patients who have a severe vomiting reflex. This presentation will introduce a definitive impression technique for implant prostheses without the use of a tray.

Methods & Materials: The clinical procedures were the following: 1) The system's impression copings were conventionally fixed with a screw, and autopolymerized resin was applied using the brush-on technique to connect them on one-third of the occlusal surface of the adjacent teeth; 2) The first impression for the residual ridge was made with silicone impression material; 3) After the impression was removed, silicone maxillomandibular registration material was injected and applied to the occlusal surface of the entire quadrant, and the patient was guided so that the mandible would move into the centric occlusion position; 4) A second wash impression was taken, and the patient closed centric occlusion again. The laboratory procedures were as follows: 1) The plaster was poured, and the cast was pinned using the conventional double-arch tray technique; 2) The casts were mounted on the plane line articulator; 3) Implant replicas were embedded into the cast using the first impression with copings; 4) The implant prosthesis was conventionally fabricated on the cast.

Results: It was possible to make a trayless impression for implant prostheses for patients with a severe vomiting reflex. The relationship of the position of the implants was maintained correctly because each replica was firmly connected with autopolymerized resin even if a tray was not used. This procedure was performed without intravenous sedation because the partial impression was small.

Conclusion: Because centric occlusion can be reproduced on the articulator using this technique, the time required for occlusal adjustment is reduced. It was possible to fabricate an accurate prosthesis by recording the eccentric occlusal position using the FGP technique when the framework was tried-in. However, the limitation of this technique is that the bounded missing and centric occlusion would be determined by the remaining teeth.

153
Table 81

Clinical Application Of The Extracoronal Magnetic Attachment

Okada, M.*, [1] Nakamura, Y., [1] Asami, K., [1] Kanbara, R., [1] Ohno, Y., Ito, F., [1] Tanaka, S., [1] Tanaka, Y.
Aichi–Gakuin University Dental Hospital
[1] Aichi-Gakuin University
Department of Dental Laboratory
[1] Department of Removable Prosthodontics
Nagoya, Japan

Purpose: Magnetic attachments have become a popular prosthetic means. And more than 1,200,000 pieces of them have been clinically used in Japan. The magnetic attachment is mainly applied to a non-vital abutment as a stud attachment. We have recently developed a new specific accessory to extend its clinical indication as an extracoronal attachment to a vital tooth. To fabricate an extracoronal magnetic attachment, a specific table has to be designed to hold a keeper at the defected side of an abutment. On the other hand, a magnetic assembly is set in the denture base to

meet the keeper. A metal housing is generally necessary for this portion to make sure mechanical strength. From our clinical experiences, making this kind of wax pattern is frankly rather complicated and time-consuming.

Methods & Materials: A set of ready-made plastic patterns which simplify laboratory works to make the wax pattern for the male and female part of the extracoronal attachment, was developed. One is L-shaped pattern with keeper tray. It is fixed to the distal site of wax crown for the abutment. After casting and polishing the keeper portion, anther cap-shaped plastic pattern is put on it and is completed as housing pattern for the magnetic assembly with certain minor connector with wax added following its casting. The keeper and a magnetic assembly are finally set in each metal housing of completed denture with resin cement.

Results:

Conclusion: This new specially designed accessory is confirmed to be very useful to make any type of removable partial dentures with magnetic attachments. Of couse we can make a magnetic denture by using a stud-type together with an exteacoronal-type according to the clinical condition of each abutment.

154
Table 82

The Relationship Between Matrix Movements And Retentive Force In Ball Attachments

Okamoto, K. *[1], Hsu,Y. [2] , Fujisawa, M. [1]
[1] Meikai University School of Dentistry
[2] The University of Alabama at Birminghum, School of Dentistry
[1] Division of Fixed Prosthodontics
Department of Restorative & Biomaterials Sciences
[2] Department of Prosthodontics
Sakado, Saitama Japan

Purpose: Ball attachments with implant-supported overdentures have been used successfully in edentulous patients. However, loss of retentive force has been reported as a long-term prosthetic complication, when compared with other types of attachment. This study evaluates the relationship between matrix movements and retentive force in ball attachments.

Methods & Materials: Two parallel implant analogs with a distance of 5 mm from the mesial proximal surfaces were placed into a master edentulous mandibular cast. Ten duplicated casts were fabricated with silicone material on the ridge area, and 10 record bases were fabricated with heat polymerizing acrylic resin. Patrix attachments (Ball attachment, NobelBiocare, Sweden) were placed on both implant analogs. The lamellae retention inserts were tightened to the tightest position in the metal housing and were placed on the patrices. The matrices were then released two-quarter turns after being transferred to the record base. The lamellae retention insert was color-coded on one wing and the record base adjacent to the coded wing was marked. The record bases were removed and inserted manually. The angles of the lamellae retention inserts were measured with a digital microscope and the retentive force of the ball attachment was measured on an Instron machine every 100 insertions from 0 to 500 and subsequently after every 500 insertions up to 5000. One-way ANOVA was used to describe the movements of the lamellae retention inserts and the retention force individually.

Results: The angle of the lamellae retention inserts became looser with an increase in insertion frequency. However, the retentive force was similar to initial retentive force even as insertion frequency increased.

Conclusion: In this study, matrix movement had little effect on retentive force. This may depend on the structure of the ball attachments between the matrices and patrices. Therefore, the position of lamellae retention inserts should be evaluated during maintenance to ensure appropriate retention of ball attachments when using implant-supported overdentures.

155
Table 83

Occlusion Of Prostheses Supported By An Implant For A Single Intermediate Missing Posterior Tooth

Okuyama, T.*, Ozawa, K., Sato, Y., Kitagawa, N., Uchida, K.
Showa University
Geriatric Dentistry
Tokyo, Japan

Purpose: Slight disharmony of occlusion in implant prostheses may cause many problems because those have not a periodontal membrane and nerve system as a stress breaker. However, regarding the optimum occlusal contacts of implant prostheses, there are still many unclear points. The purpose of this study was to investigate variations of changes in occlusal load according to clenching strength of implant prostheses and to establish adequate occlusion.

Methods & Materials: The subjects consisted of 22 patients (60±27 years old) with an implant for a single intermediate missing posterior tooth with satisfactory prognosis for more than two years. Electromyograms at maximum clenching at the intercuspal position were recorded as 100 %MVC. Subsequently, clenching at 20, 40, 60, and 80 %MVC was instructed with visual feedback. Occlusal load was recorded with pressure-sensitive sheets. Occlusal contacts were recorded with a silicon occlusal contact checking material. The changes in occlusal load according to clenching strength for the implant and each adjacent tooth were examined.

Results: The subjects were classified into 3 groups: WC group, occlusal load on implant was recorded from weak (20% MVC) clenching; MC group, from moderate (40% MVC) clenching; and SC group, from strong (80% MVC) clenching. At maximum clenching, average loads on implants were 135.0 N (WC), 100.7 N (MC), 48.0 N (SC), respectively.

Conclusion: The results showed that the WC group did not have any occlusal gap, the NC group had a small occlusal gap, and the SC group had a large occlusal gap. Clinically, there were many kinds of occlusal circumstances between the implants and the natural teeth with satisfactory prognosis. These results suggest that a stress-absorbing gap may not be necessary in an implant for a single intermediate missing posterior tooth. However, a long-term study is needed to determine the functional aspects.

156
Table 84

Measurement Of Restorative Margins In Situ

Owen, C.P., Harilal, B.***
***University of Pretoria and **University of The Witwatersrand**
***Department of Prosthodontics and **Department of Prosthodontics**
***Pretoria, South Africa **Johannesburg, South Africa**

Purpose: The clinical implications of a marginal gap between a restoration and a tooth have been well documented. Radiographic evaluation or visual examination with a mirror and probe are not reliable methods for assessing these margins. This study set out to investigate the possibility of calibrating CAD/CAM capturing devices and their associated software to measure restoration margins in situ.

Methods & Materials: Three implant abutment models were manufactured (Southern Implants, Irene, South Africa). Five dimensions of each model were first measured using three measuring devices: a measuring microscope (Vision Perigrine Mono Dynascope), a photomicrograph (Aigo ge5), and a profilometer (Baty, 20x magnification). The models were then scanned using the CEREC® (Sirona Dental Systems GmbH), and the E4D Dentist CAD/CAM restorative system (D4D Technologies, Texas USA). All measurements were made to the closest micron and all measurements compared.

The CEREC® (Sirona Dental Systems GmbH) acquisition unit was then used to capture intra-oral images of crown

margins to see if manipulation of the software would allow for measurement of the dimensions of the gap between the natural tooth margin and crown. The E4D system was not used because the software could not be manipulated to measure the marginal gap.

Results: The accuracy of the acquisition units was confirmed when compared with the measuring devices. However, it was not possible to consistently identify the restorative and tooth margins in situ because of the need for the use of powder, which obscured the tooth/restoration margin.

Conclusion: Although the calibration of the measuring software of both systems was confirmed, the Cerec acquisition unit could not be considered reliable in situ, because the powder necessary for image acquisition obscured the tooth/restorative margin.

157
Table 85

Guidelines For The Use Of Wrought Wire Clasps For Removable Partial Dentures

Owen, C.P., Naidoo, L.M.
University of The Witwatersrand
Department of Prosthodontics
Johannesburg, South Africa

Purpose: Removable partial dentures (RPDs) remain a valid treatment modality for those patients who are unable to afford alternative more expensive options. In particular, acrylic-based RPDs may be the only option and often require clasps for retention, made of wrought wires. Contemporary dental literature addresses the behaviour of wrought round wires superficially. However, these have not been translated to simple and effective clinical guidelines on the selection of clasps for RPDs, other than empiric ones. The purpose of this study was to evaluate the effects of diameter, alloy and clasp length on the behaviour of different wrought wires.

Methods & Materials: Three stainless steel wrought wires were tested: (Remanium and Noninium (nickel free) (Dentaurum, Pforzheim, Germany) and Leowire (Leoni, Fiorentino, Italy) as well as two Type IV wrought gold wires: Degulor (Degudent, Hanau, Germany) and Argen (Argen Corp., San Diego, USA). Three diameters of each type of stainless steel wire (0.8mm, 0.9mm, 1.0mm) and two diameters of the gold alloy wires (0.9mm, 1.0mm) were used. Ten samples of each diameter for the different stainless steel wires were bent to two lengths (12mm and 20mm) using a specialised device to represent the average buccal curvature of premolars and molars respectively. The gold wires were bent to 12mm, as gold wires are infrequently used in clinical practice on molar teeth. All the clasps were embedded in identical self-cured acrylic resin blocks, measuring 38mm x 25mm x 6mm. Each clasp was bent beyond its proportional limit in a tensile testing machine, and the force exerted at different deflections was recorded. The deflections were chosen to represent the clinically encountered undercuts of 0.25mm, 0.5mm, and 0.75mm.

Results: All wires except the 0.8mm diameter stainless steel wires behaved consistently and all were within their proportional limits for the deflections measured

Conclusion: Depending on the clinical situation, the retentive force required per denture is assumed to be in the region of 750 – 1000g (Bates 1966, Frank and Nicholls 1981). The data from this study revealed a range of forces per clasp that will for the first time provide clinical guidelines for the appropriate selection of wrought wire clasps

158
Table 86

The Effect Of Rhpmp-2 Coating Onto Anodized Implants On Osseointegration In Rabbit

Park, CK.*, Shim, JS., Kim, SJ., IHan, IH.,
Ryu, JJ, Shin, SW.
Korea University, Institute For Clinical Dental Research
Department of Prosthodontics
Seoul, Korea

Purpose: The aim of the present study was to evaluate the effect of rhBMP-2 onto anodized implants on the quality of osseointegration.

Methods & Materials: Nine adult New Zealand white rabbits of both sexes, weighing 4-5kg, were used in the study. Fifty-four implants 5.3mm long and 4.0 mm in diameter were divided into anodized implants(Group A) and rhBMP-2 coated anodized implants(Group B). Two implants were inserted through one cortical later in the tibia and one implant was inserted in femur for each rabbit. The stability of implants was evaluated by the resonance frequency analysis (RFA) and ISQ values were obtained. The animals were sacrificed at the end of the healing period (2, 4, 12 weeks) and ISQ values were measured. A torque meter (15BTG, Tohnichi, Japan) was connected to implants on femur, and assessed the peak torque (N cm). The students' T-test was undertaken for statistical analysis ($p<0.05$).

Results: The overgrowth of bone over the coverscrew was observed at Group B (BMP coated anodized implants). The ISQ value of group B (BMP coated anodized implants) was greater than that of Group A (anodized implants) in 12 weeks ($p<0.05$) while the ISQ values in 2 weeks and 4 weeks were not significant

Conclusion: BMP coating to anodized implant may increase the degree of osseointegration.

159
Table 87

A Retrospective Study On The 15-Year Treatment Outcome Of Nobelbiocare Implants

Park, HJ[1]*, Choi, YG[3], Kim, YS[2], Heo, JB, Shin, SW[1]
Korea University, Divisions of Prosthodontics[1] and Prevention[2]
Institute For Clinical Dental Research, Korea University and Eb Dental Clinic[3]
Seoul, Korea

Purpose: This study was aimed to evaluate cumulative survival rate (CSR) of machined and TiUnite implants for 15 and 5 years respectively and to determine risk factors of implant failure.

Methods & Materials: A total of 541 machined and TiUnite implants were placed consecutively in 156 patients at the Korea University Guro Hospital. 264 machined implants were placed in 79 patients since 1993 and 277 TiUnite implants were placed in 77 patients since 2001. Kaplan-Meier estimate of implant survival was undertaken to examine CSR. Multiple Cox proportional hazards regression was used to assess the influence of potential risk factors on implant survival after adjusting for confounders. The level of statistical significance was set as? =0.05.

Results: Thirty-seven implants (34 in machined implants; 3 in TiUnite implants) out of 541 implants failed (15-year CSR: 86.07%). The 15-year and 5-year CSR of machined implant were 82.89% and 89.21% respectively. The 5-year CSR of TiUnite implants was 98.74%. Machined implants were almost 4.6 times more likely to experience implant failure than

TiUnite implants (95%CI: 2.7, 9.5) for the 5-year CSR. Patients having systemic disease were 32% more likely to experience implant failure than patients without systemic disease (95%CI: 0.50, 0.97). Patients with other surgical procedures such as bone graft and maxillary sinus graft were 40% more likely to experience implant failure than patients without similar surgical procedures (95%CI: 0.43, 0.87). There was statistically significant difference of implant failure among anatomic location of implants (p-value=0.0006) and the kind of edentulous sites by Kennedy classification (p-value=0.0001).

Conclusion: TiUnite implants survived longer than machined implants for the 5 years. Presence of systemic disease and combination of other surgical procedures increased implant failure. Implant survival was dependent upon the anatomic location of implants and the kind of edentulous sites by Kennedy classification.

160
Table 88

Sintering Behavior And Mechanical Properties Of Zirconia Compacts For Dental Applications

Park, SW*, Oh, SJ, Vang, MS, Yang, HS, Lim, HP
Chonnam National University, School of Dentistry
Department of Prosthodontics
Gwangju, South Korea

Purpose: The purpose of this study was to compare the sintering behavior (including the linear sintering shrinkage) of presintered zirconia blocks of various densities. The mechanical properties of the resulting sintered zirconia blocks were then analyzed.

Methods & Materials: Three groups of dental zirconia blocks, each having a different density, were designed in the present study. Kavo Everest® ZS blanks (Kavo, Biberach, Germany) were used as a control group. The experimental group blocks were fabricated from commercial yttria-stabilized tetragonal zirconia powder (KZ-3YF (SD) Type A, KCM. Corporation, Japan). The biaxial flexural strengths, microhardnesses, and microstructures of the sintered blocks were then investigated. The linear sintering shrinkages of the various blocks were calculated and compared.

Results: It was found that, despite their different presintered densities, the sintered blocks of the control and experimental groups showed very similar mechanical properties. However, their linear sintering shrinkage behavior was found to depend on their densities prior to sintering. The extent of the linear sintering shrinkage was found to vary between different regions of each experimental block. By contrast, uniform sintering shrinkage was observed throughout each control block.

Conclusion: In this study, there was no significant different between the newly manufactured block and Kavo Everest ZS blank® in mechanical properties. But there was a difference in the sintering shrinkage rate depending on the density of the presintered block. And the sintering shrinkage rates were different from each other depending on the areas of presintered block. Therefore, further studies are needed on an equal sintering shrinkage rate on areas within a presintered block.

161
Table 89

Heat Transmission Along A Dental Implant

Patel, Z.*, Geerts, G.
University of The Western Cape
Prosthodontics
Cape Town, Western Cape, South Africa

Purpose: This in vitro study aims (i) to establish if the temperature of an abutment influences the temperature of the implant surface, (ii) to establish the temperature transient from abutment to implant body, and (iii) to establish for what abutment temperature the critical time/temperature threshold of 47ºC for 1 minute at implant level is reached.

Methods & Materials: Eight K-type thermocouples were attached to an abutment/implant configuration, mounted in a thermostatically controlled environment. The model consisted of 2 chambers separated by a film. The upper chamber represented the oral cavity with the abutment, which was exposed to 30ml of hot water. The temperature at each thermocouple along the abutment/implant configuration was logged every 3rd second over a period of 10 minutes using appropriate software. The test was repeated 200 times using a range of water temperatures. A logistic regression model was used for the statistical analysis of the time/temperature databases and the estimation of the 'effective dose 50' (ED50) for the abutment (95% confidence interval).

Results: For an abutment temperature range of 52.80ºC - 71.72ºC a temperature range of 43.03ºC – 53.00ºC was measured at implant level. There was a positive correlation between the temperatures of the implant and its abutment, albeit with a time-delay. The longest delay in reaching 47ºC for 1 minute at implant level was 216 seconds for a temperature of 62.74ºC. The shortest observed time to reach 47°C for 1 minute at implant level was 63 seconds for a temperature of 70.72ºC. The ED50 was estimated at 62.3ºC. This means that for an abutment temperature of 62.3ºC there is a 50% chance that 47ºC for 1 minute at implant level is reached.

Conclusion: This in vitro study supports the hypothesis that abutment temperature is transmitted to an implant. Results of in vitro studies should be interpreted with caution. However, clinicians should be aware of temperature changes along implants and the potential risk associated with it.

162
Table 90

1-Year Longitudinal Study Of Quality Of Life Outcomes In Patients With Different Prosthodontic Therapies

Petricevic N.*, Celebic, A., Rener-Sitar K.
School of Dental Medicine, University of Zagreb
Department of Prosthodontics
Zagreb, Croatia

Purpose: Oral health related quality of life (OHRQoL) is affected by oral status and degree of prosthodontic rehabilitation. The aim was to evaluate changes of the OHRQoL after different prosthodontic therapies.

Methods & Materials: The OHIP49-CRO questionnaire was completed by 228 patients before prosthodontic treatment and one year after rehabilitation with either fixed partial dentures (FPD), or removable partial dentures (RPD), combination of removable partial and complete dentures (CRPCD), complete dentures (CD) and mandibular overdentures on implants (CDI). Another group of 130 healthy subjects from general population was randomly collected as a control group.

Results: Patients who asked for prosthodontic treatment had significantly higher OHIP scores than the control group

(p<0.01). There was no significant difference between gender in the control group (p>0.05), while in the group of patients asking prosthodontic treatment women had significantly higher OHIP scores than men (p<0.05). After treatment the level of satisfaction was equal between gender (p>0.05). Any type of prosthodontic rehabilitation significantly improved OHRQoL (p<0.01). The highest improvement of OHRQoL (the largest treatment effect) was registered in patients who replaced FPDs with CDs, followed by the patients who replaced CDs with CDIs. The lowest improvement of OHRQoL was observed in patients who substituted FDPs with RPDs. Yet, the lowest OHRQoL after the therapy remained in patients who replaced FDPs with CDs.

Conclusion: In patients asking for prosthodontic therapy any type of rehabilitation significantly improved OHRQoL. Women had worse OHRQoL prior therapy than men, and after the therapy the OHRQoL was equal between gender. The treatment effect was dependent upon the type of rehabilitation.

163
Table 91

Antimicrobial Efficacy Of Denture Adhesives

Polyzois, G.*, Papaparaskevas, J., Stefaniotis, TH, Donta, A.
Medical School and Dental School, University of Athens
Department of Microbiology, Department of Oral Diagnosis and Radiology
Department of Prosthodontics
Athens, Greece

Purpose: Denture adhesives have historically been used as a means of improving denture retention and stability. Recently however it has been shown that denture adhesives may also provide an antimicrobial benefit. This study was designed to determine the antimicrobial efficacy of three denture adhesives toward Streptococcus oralis, Prevotella oralis, Streptococcus mutans and Fusobacterium nucleatum. These microbes were selected as directly or indirectly related to denture malodor.

Methods & Materials: In this study three denture adhesives and one control were used to determine their efficacy on four microbes such as Streptococcus oralis, Prevotella oralis, Streptococcus mutans and Fusobacterium nucleatum. The denture adhesives used were Corega Ultra (GSK), Fixodent Pro Original (Procter & Gamble) and Biotene Denture Grip (Laclede Inc). For Streptococcus oralis and Streptococcus mutans , four tubes of Tripticase Soy Broth 10ml and 1g denture adhesive were used while as a control four tubes of Tripticase Soy Broth 10ml without denture adhesive in each case. As far as Prevotella oralis and Fusobacterium nucleatum concerned, four tubes Thioglycolate 10ml and 1g denture adhesive were used for each one while as control for each case four tubes Thioglycolate 10ml without denture adhesive. All samples were incubated for 48 hours at 37oC. After 48 hours, the number of colonies was counted and the mean was extracted as cfu/mL. The results were treated with 1way-ANOVA on ranked data and Tukey's post hoc test at a= 0.05 .

Results: The Streptococcus oralis, for each denture adhesive showed a decreased number of colonies compared to the control. More specifically, Corega Ultra by 2 log, Fixodent Pro Original by 1 log and Biotene Denture Grip by 2,5 log. Also Prevotella oralis, for each denture adhesive revealed a decreased number of colonies compared to the control and more specifically, Corega Ultra by 3 log, Fixodent Pro Original by 2 log and Biotene Denture Grip by 3 log. Streptococcus mutans and fusobacterium nucleatum showed reduced colonies compared to the control such as Corega Ultra by 2 log, Fixodent Pro Original by 1 log , Biotene Denture Grip by 2 log and Corega Ultra by 3 log, Fixodent Pro Original by 2,5 log , Biotene Denture Grip by 3,5 log respectively.

Conclusion: The Fixodent Pro Original showed less antimicrobial efficacy than the other two adhesives for all tested microbes, while Corega Ultra and Biotene Denture Grip were more effective depending on tested microbe.

164
Table 92

Treatment Modalities For The Replacement Of A Maxillary Incisor

Potthoff, I.
Institute For Continuing Professional Development
Karlsruhe, Germany

Purpose: The replacement of an untreatable traumatized maxillary Incisor is a challenging task due to high aesthetic demands in this area. An individual treatment plan requires the consideration of numerous factors. No matter if a bridge or an implant is chosen, tooth colour, preparation geometry and margin location are as important as maintaining a maximum amount of oral tissue for satisfying final gingival aesthetics. The decision making process for all treatment modalities involves both the surgeon and the prosthodontist. A clinical case of a 55 year old male patient with tooth extraction of the first upper right incisor due to internal resorption will be presented. The main factors and requirements for an immediate implant will be discussed to show in which cases prompt management can significantly improve treatment outcome.

Methods & Materials: Case Study treatment with an immediate implant.

Results:

Conclusion: Treatment duration and outcome can be positively influenced by using immediate implants on selected patients.

165
Table 93

The Conservative Treatment Of Localised Tooth Surface Loss Using Adhesive Technology And A Dynamic Approach To Occlusion

Preiskel, Alon
25 Upper Wimpole St
Prosthodontics
London, United Kingdom

Purpose: This case illustrates the use of adhesive technology allied with an understanding of dynamic occlusion in the conservative treatment of tooth surface loss (TSL). A 24 year old female patient suffering from severe TSL resulting from bulimia was treated in this manner.

Methods & Materials: The patient complained of poor appearance of her teeth together with sensitivity of her anterior teeth affecting her eating. Gastric acid from the severe bulimia was felt to be the cause of severe TSL of the upper incisors. This was under control at time of dental treatment. There was moderate TSL of the upper canines and first premolars but mild TSL elsewhere. Restoring the aesthetics of the anterior teeth required additional vertical space but the posterior teeth required minimal intervention. It was hoped that the anterior restorations would also reduce sensitivity.

Results: A Dahl concept was utilised to create localised space for adhesive restorations anteriorly without restoring the posterior teeth.

A diagnostic wax up was fabricated to assess the amount of restoration required to provide aesthetic upper incisors. Composite resin guided by a silicone putty matrix of the diagnostic wax up was used to build up the upper incisors directly in the mouth. The palatal and occlusal surfaces of the upper canines and premolars were covered with gold

backings to reduce sensitivity and protect the exposed dentine. The diagnostic wax up was also used to guide the fabrication of the gold backings which were cemented with a resin bonding system. The anterior composites were placed at the same appointment thereby providing the patient with an increased OVD on from first premolar to first premolar with the posterior teeth out of occlusion.

Conclusion: The patient had several review appointments to refine the anterior composites and ensure comfort at the new OVD. After 3 months the posterior teeth had returned to a stable occlusion. This management demonstrates a conservative technique for the treatment of a patient with tooth surface loss.

166
Table 94

The Effects Of Prosthodontic Treatment On The Oral Function Related Quality Of Life For Maxillary Tumor Patients

Wei Hong Ren*, Ying, W., Tong Xiang Zheng, Zheng Ting Zhang, Meng Ran Zhang
Capital Medical University Stomatological School
Prosthodontics
Beijing, China

Purpose: Oral function related quality of life in patients with maxillary tumor worsens during and shortly after surgical treatment .This clinical study evaluated oral function related quality of life of these patients with prosthodontic treatment longitudinally .

Methods & Materials: Patients in this study were 9 individuals with maxillary tumor who had their surgery treatment in Department of Maxillofacial Surgery and had their prosthodontic treatment which includes provisional and permanent treatment in the Department of Prosthodontics. The satisfaction with their oral function including speech , eating , aesthetics, sociality and with overall quality of life at 2 week(without prosthodontic treatment), 3 weeks (with Immediate surgical obturator) , 15 weeks (with permanent obturator) after operation were recorded on 0-100 visual analogue scale. One –way analysis of variance (ANOVA) were performed to determine whether the differences in these mean scores were significantly different at different time .

Results: 2 week, 3 weeks, 15 weeks after operation, the mean scores is 40,85.55,93.33 on speech; 23.33,56.11,69.44 on eating; 22.78,52.22,70 on aesthetics; 21.67, 72.22,95.56 on social disruption; 26.67, 60.56,80.56 on overall quality of life.($p<0.05$).

Conclusion: The oral function related qualities of life in patients with maxillary tumor were improved with provisional and permanent prosthodontic treatment significantly. The quality of speech and sociality return normal and the quality of eating and aesthetics were still compromised by 30% with permanent obturators.

167
Table 95

Implementing And Evaluating The Acp Classification Of Complexity For Edentulous And Partly Edentulous Patients

Richards, L.C.
The University Of Adelaide
School of Dentistry
Adelaide, South Australia, Australia

Purpose: Classifications of complexity were introduced by the American College of Prosthodontists for edentulous patients in 1999 and partly edentulous patients in 2003 with the aim of: improving inter-operator consistency and professional communication; ensuring reimbursement commensurate with complexity of care; providing an objective

method for patient screening; standardising criteria for outcomes assessment and research; improving diagnostic consistency; and providing a simplified, organized aid in the decision-making process relating to referral. With this in mind The University of Adelaide and the major provider of public dental services in South Australian (SA Dental Service) undertook a project to implement and evaluate the use of the classifications for all patients seeking prosthodontic care in the public sector in South Australia. This paper describes the implementation process that was developed, summarises classification data collected for 6953 patients for the period 2006-2008, and presents information about how the use of classification information has influenced treatment outcomes.

Methods & Materials: The implementation of the ACP classifications proceeded through three phases. Initially a training module was developed, based on the material provided by the American College of Prosthodontists and the SA Dental Service patient record system was modified to include purpose-written software for recording classification details. In the second phase, the system was introduced as a trial in one clinic for 12 months during which time data was collected for 729 cases. After minor revisions to the training modules and software the system was introduced at 22 sites across metropolitan and regional South Australia in February 2007. By April 2008 a total of 6953 cases had been classified by trained clinicians as part of the diagnosis and referral process. Details of patients' age, residential location and classification scores have been analysed. In addition, information about re-treatment rates (as an indication of treatment outcome) for the period 2001-2007 have been analysed to determine whether or not the classification of cases has been associated with changes in treatment outcomes.

Results: Of the 6953 cases classified, the mean age of patients was 63.9 years (range 26.7 – 92.9 years), 4020 (57.8%) were edentulous and 2933 (42.2%) were partly edentulous, 896 (12.9%) were from regional clinics and 6057 (87.1%) were from metropolitan locations. Overall, 37.7% of cases were classified as Class 1 (ideal or minimally compromised), 24.4% as Class 2 (moderately compromised), 25.5% as Class 3 (substantially compromised) and 10.4% as Class 4 (severely compromised). For the period 2001-7 the average rate of re-treatment within 12 months was 1.17%. The data provided evidence of regional differences in the age distribution of patients and age-related differences in complexity. In addition, there was a marked reduction in re-treatment rates from a high of 1.8% in 2002 to 0.45% for the year following the introduction of the complexity classification.

Conclusion: The results of this study provide evidence of the potential for the ACP classification to provide valuable information about edentulous and partly edentulous patients and suggest that the application of this information could be an influence in improving treatment outcomes.

168
Table 96

Adhesion Of Veneering Porcelain To Zirconium Dioxide Ceramic As Determined By The Strain Energy Release Rate

Roderic, LT.*; Swain, M.
Prosthodontics & Biomaterials, University of Sydney

Iven Klineberg
Prosthodontics, University Of Sydney
Sydney, New South Wales, Australia

Purpose: To determine the adhesion at the zirconium dioxide- porcelain interface using a fracture-mechanics approach, and to investigate this adhesion under the scanning electron microscope.

Methods & Materials: 5 bilayered specimens of porcelain (VITA VM 9) bonded to zirconium dioxide (VITA In-Ceram 2000 YZ Cubes) were prepared. The porcelain side of the specimens was notched to the interface with a diamond saw. The specimens then underwent a four-point bending interfacial delaminating test on a universal testing machine. The pre-cracked specimens were subjected to load and the strain energy release rate (G, J/m2) calculated from the critical load to induce stable crack extension. The interfaces of the 5 specimens were then investigated under the scanning electron microscope.

Results: The mean G value of the 5 specimens was calculated. Scanning electron microscope imaging showed that all 5 specimens exhibited the same interface cracking behaviour. In all tests the cracks started from the tip of the pre-crack and extended along the zirconium dioxide and porcelain interface in an almost straight line. This demonstrated adhesive fracture behaviour between the porcelain and the zirconium dioxide.

Conclusion: The superior mechanical strength of a framework itself is not the only pre-requisite for long-term clinical success. Clinical failures of zirconium dioxide restorations often occur due to fractures or chipping of the veneering ceramic. This study has emphasised the need for further research into improving the adhesion of veneering porcelain to zirconium dioxide.

169
Table 97

Study Of Bone Regeneration Material Using Collagen Gel With Dmp1

Ryosuke Kagawa*[1], Ishida, K.[1], Ikebe, K.[1],
Toyosawa, S. [2], Maeda, Y.[1]
Osaka University Graguate School of Dentistry
[1] Department of Prosthodontics and Oral Rehabilitation
[2]Department of Oral Pathology
Osaka, Japan

Purpose: In bone formation, non-collagenous bone matrix proteins are added to type I collagen which was produced in high volume, thereafter mineralization occurs. Dentin Matrix Protein 1 (DMP1) is one of bone matrix proteins, which has been reported to possess high calcium binding capacity and to bind collagen surface. Thus it is suggested that DMP1 is a key regulatory protein that is required for normal growth and development of bone. We hypothesized that the use of DMP1 with type I collagen as a biomaterial will make bone regeneration more efficiently. The aim of this study was to evaluate the new bone regeneration using type I collagen gel with recombinant DMP1 (rDMP1) in defect of rat calvarial bone.

Methods & Materials: A 3-mm diameter defect was applied in the calvarial bone of each rat in our study. The animals were divided into two treatment groups applied with: A) type I collagen gel with rDMP1; and B) type I collagen gel without rDMP1. Specimens were explanted at 1, 2, 3 and 4 months after treatment and were subjected to histological evaluation. The area of new bone formation was measured histologically.

Results: After 1 and 2 months, a significant more formation of new bone was observed in group A compared than group B. On the other hand, no significant difference in amount of the new bone formation was observed between both groups after 3 and 4 months. Additionally amount of new bone formation depended on amount of type I collagen gel.

Conclusion: Results indicated that rDMP1 stimulated mineralization of type I collagen in vivo. Therefore the application of this material is suggested to enhance bone regeneration more efficiently and may be useful for prosthetic treatment.

170
Table 98

Morphological Analysis Of Tongue And Mandible In Japanese Males

Sato, Y.*[1], Shigeta, Y. [2], Ogawa, T. [2],
Ohkubo, C.[1], Fukushima, S. [2]
Tsurumi University School of Dental Medicine
[1] Department of Removable Prosthodontics
[2] Department of Fixed Prosthodontics
Yokohama, Japan

Purpose: To evaluate the morphological features of the volume of the tongue and mandible in Japanese males with Computed tomography (CT) data, and to investigate the factors that influence tongue volume.

Methods & Materials: The subjects were 40 Japanese males. The age of the patients ranged from 25 to 77 years with an average age of 52.6±12.5 years. The Body Mass Index (BMI) of the patients ranged from 20.1 to 35.8 kg/m2, with an average BMI of 25.4±3.4 kg/m2. CT imaging examinations were carried out in each patient. Segmentation was performed automatically or semi-automatically based on Hounsfield units (HU). Mandible volume within this slab was calculated from the number of voxels that had a CT value range from 200 HU (to exclude soft tissues) to a maximum value (CT value 4000 HU). The tongue was carefully outlined, and the inside of the tongue was smeared on each of the axial, frontal and sagittal planes with a semi-automatic segmentation tool. The Tongue/Mandible (T/M) ratio was calculated from the volume of the mandible and the tongue.

Results: With all our subjects, the mean tongue and mandible volume was 78990±10607.8 mm3, 87806±12079.6 mm3. In 2006, Okubo et al. measured the volume of airway soft tissues with MR image in 51 Japanese males, and reported that the mean tongue volume was 78.1±11.9 cm3 in OSA patients, 77.1±11.6 cm3 in control subjects. Our results approximately corresponded with theirs. Therefore, in Japanese males, the mean tongue volume was considered to be about 77-79 cm3. The mean of T/M ratio that is important to determine the position and range of motion of the tongue was 91%. There was a significant positive correlation between BMI and tongue volume, T/M ratio (p=.002, p=.023).

Conclusion: The tongue and mandible volume could be measured on CT data. In addition, it was suggested that the BMI influences tongue volume.

171
Table 99

Treatment Planning Of The Patient With Severe Chronic Periodontitis

Seo Young Lee,*, Jeong Kyung Kang, Sang-Wan Shin, Jae-Jun Ryu
Korea University Medical Center
Prosthodontics
An-San, Seoul, Korea

Purpose: To find the best treatment (prognosis) for the patient whose teeth have severe mobility and cannot masticate normally due to chronic periodontitis. We need to seriously consider about the patient's physical, psychological, and social status when we plan a treatment that has a desirable outcome. The aim of this treatment palnning is to choose the most adjustable treatment of several treatment alternatives for the patient with chronic periodontitis by considering all of the patient's conditions and assess the treatment plan will be predictabe.

Methods & Materials: On the first visit to the clinic, 49 years old Mr. Yim complained that he couldn't have masticated normally due to the missing left maxillary molars and the severe mobility of the remaining teeth. His medical examination revealed that there was nothing specific except for that his cholesterol and ALT levels were slightly high. There was nothing specific about his medical history. Through clinical, radial, and diagnostic wax-up we could consider several treatment plans before the treatment. First of all, for the maxilla we can extract all the remaining maxillary teeth and make a conventional full denture, and for the mandible, extract all the remaining teeth except for the # 45, 34 and rehabilitate using a overdenture or full denture. If placing the implants are possible, the first option is placing 4 implants in the maxilla and rehabilitate with overdenture using bars. For the mandible, placing 2 implants on the mandible and fabrication of overdenture or a conventional full denture can be possible. Lastly, we could rehabilitate with an implant supported fixed bridge by placing more numbers of implants in the maxilla and mandible.

Mr. Yim, a CEO of a company could financially afford to pay a high bill and wanted to rehabilitate his teeth in a fixed form and not in a removable. He didn't care how long the treatment would take, as long as he got an esthetic treatment. He emphasized the importance of esthetics, because he had to meet numerous people. Finally, he desired mightly to save the remaining teeth as possible. The vertical dimension was stable and the buccal aspect of remained maxillary anterior alveolar ridge was favorable. Considering the examination results and the patient's needs, we decided to extract all the maxillary teeth and place 10 or more implants and rehabilitate using implant supported fixed partial denture. In the mandible, we left the teeth with moderate mobility which got better after periodontal treatment and placed implants and restorate using implant supported fixed partial denture.

Results:

Conclusion: In such a case, who has a financial support, we can please the patient with successful consequences by placing implants and rehabilitate using fixed partial denture. We believe that this prosthetic plan will be best choice one could make. In addition, periodic follow up will lead to a successful prognosis.

172
Table 100

Bonding Of Auto-Polymerized Polymethyl Methacrylate Resin To Nylon Denture Base

Shimpo, H.*, Ohkubo, C., Tsuchikawa, M.[1]
Tsurumi University, Sun Medical Co., Ltd[1]
Removable Prosthodontics
Yokohama, Kanagawa, Japan

Purpose: The use of nylon dentures has recently increased in popularity. However, auto-polymerized polymethyl methacrylate (PMMA) resin cannot be bonded to polyamide thermoplastic resin. Therefore, it is impossible to repair dentures chairside using acrylic resin. This study evaluated the bonding strengths of auto-polymerized PMMA resin to nylon denture bases using adhesive agents.

Methods & Materials: The surfaces of polyamide thermoplastic resin plates (10.0×10.0×2.0 mm) were polished using abrasive paper (600 grit) and sandblasted with 50 ?m alumina particles (0.48 MPa). An adhesive agent, 4-META/MMA-TBB resin (Super bond, Sun Medical, Japan) was used on the surfaces under the following conditions: monomer + catalyst (4:1, Group 1), monomer + catalyst (8:1, Group 2), monomer + catalyst (4:1) + polymer (Group 3), monomer + catalyst (8:1) + polymer (Group 4), treatment with dichloromethane (Group 5), sandblasted (Group 6) and without treatment (Group 7). Auto-polymerized PMMA resin (Meta base M, Sun Medical) was poured into a Teflon ring (3.0 mm dia., 1.0 mm high) and polymerized according to the manufacturer's instructions. After polymerization, the specimens were stored in 37? Distilled water for 24 hours. The specimens for each condition were thermal-cycled for 5,000 cycles (TC5000). The tensile bonding strengths were measured on an autograph (AG-IS, Shimazu, Japan) at a crosshead speed of 2.0 mm/min. The data obtained (n=5) were analyzed using a two-way ANOVA and Tukey's multiple comparisons test (?=0.05).

Results: The bonding strengths of Groups 1 to 4 (7.06-8.84 MPa) were significantly higher than for Groups 5 to 7 (0.88-2.98 MPa) ($p<0.05$). No significant differences were found among Groups 1-4 ($p>0.05$), although Group 3 had the highest bonding strengths. In addition, Group 3 exhibited similar bonding strengths to Group 4 after thermal cycling.

Conclusion: Auto-polymerized PMMA resin will adhere to polyamide thermoplastic resin using 4-META/MMA-TBB after sandblasting. Thus, nylon dentures can be repaired or relined chairside using auto-polymerized PMMA resin.

173
Table 101

A Study On The Fracture Load And Marginal Fitness Of Zirconia Ceramic Coping By Design And Coloration

Shin, MR*, Kim, MH, Cho, JB
Department of Dentistry, Hangang Scared Heart Hospital
College of Medicine, Hallym University
Department of Prosthodontics Graduate School of Clinical Dentistry
Hallym University
Seoul, Korea

Purpose: : The purpose of this study was to compare the marginal fitness and fracture load of the zirconia copings according to the design with different thickness and coloration

Methods & Materials: The evaluation was based on 80 zirconia copings. Zirconia copings were fabricated in design with different thicknesses using CAD/CAM system (KAVO, Germany). Just after Sintering, the marginal discrepancies of copings were measured on the buccal, lingual, mesial and distal surfaces of metal die, under a Video Microscope System(sv-35, Sometech, Korea) at a magnification of ?100. It was remeasured after the adjusting of the inner surface.

Next, all copings were luted to the metal dies using reinforced cement {GC FujiCEM (GC Corp. TOKYO. JAPAN)} and mounted on the testing jig in a Universal Testing Machine (Instron 4467, U.S.A.). The load was in a direction perpendicular to the long axis of each specimen until failure. The results were analyzed statistically using the one-way ANOVA test.

Results: 1) The fracture load of CAD/CAM zirconia copings showed significant difference in groups 1, 2, 3, and 4. I4 and II4 had the strongest fracture load. 2) When groups with different colors and same design were compared, all of the uncolored groups showed greater fracture load ($P<0.05$), but with little significance. 3) The measured value of marginal discrepancy right after sintering was the greatest in the buccal area, except for group I2. 4) There was no significant difference of marginal fitness right after sintering among the groups in the colored zirconia group ($P<0.05$). 5) When the marginal fitness among the groups in the uncolored zirconia group was considered right after sintering, group II1 had the largest marginal discrepancy ($P<0.05$). 6) When the marginal fitness of the colored and uncolored groups with the same design were compared right after sintering, the uncolored zirconia group, exclusing groups I1 and II1, had the greatest marginal fitness ($P<0.05$). 7) After adjustment of inner surface, there was no difference in the marginal fitness in all groups when color and design of the zirconia copings were compared ($P<0.05$). .

Conclusion: Therefore, there was difference in the marginal fitness according to the design and coloration of zirconia copings right after sintering, but it was decided that the copings may well be used clinically if the inner surfaces are adjusted. The copings should be thick enough for the reinforcement of fracture strength. But considering the esthetics of the visible surfaces (labial and buccal surfaces), the thickness of may be a little thin, without giving any significant effect on the fracture strength. This type of design may be considered when giving priority to preservation of tooth or esthetics.

174
Table 102

A Case Report : Maxillary Implant Supported Overdenture For A Class III Skeletal Patient

Son, MK*, Jeong, JH, Kang, DW
Kim, HJ, Kim, YJ
Chosun University, Chonnam National University
Department of Prosthodontics, Department of Periodontics
Gwang-Ju, Korea

Purpose: Implant treatment can be a good option for completely edentulous patients. As treatment options, Implant supported fixed prosthesis and removable implant supported overdenture can be chosen. For the decision between these two treatment options, the following factors have to be considered. : Number of implants, interoccusal distance, and lip support, length of final restoration, phonetics, bone quality and quantity, and so on. In many cases, implant supported overdenture providing more esthetic and stable results than fixed prosthesis.

Methods & Materials: This report is about a female patient who was 65 years-old and complained about missing teeth, dental caries of remaining teeth and unesthetic facial profile. She had insufficient amount of bone volume and long interocclusal distance especially on the anterior portion of the maxilla. Loss of lip support and concave facial profile by class III skeleton were examined. She had removable partial denture for maxilla. All the remaining teeth were to be extracted excluding the second molars of both sides which were in relatively satisfactory state. She preferred to have implants for the fixed restoration without removable denture, because she did not want palatal covering. She also expected to change her skeletal profile with new restorations. To get an appropriate lip support and compromise a long interocculsal space, implant supported overdenture were chosen as a treatment plan.

Results: A total of six ITI standard implants were used. For each side three of them were placed from the upper canine tooth to the molar regions. Each set was connected by a bar to support the palateless overdenture. Besides, Hader bar and ERA were used to increase retention. Anterior missing area implantation was avoided due to the bone deficiency of the patient.

Conclusion: This clinical case shows functionally and esthetically acceptable results which provide stable palateless maxillary implant overdenture and an improved facial profile.(son0513@chosun.ac.kr)

175
Table 103

A Preliminary Study On The Properties Of The Dental Phosphate-Bonded Casting Mold Formed By Three Dimensional Printing.

Sun Jian*, Guo Yu, Zhang Fu-Qiang
Shanghai Jiaotong University
Department of Prosthodontics
Shanghai, China

Purpose: The aim of this study was to evaluate the properties of the dental phosphate-bonded casting mold formed by three dimensional printing. Discuss the feasibility of the application of the solid freeform fabrication on the formation of the dental phosphate-bonded casting mold.

Methods & Materials: The cylindrical specimens 20mm*40mm were generated by CAD. Three dimensional printing was applied to fabrication of the specimen with traditional dental phosphate-bonded investment materials as powder. All specimens were divided into six groups (5 specimens for each group)according to the different binders and post-treatment for strengthening:(1) 0.5%Silicasol as binder,(2)1%Silicasol as binder,(3)0.5% PVP as binder,(4)0.5%Silicasol as binder, and surface infiltrated with silicasol after fabrication, (5) 1%Silicasol as binder, and surface infiltrated with silicasol after fabrication,(6)0.5%PVP as binder, and surface infiltrated with silicasol after fabrication. Compressive strength was tested by universal machine. The length and diameter of the specimen were measured by using the digital ruler. The surface roughnesses of the specimen were also tested (traditional mixing as control group).

Results: The mean compressive strength of group 1 to 6 was 0.62, 1.24, 0.2, 3.17, 4.92, 0.52MPa respectively (ISO standard: not less than 2.5 and 3MPa for type 1 and type 2). There was significant difference ($p<0.01$) among the six groups. Group 4 and 5 showed significant higher compressive strength. The mean value of the length and diameter of the specimen for group 1 to 6 were 40.142, 20.228; 40.148, 20.132; 40.134, 20.172; 40.27, 20.646; 40.268, 20.766; 40.24, 20.778mm respectively. As for surface roughness, the mean value (Ra) for group 1 to 6 and control group were 22.91, 20.82, 19.56, 20.86, 19.72, 15.02, 6.89μm respectively. Compare to group 1 to 6, control group showed significant lowest surface roughness value ($p<0.01$).

Conclusion: It is concluded that three dimensional printing method maybe suitable for the fabrication of the dental phosphate-bonded casting mold. Further research both on investment materials and fabrication process should be done to meet the requirement of the dental phosphate-bonded casting mold.

176
Table 104

Contribution On Cad/Cam Techniques For Removable Partial Denture Framework

Taddei, C.*, Baixe, S., Barthelemy, H., Etienne, O.
University of Strasbourg, Dental Faculty
Prosthodontics
Strasbourg, France

Purpose: Currently, manufacturing processes to fabricate a metal framework are long, expensive, and mainly depend on the laboratory technician's abilities. Computer Aided Design (CAD), in association with Rapid Prototyping (RP) technology is a new process for removable partial denture (RPD) framework conception.

Methods & Materials: In order to use such a technology, first steps of the clinical procedure are following the classical treatment plan with a primary and secondary impression. Then, the master cast is optically scanned. A digital 3D RPD framework is modeled on the 3D computer model: shapes, limits, components and volumes are drawn thanks to the CAD software (Digistel®). A sacrificial resin pattern is manufactured according to this framework, using a thin resin

depositing technique in the rapid prototyping machine (Cynovad Neo®). This pattern is directly used with an investment casting process, and finishing steps proceed commonly.

Results: Metal frameworks obtained with this new technology provide similar clinical results to traditional manufacturing process. However, CAD/RP technology is more reproducible, faster and finally cheapest.

Conclusion: CAD has recently appeared for removable partial prostheses manufacturing. RP process in association provide many advantages, but total CAD – CAM' RPD conception in the future should be the next evolution.

177
Table 105

Significance Of The Anatomy And Physiology Of The Structures Around Lower Full Complete Dentures

Taddéi C.*, Bornert, F., Barthélémy, H., Feki, A., Etienne, O.
University of Strasbourg, Dental Faculty
Prosthodontics
Strasbourg, France

Purpose: This study aimed to show the anatomical and physiological changes that occur as a result of the edentulous mandible and to analyze the impact of these changes during the different steps of the full complete denture treatment.

Methods & Materials: We analyzed anatomic dissections and compared the morphology of the mandible of two hundred human skulls in order to highlight the different areas that influence the achievement of the complete denture treatment, especially those affecting the peripheral seal.

Results: Following the loss of teeth, the mandible is undergoing many changes associated with the alveolar bone resorption, creating significant morphological changes of the prosthetic supporting area. The mandibular complete denture maintains close relationship with this surface, as well as its muscular environment. These observations play a very important role in the procès of the prosthetic treatment, because they affect the border molding and prosthetic lower surface.

Conclusion: The prosthetic restoration of totally edentulous patients still represents a challenge for the dentist. This work attempts to highlight the consequences of the mandibular para-prosthetic structures anatomy on the lower full denture and its integration by the patient.

178
Table 106

Effects Of Ionizing Radiation On In Vitro Differentiation Of Osteoblasts Derived From Rat Bone Marrow Stroma

Takebe J*, Ito, S, Kikuchi, S, Ishibashi, K
Iwate Medical University, School of Dentistry
Department of Fixed Prosthodontics
Morioka, Iwate, Japan

Purpose: Radiotherapy influences bone formation at the surfaces of endosseous implants used for maxillofacial prosthetic rehabilitation in patients with oral tumors. We hypothesize that ionizing irradiation affects the differentiation and cellular physiology of osteoblasts, and thereby impairs bone matrix formation and mineralization in the bone wound

healing that occurs during the process of osseointegration. The aim of this study was to investigate how the dosage of ionizing radiation affects differentiation of osteoblasts in vitro.

Methods & Materials: Osteoblasts were isolated from the bone marrow of Wistar rats. They were exposed to 0, 40, 400, or 4000 mGy of gamma-radiation (using cobalt-60) and cultured for 5, 7, 10, or 14 days. Assays were performed for cell adhesion and alkaline phosphatase activity. Electron probe microanalysis was used to monitor bone matrix mineralization. The reverse transcription-polymerase chain reaction was used to determine mRNA expression for alkaline phosphatase, bone sialoprotein, collagen1, osteocalcin, heat shock protein 47, and ß-actin.

Results: Irradiation of less than 400 mGy induced no significant changes in cell adhesion, alkaline phosphatase activity, or osteoblastic gene expression, compared to controls. Electron probe microanalysis indicated that Ca and P signals were more evident throughout the culture period at doses of up to 400 mGy than at 4000 mGy. Bone matrix mineralization was reduced at 4000 mGy.

Conclusion: The response of gene expression to radiation may provide insights into the cellular mechanisms underlying osteoblast differentiation. The ionizing radiation-induced alterations in the differentiation states of osteoblasts may affect the bone wound healing and bone formation that occurs during the process of bone matrix mineralization. These results suggest that the phenotypic and molecular changes induced in osteoblasts by higher doses of ionizing radiation interfere with differentiation and delay the mineralization of bone matrix.

179
Table 107

Detection Of Microorganisms From Inside Of Acrylic Resin Prostheses

Takeuchi, Y. *, Nakajo, K., Sato, T., Sakuma, Y., Koyama, S., Sasaki, K., Takahashi, N.
Tohoku University
Graduate School of Dentistry
Sendai, Japan

Purpose: Acrylic resin prostheses such as dental prostheses or maxillofacial prostheses are required for restoration of esthetics and functions on stomatognathic system of the patients. It is well known that microorganisms which adhere to the surface of acrylic resin prostheses are related with the oral and respiratory infections. However, there is little information about the presence of microorganisms within acrylic resin prostheses. Thus we aimed to evaluate the microorganisms within acrylic resin dental prostheses and maxillofacial prostheses.

Methods & Materials: Twenty-five acrylic resin prostheses (15 dental prostheses from 12 patients, group A; 10 dent-maxillary prostheses with closed hollow obturator from 10 patients, group B) were obtained from 22 patients. Informed consent was obtained from each patient. The surface of the dental prostheses and dent-maxillary prostheses was disinfected with 70% ethanol. After splitting the base of dental prostheses aseptically, cutting resin chips (ca. 0.1 mg) were collected from internal layer of the split surface with sterile round bur (ca. 200 rpm) and suspended into 40mM potassium phosphate buffer (pH 7.0, 1.0 mL, PPB). While after piercing the wall of the obturator of dent-maxillary prostheses, inner fluid was collected with sterile syringe. In the absence of inner fluid, 1.0 mL of PPB was alternatively injected to the obturator and collected. Ten-fold dilutions of these suspensions were inoculated onto blood agar plates and incubated anaerobically at 37°C for 7 days. After the incubation, all colonies from plates were sub-cultured and identified by 16S rRNA gene sequence analysis.

Results: In group A, bacteria were detected in 5 out of 15 samples. Actinomyces, Lactobacillus, Propionibacterium, and Streptococcus sp. were predominant. While in group B, 13 genera were detected in 7 out of 10 samples and Bacillus, Klebsiella, Lactobacillus, Propionibacterium sp., were predominant.

Conclusion: It is revealed that the existence of viable bacteria within acrylic resin dental prostheses and dent-maxillary prostheses. Furthermore, the common detection of Lactobacillus and Propionibacterium sp. from the two types of prostheses suggests that inside of acrylic resin is the suitable environment for these two genera. However, the different bacteria detected may reflect the environmental characteristics of these prostheses.

180
Table 108

Development And Evaluation Of An Online Color Training System

Tan, J.*, Chen, L., Yang, X
Peking University School and Hospital of Stomatology
Department of Prosthodontics
Beijing, China

Purpose: To develop and evaluate an online color training system for dental professionals.

Methods & Materials: An online color training system was developed using Java language on Eclipse Platform. The system consisted of two parts, the training interface and background for user management and data collection. Three parts of training exercises including basic color training, shade guide matching and clinical shade selection simulation were incorporated into the training system. Thirty-seven color normal dental students from Peking University School of Stomatology participated in the evaluation program. They firstly went though baseline Vita-Vita test both with shade guides and the training system. Then they were trained with the system for 4 days. The same test was performed after the training program. The “before” and “after” training test results were compared using Paired-Sample t test.

Results: The average correct match increased from 6.7 (41.88%) at baseline to 11.38 (71.13%) after training in shade guide test ($P<0.001$) and from 9.67 (60.42%) to 13.06 (81.63%) in system test ($P<0.001$). The average test time was 11.27 minutes and 11.89 minutes in shade guide test ($P=0.636$). In the system test, the average test time was 12.03 minutes and 8.84 minutes ($P=0.002$).

Conclusion: The color training system can improve the color matching ability of the dental students. It is suitable for color training in dental school.

181
Table 109

Stress Analysis Of Abutment Tooth With Extracoronal Magneti Attachment Using The Three Dimensional Finite Element Method - The Construction Of Finite Element Model From Ct Data

Tanaka Y.*, Nakamura, Y., Kanbara, R., Asami, K., Kogiso, T., Ando, A., Muraji, N., Tanaka, S.
Aichi-Gakuin University
Department of Removable Prosthodontics
Nagoya, Japan

Purpose: An extracoronal magnetic attachment retainer design for partial denture prosthetic applications has been developed. Restorative limitations of space and physiologic function requirements may complicate esthetic placement of attachments in a partial denture design. Our previous reports have presented the advantages of a extracoronal magnetic attachment design for extracoronal applications with vital teeth. The traditional retainer design requirements satisfying retention and resistance form and while providing an applications that is esthetic has shown good patient feedback.

Methods & Materials: In a distal extension partially edentulous treatment, a patient may refuse to wear bilateral denture for several reasons, including esthetic concerns and satisfactory hard and soft tissue adaptation and fit. In applications of distal extension and cantilever, an extracoronal attachment has potential to cause overload. The optimal and proper use of any remaining teeth adjacent to the edentulous area for use as an supporting abutments is of great concern. Any decision in the selection of abutment number or interconnected splinting of supporting abutment teeth is based on the best knowledge based upon comprehensive dental evaluation. However, there are clinical

situations where minimal supporting information exists to appropriately render these decisions.

Results: Finite Element Method (FEM) has been well applied in stress evaluations for prosthodontic dental studies. We have previously reported the use of two-dimensional models of prosthodontic treatment situations. This study utilized the application of three dimensional modeling to evaluate the applications and stress distribution patterns for extracoronal magnetic attachment retainers for partial dentures.

Conclusion: The aim of the present study was to fabricate three-dimensional finite element model from actual patient data. We investigated the effect of interconnected abutment number in case of unilateral use of extracoronal magnetic partial denture retainers using the FEM model.

182
Table 110

Prosthetic Management Of A Patient With Severe Grinding Using A Removable Metal Splint: A Case Report

Tokue, A. [1], Hanatani, S. [1], Masaki, D. [2], Sakae, T. [2], Takeuchi, S. [1], Wakaki, M. [3], Kiyokawa, A. [2], Uetake, A. [2], Ozawa, M. [4], Sekita, S. [2], Ohkubo, C. [1]
Tsurumi University School of Dental Medicine
[1] The 1St Department of Prosthetic Dentistry
[2] Department of Dental Anesthesiology
[3] Special Care Unit For Patients With Disability
[4] Department of Operative Dentistry
[2-1-3] Tsurumi Tsurumi-Ku Yokohama, Japan

Purpose: Grinding habit has been sometimes observed in mental retardation patients. Metal splint for bite raising to upper and lower arch can protect the grinding habit. This presentation will describe the prosthetic management for severe grinding.

Methods & Materials: A 40-year-old male with mental retardation visited Tsurumi University Hospital in October 2005.His chief complaint was repeatedly fractures of incisal restorations. He had severe grinding habit, so serious attrition of remaining teeth and severe teeth mobility (grade 2 or further) were detected. In August 2006, the vertical dimension was increased under judging from the attrition of remaining teeth and the facial appearance. A resin bite raising splint was delivered to improve anti-Monson curve, to fix remaining teeth, and to increase the vertical dimension. As a final prosthesis, bite raising splint was fabricated with Co-Cr alloy. Occlusal vertical dimension (OVD) was determined to 7mm greater than OVD at rest position. In the Final prosthesis, onlay rests with bucco-lingual undercut margins (we named cap clasps) were fitted to every remaining premolar and molar teeth. The OVD and the facial appearance were restored, and they would be never changed.

Results: Without major connector, final prosthesis could be obtained the greater stiffness and durability. In approximately 2 years after delivery, there was little wear of the metal onlays and metal backing, and the mobility of remaining teeth recovered could be well maintained.

Conclusion: In conclusion, the present case with a severe grinding habit was successfully treated using a bite raising splint with cast Co-Cr alloy. The splint can protect the further teeth wear and decrease of vertical dimension.

183
Table 111

Mastication Promotes Recovery Of Memory And Learning Dysfunction By Middle Cerebral Artery Occlusion In Rats

Toyoshita, Y.*, Kawanishi, K., Koshino, H., Hirai T.
Health Sciences University of Hokkaido School of Dentistry
Department of Oral Rehabilitation
Hokkaido, Japan

Purpose: It is suggested that occlusal-masticatory function affect brain function through the mechanism such as an increase of blood flow, the number of ChAT-positive neurons and ACh levels. On the other hand, it was reported that food intake is associated with improvement of the performance of activities after stroke in clinical research. However, the details are not clear enough. In this study, we evaluated whether solid feed was more effective for functional recoveries than liquid feed in rats with ischemic brain injury after permanent middle cerebral artery occlusion.

Methods & Materials: Thirty-six male Wistar/ST rats were subjected to middle cerebral artery occlusion or sham surgery. After middle cerebral artery occlusion or sham surgery, all rats were provided liquid feed for 14 days. Then, all rats were divided into three groups: a solid feeding group, a liquid feeding group and a solid feeding group of sham. Effect of mastication on functional recoveries after permanent middle cerebral artery occlusion in rats was evaluated by the limb placement test and Morris water maze task.

Results: After surgery, limb placement test scores were equal in the both middle cerebral artery occlusion groups. In the acquisition trials of Morris water maze task, statistically significant differences in escape latency were observed between a liquid feeding group and sham groups at all days, and between the a solid feeding group and sham groups at day 3 and 4 of the trials. In the probe trial, statistically significant differences in time spent were observed between the liquid feeding group and sham groups. On day 5 of acquisition trials, it was observed that thigmotactic behavior defined as time spent in the periphery of the pool in Morris water maze task and as a indicator of spatial learning and memory ability was significant difference among three groups.

Conclusion: This study suggested that solid diet mastication could be effective for the rehabilitation of sensorimotor and learning/memory dysfunction induced by cerebral infarction. It can be said that the role of prosthodontic treatments may be extremely large because mastication is effective for rehabilitation after cerebral infarction.

184
Table 112

Case Report: Esthetic Restoration For Root-Crown Fracture In Anterior Region With Limited Orthodontic Treatment And Provisional Restoration Technique.

Tsukiboshi, T.*, Maeda, Y.
Osaka University Graduate School of Dentistry
Department of Prosthodotnics and Oral Rehabilitation
Suita, Japan

Purpose: For anterior tooth fracture, we have some treatment options such as implant, removable or fixed partial denture. In this case presentation, we would like to discuss esthetic solutions with biological and minimum invasive method using limited orthodontic treatment (LOT) and provisional restoration technique to enhance biological and stable results.

Methods & Materials: Two women (33 and 52 years old) were presented with the root-crown fracture in maxillary

anterior region. Clinical and radio graphical diagnostic data revealed root-crown fracture of right central incisor (case 1), and root-crown fracture of right central and left lateral incisors (case 2). Prior to LOT, root canal treatment was performed. A square shaped wire was attached on to adjacent teeth surface as the anchorage for the extrusion procedure. After 1 or 2 months of LOT, we applied appically positioned flap operation and provisional restoration to adjust the bone height level and gingival scallop line. Preparation for final metal ceramic restorations were performed on the fiber reinforced composite resin build-up.

Results: Esthetically satisfactory results with final restorations were obtained in both cases. Periodontal indices indicated healthy and stable situation for adjacent tooth as well as fractured ones.

Conclusion: Among other options, the orthodontic extrusion was chosen based on the fractured position, survived root length and form according to literatures. To maintain or improve bone and soft tissue volume, LOT is more predictable option with flap operation to achieve the biological width than others when we examine with 3D CT. If adequate root length is not obtained after LOT, we can provide implants into the regenerated bone housing as well as properly shaped soft tissue especially interproximal papilla region.

185
Table 113

The Effect Of Surface Treatments Of Y-Tzp Zirconia Ceramic On The Microstructure And Flexural Strength

Vang, MS*, Kim, HJ, Kim, MH, Yang, HS, Park, SW, Lim, HP
Chonnam National University, School of Dentistry
Department of Prosthodontics
Gwangju, South Korea

Purpose: The aim of this study was to investigate the effects of various surface treatments on microstructure and flexural strength of Y-TZP zirconia ceramic.

Methods & Materials: The Kavo Everest® ZS blank (KaVo, Biberach, Germany) was used in this study. Fifty-six disk-shaped specimens were prepared. The specimens were equally divided into 7 groups according to the surface treatments. In Group C, no further treatment was applied after polishing. Group G specimens were ground with #1200 diamond plate by the process of wet-grinding. Group S50 and S250 specimens were airborne-particle abraded with 50 ? and 250 ? alumina(Al2O3) particle respectively. Group SH50 and SH250 specimens were treated the same as described for Group S50 and S250 and then heat- treated. Group E specimens were etched by solution composed of distilled water 45 ml, nitric acid 45 ml, and hydrofluoric acid 10 ml for 60 mins. The quantitative and qualitative analyses were performed using scanning electron microscopy (SEM), energy dispersive X-ray spectrometer (EDX), and X-ray diffraction (XRD). 3D surface profiler was used to examine the surface roughness (Ra, Rz) and the biaxial flexural test was used to calculate the flexural strength.

Results: The following values of surface roughness (Ra), biaxial flexure strength, and relative content of monoclinic phase of zirconia were obtained for each group: Group C(8 nm, 967 MPa, 0.6 %); Group G (153 nm, 1060 MPa, 0.7 %); Group S50(532 nm, 1301 MPa, 6.5 %); Group SH50(474 nm, 826 MPa, monoclinic content not detectable); Group S250 (832 nm, 1283 MPa, 6.7 %); Group SH250 (889 nm, 853 MPa, monoclinic content not detectable); Group E (17 nm, 1094 MPa, 1.5 %).

Conclusion: Surface roughness and flexural strength of Y-TZP ceramics increased by Al2O3 sandblasting, while lower mean strength values was measured when the same procedures are followed by heat treatment. With the increase of monoclinic ZrO2 content, the biaxial flexure strength also increased. On the other hand, there was no clear relationship between biaxial flexure strength and surface roughness.

186
Table 114

Consistence Of Try-In Pastes And Luting Agents On The Resultant Color Of Ips Empress? All-Ceramic Veneers

Wang Yi-Ning*, Xu Bin-Ting, Li Qing, Li Rong
Key Laboratory For Oral Biomedical Engineering Of Ministry Of Education
School and Hospital Of Stomatology
Wuhan University, China
Prosthodontics Department
Wuhan, China

Purpose: (1) to investigate the effects of try-in pastes and luting agents on the resultant color of IPS Empress? All-ceramic veneers, (2) to evaluate the consistence of try-in pastes and the corresponding luting agents on the finial color.

Methods & Materials: Disc-shaped ceramic specimens were fabricated in 3 thickness (0.5, 0.7 and 1.0 mm) and 2 shades (A1 and A3). A3 shade composite resin specimens were fabricated and served as the backgrounds. Two ceramic veneer adhesive systems (3M, VOCO) were used. The ceramic specimens were seated on the resin specimens using a refractive liquid, try-in paste and luting agents, respectively. The color of the combinations was measured using a spectrophotometer and subsequently converted to CIEL*a*b* values. The color differences between the try-in paste/refractive liquid, the luting agent/refractive liquid, and the try-in paste/luting agent were calculated and registered as ?Epaste, ?Eresin and ?Epaste-resin, respectively.

Results: All of the values of the? Epaste, ?Eresin, ?Epaste-resin were less than 2.72. Three-way ANOVA revealed that the? Epaste-resin values were significantly affected by the three factors of veneer thickness, veneer color and luting agent color ($P<0.01$). Tukey's post hoc analysis showed that the luting agent induced less influence on the? Epaste-resin values while the thickness of the veneers decreased.

Conclusion: The color of ceramic veneers was affected by the try-in pastes and luting agents. However, the colors change fallen into the clinical acceptable range. The consistence of the try-in pastes and the corresponding luting agents was excellent and affected by the factors of the veneer thickness, the veneer color, and the luting agent color. Respect to the veneers in thinner thickness, the luting agent induced less influence on the consistence.

187
Table 115

Torsion Test At The Interface Between Implant And Implant Abutment Of The Implant Body

Watanabe, F*, Ishiguro, T, Takase, I, Ueda, K
Department of Crown & Bridge School Of Life Dentistry
Niigata Nippon Dental University
Department of Crown & Bridge
Niigata, Japan

Purpose: The structure of osseointegrated implant restoration consists of the implant body, abutment, abutment screw and crown. Fracture of the part of connection between the implant and implant abutment is rarely encountered clinically. It is speculated that the cause of bending is horizontal loading, rotational torque during chewing and rotational torque at the installation of the abutment on the superstructure. The manner of the abutment connection is roughly classified into internal and external but the configuration is variable. Each implant has its implant own individual anti-rotational structure at the interface of the implant and abutment to avoid rotation of the abutment. When eating, vertical, horizontal and rotational force are loaded during chewing. The purpose of this research was to investigate the fracture strength using a

torsion test at the part of the connection between the implant and abutment.

Methods & Materials: A torsion test device (Shimadzu, Tokyo) was developed. Five different diameters CAMLOG implants (diameters of 3.3,3.8,4,3,5.0,6.0mm) were used for the specimens. Each implant was connected with each size of abutment using a torque rachet of 20Ncm. The implant specimen was mounted on the torsion testing device and torsion force was applied. We then measured the fracture strength using a rotational speed of 3.6 degree/min until the generation of permanent transformation. The specimens were removed from the device and the abutment was also disconnected with the implant. The part of anti-rotational structure of the implant and abutment was observed by microscope.

Results: The graph of torsional fracture strength demonstrated a parabolic curve for each specimen. Regarding the torque of generation of transformation, the diameter of a 3.3mm CAMLOG implant was 0.673Nm, and the diameter of a 3.8mm CAMLOG implant was 0.97Nm. The torsional fracture strength of the smaller diameter implant showed a lower value compared with the wider diameter implant. Microscopic observations showed that the three projections of abutment corresponded with anti-rotational notch destruction in all implant diameters. For the connecting part of the implant body, the picture was scrunched and damaged.

Conclusion: The graph of torsional fracture strength showed a parabolic curve in an specimens. The primary curve was considered as torsion torque to plastic deformation and afterward, the gradual curve led to the results of permanent transformation.The force leading to permanent transformation of the abutment connection was different for each implant diameter. The three projections of the abutment corresponding to anti-rotational notch were destroyed in each CAMLOG implant.

188
Table 116

Mkk6/P38 Signal Transduction Cascades Regulate Nickel Allergy In The Model Mouse

Watanabe, M.*, Ichikawa, T.
The University of Tokushima
Oral and Maxillofacial Prosthodontics
Tokushima, Tokushima, Japan

Purpose: Although Nickel (Ni) is well known as one of the most common allergenic dental materials such as for removable or fixed dentures, the mechanisms of Ni allergy development and symptoms have many unknown points. We already reported that dendritic cells (DCs) have played an important role in the process of Ni allergy development. The aim of this study was to regulate Ni allergy symptoms using MKK6 signaling in the model mouse.

Methods & Materials: Freshly isolated bone marrow cells were stimulated with GM-CSF for 7 days to induce differentiation into DCs. DCs were cultured by the additional stimulation of NiCl2 for 48 hours and several protein expressions were examined after the stimulation by Western blot. analysis, quantitative real-time PCR and ELISA. Then, DCs over-expressed of MKK6 gene were stimulated with Ni and injected intraperitoneally into both flanks of specific pathogen-free female C57BL/6J mice. On the other hand, to inhibit MKK6 expressions, MKK6 siRNA with Atelo collagen was injected into pinnae of C57BL/6J mice pre-injected Ni into flanks. 14 days later for DC-injected mice or 5 days later for siRNA injected mice, Ni was injected as the challenge for recall into the pinnae of right ear. 48 hours after the challenge, developments of Ni allergy were determined by measuring the increment of ear thickness.

Results: We detected an increase in DCs expressing phosphorylated MKK6 protein after the stimulation by NiCl2. A significant acceleration of Ni allergy was observed by ear swellings of MKK6 over-expressive DC-transferred mice compared with controls. In addition, a reduction of ear swellings was observed in MKK6 inhibited by RNAi treatment.

Conclusion: We succeeded to regulate Ni allergy symptoms in mice and to demonstrate that MKK6/p38 signal transduction cascades were the critical pathways for the development and symptoms of Ni allergy

189
Table 117

Study On Volunteer To Detect MRI Artifacts Caused By FPDS

Wei, B.*, Chen, J., Xu, C.
Shanghai Jiao Tong University
Department of Prosthodontics
Shanghai, China

Purpose: The purpose of this study was to evaluate MRI artifacts in a human's (volunteer) oral cavity caused by several kinds of fixed partial dentures (FPDs) made of different alloys or different amounts of crowns.

Methods & Materials: Chosen was the volunteer who was a 23-year-old female graduate student of med school, with no lost-tooth or prosthesis in her mouth. She signed consent form voluntarily and agreed to participate in the study. 16 samples were divided into two groups --- non-precious alloy group and noble alloy group. There were eight samples in each group. Every sample was placed in the same volunteer's oral cavity with a special device and subject to T2-weight Fast Spin Echo sequence (T2-FSE) scans by MR apparatus (1.5 Tesla, Signa LX, GE, and America). The extent of MRI artifacts were measured and analyzed. SAS 8.2 was used for group t test.

Results: The area of artifacts caused by all samples ranged from 69 to 11551 pixels in MR images. There was statistically significant difference in the magnitude of artifacts between non-precious alloy crowns and noble alloy crowns (t test, $P<0.05$). Artifacts caused by non-precious alloy crowns would create more distortions in MR images of the oral and maxillofacial region, while artifacts caused by gold alloy crowns were less and more localized. There was statistically significant difference in the magnitude of artifacts between single crown and five-unit crowns ((t test, $P<0.05$).

Conclusion: All samples could produce artifacts in MR images. Artifacts caused by non-precious alloy crowns were greater than those caused by noble alloy crowns and the size of artifacts was closely related to the amount of dentures.

190
Table 118

Reliability Of Shade Selection Using An Intraoral Spectrophotometer

Witkowski, S.*, Yajima, N., Wolkewitz, M., Strub, J. R.
University Hospital of Freiburg
Prosthodontics
Freiburg, Germany

Purpose: This study evaluated the accuracy and reproducibility of shade selection of human teeth using a digital spectrophotometer device. Variables such as different operators and different illumination conditions were tested for their influence on reproducibility of measurements.

Methods & Materials: Fifteen anterior teeth of 15 subjects were evaluated for their shade using a digital spectrophotometer (Crystaleye, Olympus, and Tokyo Japan) by two examiners. Each examiner performed the measurement 10 times of the labial surface of each tooth containing three evaluation sides (cervical, middle, incisal, n=300). CIE (Commission International on Illumination) color space value for L* (darkness, 0 perfect black - 100 perfect white) a* (red/green, -150 green - +100 red) and b* (yellow/blue, -100 blue - +100 yellow) were obtained from each evaluated side an amounted a total of 2700 values. In addition, all measurements of all teeth were repeated with the dental unit's light source focused on the subject's mouth. To describe the reproducibility of the measurement unit the variance coefficient was used. A linear model was fitted to explore potential effects of operator and environment on the measurements. Difference of least-square means between examiner 1 and 2 were received from the linear model using GEE techniques for correlated outcomes. Each subject was considered as a cluster. Model assumptions were graphically checked by residuals and other regression diagnostics, thus normality of error terms were assumed.

Results: The measurement error was very low: the median of the variance coefficient was 0.01717, reflecting a good reproducibility of the measurements. Differences of least-square means between operator 1 and 2 were graphically explored with 95% confidence intervals, separately for each CIE and evaluation side. Differences between values enquired by the two operators were statistically not significant. There were no statistically differences between values by two operators or between different illuminator environments.

Conclusion: Within the limits of this study, the accuracy and reproducibility of dental shade selection using the tested spectrophotometer regardless of examiner and illumination conditions reflected the reliability of this device and therefore it can be recommended for clinical application.

191
Table 119

Apoptosis Was Induced In Human Periodontal Ligament Cells By Cyclic Stretching Through The Activation Of Caspase-3 Via Caspase-9 Signaling Cascade

Chun Xu*, Yi Hao, Jing Li, Ming Xie, Jiaying Ma, Fuqiang Zhang
School Of Stomatology, Shanghai Jiao Tong University
Department Of Prosthodontics
Shanghai, China

Purpose: The response of periodontal ligament (PDL) cells to mechanical stimulation is important in the periodontal tissue remodeling. Previously, we discovered that cyclic stretching force on PDL cells induced apoptosis. However, the nature of stretching force-induced cell death is unclear. In the present research, we tested the hypotheses that cyclic stretching force induces apoptosis in PDL cells through the activation of caspase-3 via caspase-9 signaling cascade.

Methods & Materials: The human PDL cells were obtained from healthy premolars. After three to five passages, the cells were stretched by 1%, 10% and 20% strain for 6h, 12h ,24 h and 48h. Before and after the loading of stretching strain, morphological changes of human PDL cells in each stretching and non-stretching group were observed using an inverted phase-contrast microscope. After being stretched, apoptotic cells were detected with the TUNEL assay and visualized by confocal laser scanning microscope and caspase-3 activity was measured with a caspase-3 colorimetric assay kit. Cells were also treated with inhibitor of caspase-8 or caspase-9 before being stretched and then after 24h of cyclic stretching force application, caspase-3 activity was measured.

Results: After being stretched, the cells became aligned regularly and the number of apoptotic cells and the activity of caspase-3 increased significantly in a time-and force-dependent manner. Caspase-3 activity reached a peak after 24h stretching. The stretching induced caspase-3 activation was reduced significantly by a caspase-9 inhibitor, whereas a caspase-8 inhibitor had no such effect.

Conclusion: In vitro application of cyclic stretching force can induce apoptosis in PDLCs through the activation of caspase-3 via the caspase-9 signaling cascade.

192
Table 120

The Research On 3-D Reconstruction Of The Maxillary Central Incisor By Digital Camera

Xu Kan*, Dong Zhen-Jie, Bao Xiang-Jun, Wang De-Fang
Shanghai Jiao Tong University
Department of Prosthodontics
Shanghai, China

Purpose: To evaluate the role of digital camera in reconstruction 3-D solid model of the maxillary central incisor.

Methods & Materials: Take photographs of every section of the maxillary central incisor with digital camera, then reconstruct the 3-D model with PHOTOSHOP software and 3DMAX software.

Results: The precise 3-D solid model of the maxillary central incisor has been reconstructed.

Conclusion: 3-D reconstruction of he maxillary central incisor can be completely accomplished by dentist himself.

193
Table 121

Effects Of Four Dental Bondings On The Expression Of Tnf-? And Il-1? Of Cultured Murine Macrophage Cells

Deng Xuliang*, Ma Qi, Hu Xiaoyang, Wei Yan, Zhang Xuehui
Peking University, School of Stomatology
Department of Special Dentistry
Beijing, China

Purpose: This study was designed to investigate the effects of four dental bondings(Carboxylic acid zinc, Phosphate zinc, Glass ionomer and Zinc-oxide eugenol)on expression of TNF-a and IL-1ß in cultured murine macrophage cell line RAW 264.7.

Methods & Materials: Before the experiment, extracts of the positive control material, Polyvinyl chloride containing 8% organic tin(PVC) and the 4 test materials, Carboxylic acid zinc, Phosphate zinc, Glass ionomer and Zinc-oxide eugeno were prepared in DMEM medium according to ISO 10993-12 guidance(1 g/5 mL of medium for 72h at 37?). Tissue culture polystyrenes (TCPs) was used as the negative material. RAW264.7 cells were suspended at a final concentration of 2.0×105cells/ml in DMEM in 24 well plates and incubated at 37? in 5% CO2. Cells were allowed to adhere for 2 h, washed with HBSS three times, and cultured for 24 h. The whole experiment conclude unstimulated macrophages group and LPS stimulated macrophages group(the final concentration of LPS was 1.0 ug/mL), and the two cell groups were separately cultured in material extracts for 6, 24 and 48h. The expression of TNF-a and IL1-ß was measured by immunoassay with commercially available ELISA kits and compared within different groups.

Results: The results showed that of unstimulated macrophages were unable to express TNF-a and IL-1ß in response to the negative materials. When unstimulated macrophages were cultured with positive material and Zinc-oxide eugenol, cytokine expression increased significantly compared with negative control (p?0.01). Phosphate zinc also induced moderate cytokine expression (p?0.05). But Glass ionomer and Carboxylic acid zinc expressed no detectable level (p?0.05).

For cytokines expression by LPS-stimulated macrophages, results showed that TNF-a and IL-1ß levels increased when LPS-stimulated macrophages exposured to all the test materials. The positive and Zinc-oxide eugenol materials induced the highest cytokine expression, and the peak amount of TNF-a were found in cell culture medium of 24h exposure to

Zinc-oxide eugenol which was about 150-fold higher than that in negative control (p?0.001). The levels of TNF-a decreased after 48h stimulation period. Glass ionomer and Carboxylic acid zinc also induced moderate cytokine expression (p?0.01). These results show that different biomaterials induce varying degrees of immune responses.

Conclusion: TNF-a and IL1-ß are sensitive indicators of immune stimulation that can help to monitor the levels of cellular activation induced by different bondings. Our findings showed that Glass ionomer and Carboxylic acid zinc had relative good biocompability. While Zinc-oxide eugenol and Phosphate zinc stimulated apparent pro-inflammatory cytokines producing in vitro from RAW 264.7 cells.

194
Table 122

Shear Bond Strength Between Zirconia Ceramic And Bovine Dentin Luted With Various Dental Cements

Yang, HS*, Kim, YE, Heo, SO, Vang, MS, Park, SW, Lim, HP
Chonnam National University, School of Dentistry
Department of Prosthodontics
Gwangju, South Korea

Purpose: The purpose of this study is to compare the shear bond strength of zirconia coping materials when they are bonded with various luting agents, and to identify the thermocycling effect on the shear bond strength of luting agents to zirconia coping materials.

Methods & Materials: 56 square specimens were fabricated from zirconia ceramic (Everest® ZS-Blanks; Kavo, Germany). After zirconia ceramic in pre-sintering state was cut and sintered, the surface to be bonded was wet-ground sequentially to standard dimension and then randomly divided into 8 experimental groups. The dentin portion of bovine teeth was exposed and embedded into an autopolymerizing acrylic resin. Fabricated zirconia ceramic specimen and bovine teeth specimen were bonded each other using 4 different types of luting cement : RelyX-UnicemTM1), Rely-X LutingTM2), Transbond XTTM3), Fuji Ortho LCTM4). On the half of these, thermocycling treatment was performed. Then, the specimens were evaluated for their shear bond strength using universal testing machine (Instron 4302®; Instron, England).

Results: Statistical analysis was done on the values taken from the experiment, and the results were as follows.
1. Among the four cements used in this study, the RC1 showed the highest value in bond strength followed by RC2, RM1 and RM2 regardless of presence of thermocycling treatment.
2. There was no statistically significant difference on shear bond strength between thermoncycling treatment and non-thermocycling treatment in all cements but in RC1.
3. For both non-thermocycling and thermocycling treatment, there was statistically significant difference among cements.
4. Adhesive failure was observed in all specimens.

Conclusion: Under the conditions of this study, the results showed that it was not possible to achieve a consistently stable bond to high-density zirconia ceramic using resin-modified glass-ionomer cements(RM-GICs). However, it is noteworthy that RM-GICs' bond strength values were mostly unaffected by thermocycling treatment. Therefore, a RM-GICs may have some advantages in situations which resin bonding is not indicated.

195
Table 123

Influence Of Proper Fitting Of Dentures In Partial Denture Wearers On Brain Function - Relationship Between Mastication And Brain Function -

Yoneyama, Y.*, Morokuma, M., Hosoi, T., Shibuya, N.
Tsurumi University School of Dental Medicine
Department of Removable Prosthodontics
Yokohama, Japan

Purpose: The purpose of this study was to examine the effects of mastication, with and without wearing dentures in partial denture wearers, on brain function. The main focus was to research improved brain function in relationship to correctly fitted dentures.

Methods & Materials: Subjects were 20 partial denture wearers (aged 54-82, Mean 67.6) that visited Tsurumi University Dental Hospital Removable Prosthodontics Dept. for monthly denture maintenance. Denture maintenance was performed to ensure the best fitting of denture for all patients. Initially the occlusal contact area and occlusal force were measured with and without dentures for functional assessment using the Dental Prescal Occluzer (FPD-705, GC Co., Japan) and Dental Prescale 50H without wax version (GC Co., Japan). Electroencephalograms taken for 3 minutes after gum chewing (Xylitol Dental support chewing gum, Lotte, Japan) with and without dentures were analyzed by using Diagnosis Method of Neuronal Dysfunction for brain function assessment. The statistical analysis was performed using Wilcoxon's test.

Results: The average occlusal contact area of the denture wearing group was 10.2 mm2 (SD : 5.7). The average occlusal contact area of the non-denture wearing group was 6.6 mm2 (SD : 5.7). The average occlusal force of the denture wearing group was 449.1N (SD : 220.6). The average occlusal force of the non-denture wearing group was 291.5 N (SD : 228.0). Both Results in all subjects increased significantly with denture wearers ($p<0.05$). All together, seventeen subjects (n=20) showed an increase in brain function activity ($p<0.05$). It was found that the effect of partial denture usage of properly fitted dentures to improve mastication and occlusion is markedly involved in not only improved mastication but also enhanced brain function. Mastication improvement by correct denture use is followed by the activation of brain function after chewing.

Conclusion: In conclusion, improved mastication and brain function activation was achieved by proper fitting of dentures.

196
Table 124

Full Mouth Fixed Implant Rehalibitation In Chronic Periodontitis Patient

Yoo, JS*, Pae, A., Kim, HS, Kwon, HR,
Woo, YH, Choi, DG
School of Dentistry, Kyung Hee University
Department of Prosthodontics
Seoul, South Korea

Purpose: When a patient who became edentulous by severe periodontal disease wears usual dentures, they feel great discomfort. Under their condition, it is hard to gain retention, stability and support with usual dentures. Also, drastic change in oral environment and the disappointment of losing the whole dentition hinders them from wearing dentures. Implant treatment can be a good option in treating completely edentulous patient. Implant treatment can be divided into two big categories: implant supported fixed prosthesis and removable implant supported over-denture. Radiographs, intra-oral photos, patient's expectation and etc. have to be thoroughly examined to choose an appropriate treatment option. If a patient has poor oral hygiene and severe alveolar bone loss, removable implant supported over-denture is recommended. And if a patient has good oral hygiene, enough amount of vertical and horizontal alveolar bone and is financially well-off, fixed implant supported prosthesis can be an option. Fixed prosthesis in edentulous patients is

reported to show clinically successful results.

Methods & Materials: This case report presents 40 year-old female patient who visited the clinic with periodontal disease and pus discharge on the lower left posterior region. She had no special medical history and wanted fixed prosthesis. Fixed prosthesis was chosen as a treatment plan after a thorough examination of intraoral and facial photos, study model and radiographs. The whole dentition was extracted, but upper and lower second molars were reserved to maintain the vertical height. Then, temporary denture was fabricated. Radiographic stent was fabricated after full mouth wax-up. Considering the CT results, 8 implants were decided to be placed in the maxilla and 6 in the mandible. Temporary denture was worn for 3 months during the healing period. Then, temporary fixed restorations were set and after another 3 months, final prostheses were set.

Results: The result is satisfied functionally, esthetically. Now the patient is checking for 6 months.

Conclusion: A team approach is crucial for the treatment of edentulous patients with fixed implant-supported restorations. Diagnostic planning and patient selection determine the treatment feasibility and provide reproducible information during the whole prosthetically driven treatment. A fixed, segmented rehabilitation supported by six to eight anteroposterior implants is a reproducible treatment for edentulous patients when optimal anatomic conditions are present. The results were satisfactory.

197
Table 125

A Histomorphometric And Removal Torque Study Of Oxidized Titanium Implants With Macroscopic Grooves In Rabbit Bone

Yoon, HI*, Yang, JH, Kim, YS, Han, JS
School of Dentistry, Seoul National University
Department of Prosthodontics
Seoul, South Korea

Purpose: The aim of this study was to verify the effects of macroscopic grooves of dental implants on bone response and implant stability at the early stage of healing period.

Methods & Materials: The anodized titanium implants with and without macroscopic grooves were prepared. Twelve rabbits received 48 threaded implants in the tibia. The implants are divided into two groups and each rabbit received four implants. Histomorphometry and removal torque value were evaluated 2 and 6 weeks after implant insertion.

Results: The affinity for bone formation within the grooves was confirmed at 2 and 6 weeks of healing although the percentage of bone-to-implant contact showed no significant difference between the two groups ($P>0.05$). The experimental implants also showed significantly greater resistance to the reverse torque than the control at 2 and 6 weeks ($P<0.05$). The torque value for experimental group was 36.4 ± 27.5% (2 weeks) and 33.2 ± 24.9% (6 weeks) higher than the value of the control group.

Conclusion: The groove structure on oxidized titanium surface may increase resistance to shear load as well as adhesion of the bone-implant interface. Such a geometric feature as macroscopic groove may provide favorable osseointegration and stabilization of the inserted implant in various clinical conditions including early loading.

198
Table 126

Case Of Reconstruction Of Missing Lower Right-Side Molars With An Implant-Supported Fixed Prosthesis

Yoshinori Gunji*
Tohoku University Graduate School Of Dentistry
Division of Advanced Prosthetic Dentistry
Sendai, Japan

Purpose: A 62-year-old woman, missing her lower-right second premolar and first molar, complained of pain and difficulty of chewing due to an ill-fitting removable partial denture for the edentulous site. After a series of examination and consultation for prosthodontic treatment to resolve her complaints, insertion of an implant-supported fixed prosthesis on two implants installed at her edentulous site was selected as a favorable treatment modality among some options such as using a removable partial denture, a fixed partial denture, and an implant-supported fixed prosthesis. One of the major reasons for the decision was that there was adequate quantity and quality of bone at her edentulous site. The other reason was the patient's choice among the treatment options.

In this case, application of splinting of the superstructures on the implants and the occlusal contacts on the prosthesis against the opposite teeth were considered for designing the prosthesis. It is well known that occlusal overloads may cause biological changes in the bone surrounding the implant, which can lead to a loss of osseointegration. Splinting the superstructures of implants is considered an effective technique for distributing the loads exerted on implants, thus eliminating the risk of occlusal overloads. Actual loads exerted on the implants were measured in vivo with 3-D piezoelectric force transducers. The results indicated that the loads were allocated more evenly in the case of splinting than without splinting. Therefore the superstructures were splinted.

In terms of occlusion, light contact at heavy bite and no contact at light bite in the intercuspal position have been considered as a reasonable approach to distributing the loads on teeth and implants. This approach is based on the idea that the occlusion with a single implant should be designed to minimize occlusal force on the implant and to maximize the distribution of force to adjacent natural teeth. However, it has been reported that a right-left balance of occlusal contacts is important for the function of masticatory system and preventing the temporomandibular disorders. Therefore, the superstructures were provided the occlusion to make contacts against the opposite teeth at light bite as same as the residual teeth.

Nine months after treatment, a follow-up examination showed no complications such as superstructure fracture or abutment screw loosening. Moreover, the patient was satisfied with the functionality of the implant-supported fixed prosthesis. Further continuous follow-up is essential to obtain good prognosis.

199
Table 127

The Corrosion Behavior Of Dental Metallic Materials In The Presence Of Microorganism

Zheng Yuanli*, Lu Chunhui
School Of Stomatology, Shanghai Jiao Tong University
Department Of Prosthodontics
Shanghai, China

Purpose: The aim of this study was to compare the resistance to the corrosion of dental CoCr alloys in a solution containing the oral bacteria named Streptococcus mutans (UA159).

Methods & Materials: In this study, the electrochemical behavior of dental Co-Cr alloys was investigated by an electrochemical means in sterile artificial saliva and in an artificial saliva including UA159. Open-circuit potentials, potentiodynamic curves, polarization resistance and impedance spectroscopy were the electrochemical procedures

selected for this work.. The electrochemical impedance spectroscopy was useful for studying the effect on the number of viable bacteria in the biofilm or on the activity of the bacteria. In the potentiodynamic curves, we found the Ecorr, Icorr, Ebr, Epass, Ipass, and so on. Both the environmental scanning electron microscopy (SEM) and the atomic force microscopy (AFM) were useful for finding the change in the surface microstructure. The energy dispersion X-ray analysis (EDX) and the X-ray photoelectron spectroscopy (XPS) could be used to study the corroded products and the change in composition /structure and morphology of the metal materials.

Results: After the electrochemical corrosion, we found the effect of corrosion more obvious. The Ecorr in the artificial saliva is -200±50mV, while the Ecorr in the artificial saliva including UA159 is -500mV±50mV. The Icorr in the artificial saliva without and with UA159 is 50±20nA/cm2 and 100±20nA/cm2, respectively. It is also found that with the absolute of Ecorr and Icorr increased, the dental Co-Cr alloys in the microorganism environment are more susceptible to corrode. The surface analysis also confirmed that the corrosion effect resulted from the UA159.The microstructure is corroded more seriously in the artificial saliva including UA159 than in the sterile artificial saliva.

Conclusion: Microorganisms in the oral environment may stimulate or accelerate the electrochemical corrosion process. The resistance to corrosion of the Co-Cr alloys is reduced in the presence of microorganism.

200
Table 128

Evaluation Of Genetic, Psychological, And Behavioral Factors As Risk Factors For Sleep Bruxism

Yuka A.[1]*, Kazuyoshi Baba[2], Takeshi Suganuma[2], Shuichiro Yoshizawa[2], Sachiko Ando[3], Naomi Watanabe[3], Masakazu Ishii[3], Yuji Kiuchi[3], Gou Yamamoto[4], Tetsuhiko Tachikawa[4], Tomohiko Gunji[5], Yoshimasa Igarashi[1]
[1][5] Tokyo Medical and Dental University
[2][3][4] Showa University
[1] Removable Partial Denture Prosthodontics
[2] Prosthodontics, School of Dentistry
[3] Pathophysiology, School of Pharmaceutical Sciences
[4] Oral Pathology and Diagnosis, School of Dentistry
[5] Periodontology
Tokyo, Japan

Purpose: There is a consensus about the multi-factorial nature of the etiology of sleep bruxism. For example, psychological and behavioral factors have been frequently related to sleep bruxism. However, no study has attempted to investigate possible roles of genetic factors in development of sleep bruxism. The purpose of this study was to investigate whether any genetic, psychological, and behavioral factors would be related with sleep bruxism status.

Methods & Materials: A total of 65 individuals (33 females and 32 males, mean age 34.0, SD 11.5) participated in this study after signing the university-approved consent form. Using a clinical diagnostic criteria derived from literature (Dubé et al., 2004) and 3 nights masseter EMG recording data by a small electromyographic divice (BiteStrip®, SLP), the subjects were divided into sleep bruxer (n=45) and control (n=20) groups. Regarding genetic factors, serotonin-related polymorphisms, which included 5-HTT gene polymorphisms: 5-HTT linked polymorphic region (5-HTTLPR) and 5-HTT variable number of tandem repeat at intron 2 (STin2 VNTR), and single nucleotide polymorphisms (SNPs) of serotonin receptor 1A (HTR1A), serotonin receptor 2A (HTR2A), and serotonin receptor 2C (HTR2C), were selected to be genotyped. Besides genotyping, two personality inventories (TCI and NEO-FFI) and questionnaires about family history of sleep bruxism, daytime sleepiness (Epworth sleepiness scale: ESS), life events, tooth contacting habits, alcohol intake, and cigarette smoking were administered to evaluate other potential factors. A multiple logistic regression analysis was performed between above-mentioned factors as the predictors and sleep bruxism status as the outcome ($p<0.05$).

Results: The regression analysis found that the score of reward dependence temperament as measured by TCI (Odds ratio: OR=2.06, 95% confidence interval: CI=1.2 to 3.0, p=0.005), Epworth sleepiness scale (OR=1.38, 95%CI=1.0 to 1.6, p=0.02), HTR2A SNP genotype (OR=6.91, 95%CI=1.1 to 52.8, p=0.04), and tooth contacting habit (OR=0.02, 95%CI=0.001 to 0.56, p=0.02) were significantly associated with sleep bruxism.

Conclusion: These results suggest that a temperament of reward dependence, daytime sleepiness, daytime tooth contacting habit, and SNP of serotonin receptor 2A are associated with sleep bruxism within the frame of this study.

201
Table 129

Oral Health Status Of A Group Of Turkish Dental Patients

Bulem Yuzugullu*, Ayse Gulsahi*, Cigdem Celik****
Baskent University, Faculty Of Dentistry
***Department Of Oral Diagnosis and Radiology** ****Department Of Conservative Dentistry** *****Department Of Prosthodontics**
Ankara, Turkey

Purpose: The aim of the present study was to evaluate the oral health status of a group of Turkish dental patients related to socio-demographic and -economic factors, dental behavior and dental visit patterns.

Methods & Materials: A total of 500 patients [185 male (37%), 315 (63%) female] were included in the study. Socio-demographic and –economic factors, dental behavior and visit patterns were recorded for each patient. Clinical oral health status was assessed by determining the DMFT/DMFS index scores. Multiple linear regression analyses were performed for comparisons.

Results: Caries experience measured by the DMFT/DMFS index increased across older age groups ($p<.001$). For male compared with female patients, while mean number of decayed teeth were higher ($p<.05$); filled teeth were lower ($p<.01$). While the mean number of filled teeth were higher with high education level; missing teeth were less as the level of education increased ($p<.001$). The mean number of filled teeth were higher in patients who had not visited a dentist before ($p<.001$). Patients who smoked showed higher numbers of missing teeth ($p<.05$).

Conclusion: Dental visit pattern and socio-demographic factors were significantly related to caries experience.

202
Table 130

A Quantitative Evaluation Of The Distal Displacement Of The Gingival Zenith In The Maxillary Anterior Teeth

Žagar, M*, Carek, V.
School Of Dental Medicine, University Of Zagreb
Department of Prosthodontics
Zagreb, Croatia

Purpose: The appearance of gingival tissues plays an important role in the esthetics of the maxillary anteerior teeth. The aim of this study was to quantify the specific distal displacement of the gingival zenith in the maxillary anterior dentition.

Methods & Materials: Bilateral measurement, taken with a digital caliper in maxillary stone casts from periodontally healthy students were recorded in six maxillary anterior teeth to evaluate distal displacement of the gingival zenith in relation to the long axis of the crowns.

Results: The gingival zenith was distally displaced between 0.45 and 1.01 mm in 90%, 85% and 60% of the central incisors, lateral incisors and canines, respectively. Contralateral comparisons between the tooth groups revealed significantly larger distal displacement of the zenith in left canine ($p<0.05$). Ipsilateral comparisons revealed that the lateral displacement of the zenith was significantly larger in central than in lateral incisors ($p<0.05$). Similarly, the zenith of lateral incisors was displaced significantly more distal than that of canine teeth ($p<0.05$). Comparisons of the frequency of coincidence of the position of the gingival zenith with the long axis of the tooth revealed that it was significantly greater in canines than in lateral and central incisors ($p<0.05$).

Conclusion: The frequency and magnitude of distal displacement is tooth-dependent and larger in central than in lateral incisors, which in turn, is larger than in canines. These data could be used as reference points during esthetic anterior oral rehabilitation, especially in case of porcelain laminate veneers.

203
Table 131

Measurement Of Three Dimensional Morphology Of Composite Resin Polymerization Shrinkage

Zhang, B.*, Deng, X
Shanghai Jiao Tong University School of Medicine
Department of Prosthodontics
Shanghai, China

Purpose: The aim of this study was to investigate the effect of light emitting diode(LED, SATELEC, France) light curing unit (LCU) and a quartz tungsten(QTH, Coltolux 75, American) LCU on the polymerization shrinkage of three different dental composites.

Methods & Materials: A Phase Shifting Projected Grating Topography Measuring Instrument was used to obtain the three dimensional (3D) contour line contour of the sample surface. The value of each contour line was calculated by image processing software automatically and the precise morphology of the objective surface was obtained. Three different kinds of resin composites were used: two were micro-hybrid (Z250, 3M; AP-X, KURARAY), the another one is hybrid (Z100, 3M).Those three different kinds of composites of the same shade were irradiated by QTH and LED light curing units at 2mm distance from the light guide of the LCU(LED, QTH). The phase shifting projected grating topography measuring instrument was placed in the lateral of the curing cavity, measuring the samples' 3D surface topography at three different time spots: before curing, 50s after the beginning of curing and 400s after the beginning of curing. The 3D morphology of the sample before curing minus the 3D topography 50s or 400s after curing was the polymerization shrinkage of the sample 50s or 400s after the beginning of curing. Results of polymerization shrinkage were analyzed statistically using analysis of variance (ANOVA).

Results: For Z100 and Z250, polymerization shrinkage of the LED light cured samples 50s and 400s after the beginning of curing sample was less than that of QTH light cured samples ($P<0.05$). For the AP-X, there was no statistical difference between polymerization shrinkage of the LED light-cured samples and the QTH light cured samples ($P>0.05$).

Conclusion: LED LCU has less polymerization shrinkage than QTH LCU for Z100 and Z250. There is no difference of polymerization shrinkage for AP-X between LED LCU and QTH LCU.

204
Table 132

Apoptosis In Periodontal Ligament Cells After Being Challenged By Cyclic Stretching Force

Fuqiang Zhang*, Chun Xu, Yi Hao, Jing Li, Ming Xie, Jiaying Ma
School Of Stomatology, Shanghai Jiao Tong University
Department of Prosthodontics
Shanghai, China

Purpose: The periodontal ligament cells (PDLCs) plays an important role in maintaining homeostasis of periodontal tissue under mechanical force-loading caused by mastication. While it still remains unclear whether excessive mechanical force can induce PDL cells (PDLCs) apoptosis. This study examined the relationship between stretching force and apoptosis in human PDL cells in vitro.

Methods & Materials: Human PDLCs were dissociated from the periodontal ligaments of healthy premolars. After four passages, the in vitro cultured human PDL cells were stretched by 1%, 10% and 20% strain with a cell strain unit for 6h, 12h, 24 h and 48h. After being stretched, apoptotic cells were detected through the terminal deoxynucleotidyl transferase (TdT)-mediated dUTP-biotin nick-end-labeling method (TUNEL) by using flow cytometry and confocal laser scanning microscopy. In addition, real-time PCR was used to confirm the change of gene expression of Bcl-2 and Bax

following stretching force.

Results: After being stretched, human PDLCs became regularly aligned and the number of apoptotic cells increased significantly in a time-and force-dependent manner in response to stretching force within 24h, and then apoptosis decreased at 48h. Meanwhile, Bcl-2 and Bax gene expression significantly increased and the Bcl-2/Bax mRNA ratio showed a significant decline after application of stretching force.

Conclusion: The results demonstrated that stretching force can induce apoptosis in human PDL cells and Bcl-2 family is contributed to apoptosis.

205
Table 133

The Study On The Microcracks Of All-Ceramic Material Appling The Digital Image Correlation Method

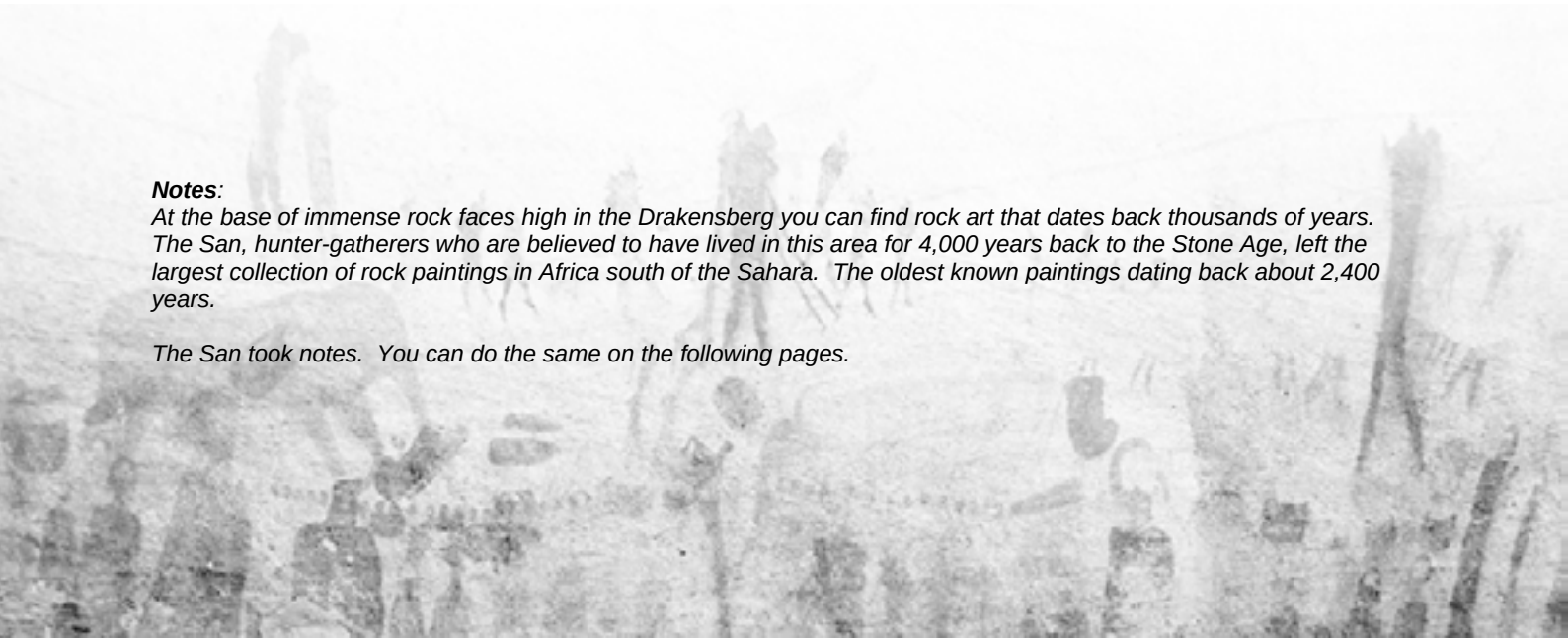
Zhang XY* [1], Zhang DS [2], Ruan DP [1], Lu CL [2], Wu YL, Luo M [2], Xu K [1]
[1] Shanghai Jiaotong University Shanghai
[2] Shanghai University Shanghai
Department Of Prosthodontics, The Keypoint Laboratory
The Dental Institute, College Of Stomatology
Ninth People'S Hospital, School Of Medicine
Shanghai, China

Purpose: To study the application of digital image correlation method for testing the microcrack's initiation and propagation when the all-ceramic samples were loading.

Methods & Materials: The plane and curve models of all-ceramic materials with speckled surface, 10.0×2.0×2.0mm3 in size, were manufactured and adhered to resin underlying , then fixed them to the micro tensile framework .The microcracks were observed when the specimens were loading , and all the speckled images were collected by charged coupled device camera in real-time simultaneously. The cracks were observed and variational sequence images were caught. After they were treated by digital image correlation system software, the digital images and the displacement status were worked out to track the initiation, propagation and evaluate the developmental trend of microcracks in the bilayer all ceramics.

Results: The subcritical cracks or cracks were observed earlier and clearer than that with eyes, and the position and length of cracks' tip could be distinguished exactly.

Conclusion: The digital image correlation methods were applicable to study the microcracks of all-ceramic including orientation, range, and extension trend.



***Notes**:*
At the base of immense rock faces high in the Drakensberg you can find rock art that dates back thousands of years. The San, hunter-gatherers who are believed to have lived in this area for 4,000 years back to the Stone Age, left the largest collection of rock paintings in Africa south of the Sahara. The oldest known paintings dating back about 2,400 years.

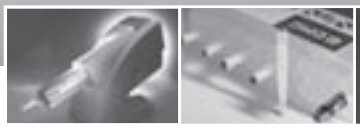
The San took notes. You can do the same on the following pages.

NOTES

NOTES

Abstract Index by Author

High Quality.
Made in Germany by DMG.



DMG

straumann

ESTHETICS BY DESIGN

The **Straumann® Anatomic IPS e.max® Abutment** is a premium ceramic restoration combining outstanding esthetics and excellent material. Designed by Straumann® and produced by Ivoclar Vivadent to fit a range of patient needs, the new abutment is specifically intended for reliable use and esthetic results and offers great flexibility in its application.

COMMITTED TO
SIMPLY DOING MORE
FOR DENTAL PROFESSIONALS

www.icp-org.com

International College of Prosthodontists
PO Box 99119 · 4425 Cass Street, Suite A
San Diego, CA 92109 USA
Tel: 1 (858) 270 1814 · Fax: 1 (858) 272-7687
Emal: icp@icp-org.com · Web Site: www.icp-org.com