



*Welcomes our colleagues to the*  
*9<sup>th</sup> Biennial Meeting of the*  
**International Congress on Maxillofacial Rehabilitation**  
**May 19-22, 2010 · Sestri Levante, Italy**

*Organization and Institution Sponsors*

**International Society for Maxillofacial Rehabilitation**  
**Department of Prosthetic Dentistry, University of Turin**  
**Department of Fixed & Implant Prosthodontics, Genoa University**



*With generous financial support from our Conference Sponsor*

**Gecar**





**ISMR**

**International Society for  
Maxillofacial Rehabilitation**

## **DEDICATION of the ISMR 2010 Congress**

### **In Memory of Henk Verdonck**



The 2010 ISMR international biennial conference will celebrate the memory of Henk Verdonck. On Saturday, the 7th of February 2009, our colleague Henk Verdonck of Maastricht, The Netherlands passed away suddenly and unexpectedly at 53 years of age. Henk, a prosthodontist of extraordinary ability was an innovator in the truest sense and an international leader in the application of advanced digital technologies to maxillofacial prosthetics.

Celebrating the life of Henk Verdonck at the ISMR Sestri Levante conference holds particular significance as Henk chaired the team that hosted the 2004 ISMR conference in his home town, Maastricht. This will always be remembered as a very special conference in the history of the ISMR for not only the quality of the scientific program but the excellent organization of the meeting and the special warmth that Henk personally brought to the conference.

Henk was a perfectionist who had a talent for bringing together the digital and virtual world with traditional approaches in common clinical use. In all his clinical work Henk was devoted to those in need of maxillofacial prosthetic care.

It was particularly sad that Henk passed away within months after the defence of his doctoral thesis on "The Correlation between Irradiation and Maxillary/Mandibular Bone Vascularity, Bone Mineral Density as well as Implant Stability". With the loss of Henk, we have all lost a colleague who produced so many novel ideas for head and neck patient care that provided or held promise for the future of bringing improved quality of life to patients.

Henk will live on in our memories as a very special person and a remarkable colleague who contributed so much to his field of endeavour. For his smile alone, we shall always miss our friend and colleague. The ISMR dedicates the 2010 international biennial conference to the memory of Henk Verdonck and celebrates the wonderful contribution that Henk Verdonck made to head and neck related care.



## ISMR FIRST HONORARY MEMBER



**Giulio Preti, MD, DDS**  
**Professor and Chairman**  
**Department of Prosthodontics**  
**University of Turin, Italy**

Early in his professional career, Professor Giulio Preti recognized the value of a team approach to health care. As a young physician he realized that comprehensive care required close collaboration among medical and dental specialists and allied health professionals. His subsequent dental education only furthered his desire to bring the professions of medicine and dentistry closer together and to cooperate with other health care specialists to better serve their patients.

At the University of Turin, he rose to the rank of Professor and Chairman of the Department of Prosthodontics. There, he developed an academic model that is still pointed to as a landmark. Through a combination of volunteer faculty, ingenuity, creative design, persuasive power, and persistence, Prof Preti redefined dental education and introduced the student to all phases of the patient care experience. Equally noteworthy is his vision in developing a strong program of scientific inquiry at the university, Professor Preti has made valuable contributions to research and improved patient care through his many published papers and textbooks as well as by serving to facilitate his colleagues and students in their quest for evidence-based solutions to problems.

At the renowned Zurich Group, Professor Preti's leadership has served as an inspirational model for those seeking excellence in clinical care, research, and education. This unique, professional organization has had a vision of the future and a commitment to continuous quality improvement that extends well beyond either dentistry or Prosthodontics alone but has touched those in medicine, the basic sciences, and the neurosciences as well. And this influence has not been limited to Italy or Europe alone. It has been felt throughout the world.

To paraphrase one of Professor Preti's colleagues, Carlo Guastamacchia, "Giulio Preti is the flag and the wind for the Italian community. His enthusiasm, his competence, and his love for the work are the best examples that he can offer to our profession." Professor Preti epitomizes the mission, values, and vision of the ISMR, all that we strive to be in the international healthcare community.

Professor Preti and his staff hosted the first ISMR meeting held in Europe. The 1998 International Congress on Maxillofacial Rehabilitation meeting was held in Turin, Italy at the prestigious Lingotto convention center. From the inception of the ISMR, Professor Preti has been a motivating force with our European maxillofacial colleagues and his disciples from both Genoa and Turin have continue to support our educational mission by co-sponsoring this 2010 meeting here in Sestri Levante, Italy. In recognition of his leadership, visionary thinking, and commitment to the interdisciplinary approach to patient care, it is with great pleasure that we recognize Professor Giulio Preti as the first Honorary Member of the International Society for Maxillofacial Rehabilitation.



## International Society for Maxillofacial Rehabilitation

### THE ISMR MISSION:

ISMR ADVANCES INTERDISCIPLINARY MAXILLOFACIAL REHABILITATION THROUGHOUT THE WORLD.

*“EDUCATION, PATIENT CARE, OUTREACH AND RESEARCH”*

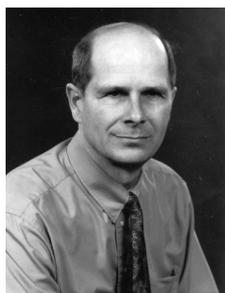
### ISMR: THE HISTORY

In the late 1980's John Beumer, Director of Maxillofacial Prosthetics UCLA, Los Angeles, California, Ian Zlotolow, Director of Dental Service, Department of Surgery, Memorial Sloan-Kettering Cancer Center, New York, New York and Sal Esposito, Director of Maxillofacial Prosthetics at the Cleveland Clinic, Cleveland, Ohio met and decided to conduct an international symposium devoted to the art and science of maxillofacial prosthetics. Seed money for this initial meeting was provided by their respective institutions and by the Borchard Foundation. More than 400 individuals from more than 30 countries attended this initial conference. The funds contributed by the Borchard Foundation were used to support the travel and lodging expenses of 30 professionals from underdeveloped countries.

The meeting was so successful and well attended that Beumer, Zlotolow and Esposito formed an international organization devoted to maxillofacial rehabilitation. They decided to conduct the meetings every two years and to rotate them between North America, Europe and Asia. The International Congress of Maxillofacial Prosthetics was then established and incorporated in October of 1996.

As the organization developed, it was understood that professional groups other than prosthodontists contributing to head and neck related care wished to participate in the organization. In recognizing this and the need to create an international organization that brought a diversity of professional groups together, the organization was renamed the International Society for Maxillofacial Rehabilitation (ISMR) on January 7<sup>th</sup>, 2002. In 2008 it was decided that the ISMR needed to be completely restructured to reflect and embrace the interdisciplinary nature of head and neck related care. The restructuring also needed to address development of a future-oriented organization that actively engaged involvement of the best young minds for the future. The decision was also made that, as a fundamental principle, these best young minds needed to be actively engaged in the operation of the ISMR.

The ISMR interest is in maxillofacial reconstruction and rehabilitation. This interest is not restrictive and relates, in broad fashion, to head and neck education, patient care, outreach and research. The ISMR membership is drawn from the international clinical and research community that has an interest in head and neck related care. The mission of the ISMR is to *advance interdisciplinary maxillofacial rehabilitation throughout the world*. The fundamental purpose of this mission is to improve reconstructive and rehabilitative maxillofacial care with the aim of improving quality of life of individuals needing care. The ISMR delivers this mission through bringing support to professionals involved in care, teaching and research. The ISMR is structured to be a fully interdisciplinary organization that recognizes the importance of diverse clinical and research disciplines embracing interdependency in their respective roles. The ISMR is an inclusive organization that places particular value on mutual respect of diverse disciplines in delivering excellence in education, patient care, outreach and research.



John Beumer



Salvatore Esposito



Ian Zlotolow

## WELCOME FROM THE ISMR PRESIDENT

Dear ISMR Members and Colleagues,

Benvenuti a Italia!

Welcome to Italy, Sestri Levante, and the 10<sup>th</sup> International Congress on Maxillofacial Rehabilitation. Many thanks are due our Italian colleagues for their efforts to secure such a beautiful venue and the support of so many sponsors.

This is an exciting time for our organization and we will all play an important role. We are moving into a new era where the ISMR will play a leading role as the first truly multidisciplinary, international organization dedicated to maxillofacial rehabilitation. This will allow us to foster global alliances, establish regional centers of excellence, and continue to support the improved quality of life for our patients around the world.

I would like to thank our Gold Patron, Gecar Spa- BMW; our Silver Patrons, Conexao – Sistemas de Próteses, Dental Tech, Henry Schein - Krugg S.p.A., Neuromed S.r.l., Nobel Biocare, Piezosurgery S.r.l., Southern Implants, Zimmer Dental Italy; our Bronze Patrons, 3dMd, 3DIEMME, 3M ESPE, Class Implant S.r.l., Cochlear AG, Gendex/Kavo/Imaging Sciences Int., Ghimas S.p.A., Major Prodotti Dentari S.p.A, Materialise, MUSC Maxillofacial Prosthodontic Clinic, Quintessenza Edizioni, Technovent Limited; our Subscription Patrons, Heraeus Kulzer S.r.l., iRSM. Their dedication and support of our mission plays an important role in our success.

Finally, I would like to thank you for attending this year's congress. I promise you a program filled with quality speakers from around the world. I am confident that you will find this a worthwhile experience. As important, I encourage you to use the congress as an opportunity to reconnect with old friends, make new ones, and enjoy beautiful Italy.



Welcome,

A handwritten signature in black ink that reads "David J. Reisberg, DDS".

**David Reisberg, DDS**  
**ISMR President**  
Professor of Surgery and Prosthodontics  
Director, The Craniofacial Center  
University of Illinois at Chicago  
Chicago, IL USA

## RESTRUCTURING OF THE ISMR

### Announcement by Dr David Reisberg, President on Behalf of the ISMR Board of Councilors

Dear ISMR Members,

I want to bring you up to date on some very exciting news that involves our organization. Some of you may recall that at the 2008 constituent meeting, I asked for your indulgence as the Board of Councilors updated our bylaws, policies and procedures. From the success built by the ISMR Founders, Drs Beumer, Esposito and Zlotolow, the goal was to restructure the ISMR to fully realize our potential to be a unique organization that is both international and interdisciplinary in its focus on the rehabilitation of the head and neck patient.

Over the past two years, the Board of Councilors has worked hard to accomplish this goal. I am pleased to announce that this process is now largely complete and involved:

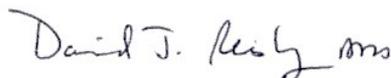
- A strategic planning exercise that will carry the ISMR to 2014
- New bylaws, Rules of Order, Terms of Reference
- Registration of the new ISMR bylaws
- Establishment of the new Officers, Board of Councilors and fourteen new Committees
- A structure for the Advisory Council of Organizational Members that allows other professional societies to hold membership in the ISMR. Please encourage your professional societies to hold membership in the ISMR.
- A new logo and branding for the ISMR
- A new website for the ISMR. The website will continue to develop so please visit the site over the next few months.
- Creation of Special Interest Groups for the ISMR

The Founders and past Board of Councilors are to be congratulated on their vision, flexibility, and desire to welcome all clinical and scientific disciplines that contribute to improving the quality of life of our patients.

My appeal to you as members of the ISMR and of the international community is to encourage colleagues from all disciplines to join our organization. We need to build a strong membership that will represent our interests. Ultimately, this will benefit our patients who deserve our best efforts.

Thanks to all who contributed their time and efforts and welcome to all of our new members from disciplines new to the ISMR. We have a particularly impressive venue and an excellent scientific program in Sestri Levante, Italy. I look very forward to welcoming you to Sestri Levante.

David Reisberg



**ISMR President**

## WELCOME FROM THE CONFERENCE PROGRAM CHAIR

Dear Colleagues,

On behalf of the 2010 Program Committee, welcome to Sestri Levante! The 2010 ISMR biennial international conference marks a very special event in the history of the ISMR and Sestri Levante provides a spectacular venue to mark this occasion.

The first meeting of the ISMR was held in April of 1994 and the ISMR came into being formally in October 1996 with incorporation of the organization. Since that time, the organization has developed substantially and has hosted a series of very successful international biennial conferences. In recognizing the great strides that have been made towards an interdisciplinary approach to care of head and neck related conditions, a very responsive decision was made to completely restructure the ISMR to establish an internationally unique organization that fully embraces an interdisciplinary structure in its organization and activities.

The restructured ISMR provides an environment where all clinical and scientific disciplines are represented and can meet on an equal footing. This has meant the creation of an entirely new organization with new bylaws, a new board structure, new committees and a new branding for the organization. Sestri Levante provides a wonderful setting for the revealing of your new ISMR organization.

To mark this occasion, a very special scientific program has been developed for the conference and we are very grateful to all our invited speakers, participants and industry partners for bringing such strong support to the ISMR meeting in Sestri Levante. Particular thanks needs to be paid to our Italian colleagues who have provided such a special venue for the conference and for the truly remarkable support they have developed for the ISMR and the 2010 conference. The Program Committee would also like to express our gratitude to all of the industry partners who have most generously supported the ISMR 2010 conference.

We wish you a professionally fulfilling meeting and hope that you will have opportunity to enjoy the special environment that Sestri Levante and surrounding Liguria provides.



Best Regards,

A handwritten signature in black ink that reads "Johan Wolfaardt". The signature is written in a cursive style with a horizontal line underneath.

**Johan Wolfaardt, BDS, MDent, PhD**  
**Program Chair**

Institute for Reconstructive Sciences in Medicine  
Misericordia Community Hospital  
University of Alberta / Alberta Health Services / Covenant Health  
Edmonton, AB. Canada T5R 4H5

## WELCOME ADDRESS FROM CONGRESS CHAIRS GENOA AND TURIN, ITALY

Dear Colleagues and Friends,

On behalf of the Faculty of Dentistry of Genoa and Turin University, Italy, we are delighted to make you welcome to the 9<sup>th</sup> International Society of Maxillofacial Rehabilitation (ISMR) meeting, 19-22 May 2010, in Sestri Levante, Italy.

The scientific board has developed an exciting scientific program which will cater for the spectrum of interests of all the participants. In addition, the uniquely beautiful Riviera location will be an attraction for our social and cultural events. This 3-days Congress includes the lectures of keynote speakers and experts from all over the world. On Saturday, Workshops will be held for the widening of specific issues that are particularly relevant on the clinical point of view.

We are delighted to acknowledge our current Sponsors, our Patron and Exhibitors and we appreciate their support to the ISMR meeting. The meeting is committed to the philosophy of an interdisciplinary approach to the patient and it is addressed to maxillofacial surgeons, otolaryngologists, oncologists, prosthodontists, psychologists and basic scientists. The goal of the program is to provide a holistic vision of the maxillofacial rehabilitation and to give the opportunity to share scientific knowledge and clinical experience among different professionals from all over the world. We hope you take the time to enjoy the gorgeous spring of the Italian Riviera and to meet new and old friends joining us at the ISMR meeting.

We are really looking forward to meeting you personally in Sestri Levante, Italy.



Distinti Saluti,  
**Paolo Pera, MD, DDS**  
**Conference Congress Chair**  
Professor and Chair  
Department of Fixed and Implant Prosthodontics  
Genoa University  
Genoa, Italy



Distinti Saluti,  
**Gianfranco Gassino, MD, DDS**  
**Conference Congress Chair**  
Prosthodontic Department  
Dental School  
University of Turin  
Turin, Italy

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Dr. Joaquim Augusto Piras de Oliveira  
São Paulo, BRAZIL

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Professor and Chairman  
Division of Advanced Prosthodontics, Biomaterials  
and Hospital Dentistry  
Weintraub Center of Reconstructive Biotechnology  
UCLA School of Dentistry  
Los Angeles, CA USA

Salvatore Esposito, DMD  
Private Practice  
Beachwood, OH USA

Kwang Nam Kim, DDS, PhD  
Seoul National University  
Dean of the Dental School  
Seoul, Korea

Giulio Preti, DDS, MD, PhD  
Chairman Department of Prosthetic Dentistry  
School of Dentistry  
Department of Clinical Physiopathology  
Faculty of Medicine, University of Turin  
Turin, Italy

Takashi Ohyama, DDS, PhD  
Professor and Chief  
First Department of Prosthodontics  
Tokyo Medical and Dental University  
Tokyo, Japan

Robert P. van Oort, DDS, PhD  
Groningen University Medical Center  
Department of Oral Maxillofacial Surgery and  
Maxillofacial Prosthetics  
Groningen, The Netherlands

Ian M. Zlotolow, DMD  
Chief of the Dental Service  
Department of Surgery  
Director of the Maxillofacial Prosthetic and Dental  
Oncology Fellowships  
Memorial Sloan-Kettering Cancer Center  
Dental Services  
New York, NY USA

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Web: [www.ismr-org.com](http://www.ismr-org.com)



## CONFERENCE PROGRAM CHAIR

### Johan Wolfaardt, BDS, MDent, PhD, Program Chair

Institute for Reconstructive Sciences in Medicine Division of Otolaryngology - Head and Neck Surgery,  
Department of Surgery, University of Alberta, Edmonton, Alberta, Canada

## CONFERENCE CONGRESS CHAIRS

### ISMR, USA

David Reisberg, DDS  
Professor of Surgery and  
Prosthodontics  
Director, The Craniofacial Center  
University of Illinois at Chicago  
Chicago, IL USA

### ISMR, Italy

Paolo Pera, MD, DDS  
Professor and Chair  
Department of Fixed and  
Implant Prosthodontics,  
Genoa University  
Genoa, Italy

### ISMR, Italy

Gianfranco Gassino, MD, DDS  
Prosthodontic Department  
Dental School,  
University of Turin  
Turin, Italy

## 2010 CONFERENCE COMMITTEE

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Los Angeles, CA USA

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Roberto Branchi  
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Ian Zlotolow  
Oakland, CA USA

## PRESENTER DISCLOSURE STATEMENTS

9<sup>th</sup> International Congress on Maxillofacial Rehabilitation  
May 19-22, 2010, Sestri Levante, Italy

The International Society for Maxillofacial Rehabilitation (ISMR) requests that all speakers shall disclose any affiliation with and financial interest in a company or a product related to the subject matter of the presentation as a part of the Speaker's Agreement. The intent of this policy is not to prevent a speaker with an affiliation or financial interest from making a presentation but any potential conflict must be identified openly so that the attendees have the full disclosure of the facts and may form their own judgments about the presentation. Any portion of the information submitted below will be shared with the attendees to gain perspective on the educational merits of the presentation.

The following speakers have indicated that they have a financial interest in a commercial product(s) or services that will be discussed in their presentation.

Kanchan Dholam

Naresh Jha

Lisette Van Der Molen

The following speakers have indicated that neither they or any members of their family has a financial arrangement or affiliation with any corporate organization offering financial support or grant monies for the ISMR Conference, nor do they have a financial interest in any commercial product(s) or service(s) that will be discussed in their presentation

Gorakh Ahire	Tomas Escuin	Maria Menini	Roberto Scotti
Somkiat Aimplee	Ariane Farah	Eitan Mijiritsky	Hideki Sekiya
Puneet Anand	Gary Faulkner	Shin Miyamae	Tose Shigemori
Chaux Anne-Gaelle	Zhihong Feng	Jien Morimata	Zou Shiquan
R. Aramini	Davide Fornengo	David Morris	Naoko Shiroshita
Nina Ariani	Gianfranco Gassino	Marco Mozzati	Ana Soares Mello
Domenico Baldi	Giorgio Gastaldi	Mai Murase	Ana Sousa Surwald
Craig Barclay	Peter Gerngross	Bruno Musante	Stephen C Tam
Oya Barut	Yumushan Gunay	Federico Mussano	Khim Hean Teoh
Francesco Bassi	Soshi Hanawa	Vincenzo Notaro	Yoshiyuki Tochihara
Edmond Bedrossian	Kazuhiro Hori	Matthew Obuhoff	Joerd Van Der Meer
Elisabetta Bellia	Teruo Ino	Won-Suk Oh	Suzanne Verma
Julie Bemer	Tomohiko Ishigami	Sachiko Okazaki	Tong-Mei Wang
Marco Bevilacqua	Rui Ito	Joaquim Augusto	Alvin Wee
Pravin Bhirangi	Jason Jason	Piras Oliveira	Guofeng Wu
Marco Bonelli	Jay Jayanetti	Antonio Olivo	Masaaki Yamamoto
John Gregory Boyes-Varley	Ting Jiao	Tetsuo Oyama	Fumi Yoshioka
Edoardo Brauner	Banu Karayazgan-Saracoglu	Shogo Ozawa	Yimin Zhao
Chris Butterworth	Ho Beom Kwon	Ilknur Özcan	
Paola Ceruti	Vojkan Lazic	Julide Ozen	
Leonardo Ciocca	Denise Mac Carthy	Enric Pedmonte	
Nadia Cocero	Edoardo Manfredi	Peeranuch Prayadsab	
Trevor Coward	Carlo Manzella	Biagio Rapone	
Luciano Dib	Miwa Matsuyama	Harry Reintsema	
Hisham El Fattah	Ana Mello Soares	Weihong Ren	
Thais Emidio	Giulio Menicucci	Samuel Salino	
		Guido Schioli	

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## CONFERENCE MODERATORS

Thursday May 20, 2010 9:00-10:00am  
Plenary Session I

**Robert Taft**  
**Francesco Bassi**

Thursday May 20, 2010 10:45am-12:30pm  
Plenary Session I

**Pravin Patel**  
**Gianmario Schierano**

Thursday May 20, 2010 13:30-15:00  
Concurrent Session I  
Osseointegration

**Salvatore Esposito**  
**Giorgio Gastaldi**

Thursday May 20, 2010 15:30-17:00  
Concurrent Session I  
Osseointegration, Regenerative Medicine &  
Radiation Therapy

**Betsy Davis**  
**Dale Howes**

Thursday May 20, 2010 13:30-17:00  
Concurrent Session II  
Special Session with an Interdisciplinary Panel

**John Wolfaardt**

Friday May 21, 2010 9:00-10:45am  
Plenary Session II

**David Reisberg**  
**Harry Reintsema**

Friday May 21, 2010 11:15am-12:30pm  
Concurrent Session I  
Maxillofacial Prosthetics & Facial Prosthetics/  
Materials

**Stefano Carossa**  
**Alvin Wee**

Friday May 21, 2010 11:15am-12:30pm  
Concurrent Session II  
Digital Technology

**Martin Osswald**

Friday May 21, 2010 11:15am-12:30pm  
Concurrent Session III  
Rehabilitation

**Ruben Rosenberg**

Friday May 21, 2010 14:15-16:00  
Plenary Session III

**Joachim Stalfors**  
**Neal Garrett**

Friday May 21, 2010 16:30-17.30  
Concurrent Session IV  
Digital Technology

**Arun Sharma**  
**Enrico Conserva**

Friday May 21, 2010 16:30-17.30  
Concurrent Session V  
Digital Technology

**Gerald Grant**

Friday May 21, 2010 16:30-17:30  
Concurrent Session VI  
Rehabilitation

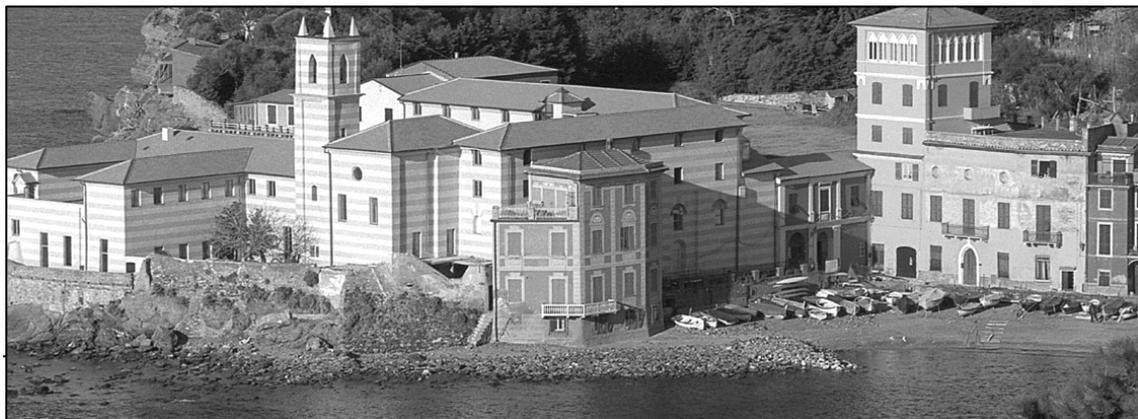
**Peter Gerngross**

Saturday May 22, 2010 9:00-10:30am  
Plenary Session IV

**Nareshj Jha**  
**Francesco Bassi**

Saturday May 22, 2010 11:00am-12:30pm  
Plenary Session IV

**Gosta Granström**  
**Jan L.N. Roodenburg**



## CONFERENCE OVERVIEW

### Wednesday, May 19<sup>th</sup>

#### Meeting Room

08:00 - 16:00	ISMR Board Meeting ( <i>Officers &amp; Council Members</i> )	Sala Mimosa
13:00 - 19:00	Conference Registration	Congress Hall Foyer
16:00 - 19:00	<b>Poster &amp; Welcome Reception</b>	Congress Hall - Corale & Belvedere Patios

### Thursday, May 20<sup>th</sup>

08:00	Conference Registration Opens	
08:45	Opening Ceremony	Congress Hall
09:00 - 12:30	<b>General Session</b>	Congress Hall
12:30 - 13:30	Conference Luncheon	Corale & Belvedere Patios
12:30 - 13:30	<b>ISMR Business Working Lunch</b> ( <i>Invitation only</i> )	Patio (Atrio)
13:30-17:00	<b>Concurrent Session I</b> <i>Osseointegration, Regenerative Medicine &amp; Radiation Therapy</i>	Congress Hall
13:30-17:00	<b>Concurrent Session II</b> <i>Meeting Today's Complex Challenges in Involving the the Patient and their Families in Head and Neck Cancer Treatment Selection</i>	Sala Oleandro
17:00	Session Adjourns	
17:00 - 19:00	<b>Exhibit Reception</b>	Exhibit Area & Corale & Belvedere Patios

### Friday, May 21<sup>st</sup>

08:00	Conference Registration Opens	
08:45	Conference Announcements	Congress Hall
09:00 - 11:15	<b>General Session</b>	Congress Hall
11:15 - 12:30	<b>Concurrent Session I</b> <i>Maxillofacial Prosthetics &amp; Facial Prosthetics / Materials</i>	Congress Hall
11:15 - 12:30	<b>Concurrent Session II</b> <i>Digital Technology</i>	Sala Oleandro
11:15 - 12:30	<b>Concurrent Session III</b> <i>Rehabilitation</i>	Sala Ginepro
12:30 - 13:45	ISMR Member Lunch ( <i>Members only</i> )	Sala Oleandro
12:30 - 14:15	Conference Lunch	Corale & Belvedere Patios
14:15 - 16:30	<b>General Session</b>	Congress Hall
16:30 - 17:30	<b>Concurrent Session IV</b> <i>Digital Technology</i>	Congress Hall
16:30 - 17:30	<b>Concurrent Session V</b> <i>Digital Technology</i>	Sala Oleandro
16:30 - 17:30	<b>Concurrent Session VI</b> <i>Rehabilitation</i>	Sala Ginepro
17:30	Session Adjourns	
18:30 - 23:00	<b>ISMR Banquet</b> <i>Poster Awards and Acknowledgements- fee required</i>	Hotel Nettuno Seaside Restaurant

### Saturday, May 22<sup>nd</sup>

08:00	Conference Registration Opens	
09:00 - 12:30	<b>General Session</b>	Congress Hall
12:30	Conference Adjourns	
12:30 – 14:00	ISMR Board Meeting ( <i>Officers &amp; Council Members- working lunch</i> )	Sala Mimosa
14:00 - 17:00	<b>Elective Concurrent Workshops</b> ( <i>fee required</i> )	
	<b>Workshop #1: Industry</b> Southern Implants <i>Maxillofacial Implants: Does the Implant System Matter?</i>	Sala Ginepro
	<b>Workshop #2: Industry</b> Piezoelectric Surgery <i>Piezosurgery for Dental as well as Oral and Maxillofacial Surgery Applications</i>	Sala Oleandro
	<b>Workshop #3: CE</b> <i>Clinical Research Design</i> <i>Considerations for Outcomes of Maxillofacial Rehabilitation</i>	Sala Ginestra
	<b>Workshop #4: CE</b> <i>Use of Medical Modeling in Your Daily Practice: What You Need to Know</i>	Congress Hall
	<b>Workshop #5: CE</b> <i>Predictable Osseointegration for Immediately Loaded Implants in Full-Arch Treatment. Surgical, Prosthetic and Laboratory Guidelines</i>	Sala Segreteria

## SCIENTIFIC PROGRAM SCHEDULE

### Wednesday, May 19<sup>th</sup>

08:00 - 16:00	ISMR Board Meeting	Officers/Council Members only	<b>Sala Mimosa</b>
13:00 - 19:00	Conference Registration		<b>Congress Center</b>
16:00 - 19:00	<b>Poster &amp; Welcome Reception</b>	<b>Congress Hall &amp; Corale &amp; Belvedere Patios</b>	
	<i>See page 37 for Poster Papers and Presenters</i>		

### Thursday, May 20<sup>th</sup>

08:00	Conference Registration Opens		
08:45	Opening Ceremony		<b>Congress Hall</b>
<b>09:00 - 12:30</b>	<b>General Session</b>		<b>Congress Hall</b>

**Moderators:** Robert Taft & Francesco Bassi

	<u>Abstract #</u>		
9:00	1	<b>Gösta Granström</b>	<i>Osseointegration and Radiation Therapy</i>
9:30	2	<b>Arun Sharma</b>	<i>Implants for Pediatric Patients: Growth and Implant Placement</i>
10:00	3	<b>Massimo Robiony</b>	<i>Accuracy of Virtual Reality and Stereolithographic Models in Maxillofacial Surgical Planning</i>
10:30		Discussion	
10:45		AM Coffee Break	

**Moderators:** Pravin Patel & Gianmario Schierano

	<u>Abstract #</u>		
11:15	4	<b>Joacim Stalfors</b>	<i>Skin Response with Skin Penetrating Implants</i>
11:45	5	<b>Naresh Jha</b>	<i>Saliva Preserving Strategies in Management of Head and Neck Cancer</i>
12:15		Discussion	
12:30		Conference Luncheon	<b>Corale &amp; Belvedere Patios</b>

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13:30-17:00 **Concurrent Session I- Osseointegration** **Congress Hall**

**Moderators:** Salvatore Esposito & Giorgio Gastaldi

	<u>Abstract #</u>		
13:30	6	John Gregory Boyes-Varley	<i>Maxillary Reconstruction following Gunshot Wounds to the Face</i>
13:45	7	Antonio Olivo	<i>Rehabilitation of Severe Upper Jaw Atrophy by Zygoma Implants</i>
14:00	8	Guido Schirotti	<i>Zygoma Implants Placement with Flapless Computer Guided Surgery: A New Protocol Proposal</i>
14:15	9	Domenico Baldi	<i>Sinus Floor Elevation using Osteotomes or Piezoelectric Surgery: A New Approach</i>
14:30	10	Valentina Arata	<i>Immediate Loading Dental Implants in Osteoporotic Patients Treated with Oral Bisphosphonates</i>
14:45	11	Chris Butterworth	<i>Peri-Implant Keratinised Soft Tissue Grafting in Oral Cancer Patients: Rationale and Novel Techniques</i>
15:00		PM Coffee Break	

Thursday, May 20<sup>th</sup> (continued)

**PROGRAM SCHEDULE**

**Moderators:** Betsy Davis & Dale Howes

**Congress Hall**

Abstract #

- |       |    |                 |                                                                                                                                                                     |
|-------|----|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 15:30 | 12 | Harry Reintsema | <i>Treatment Outcomes with Mandibular Implants Placed per Ablationem in Head and Neck Oncology Patients: Evaluation of Five Year Survivors</i>                      |
| 15:45 | 13 | Luciano Dib     | <i>Rehabilitation of Cancer Patients Utilizing the Osseointegration Concept. A Comparison Between Two Cancer Rehabilitation Centers in Sao Paulo and Gothenburg</i> |

**Regenerative Medicine**

Abstract #

- |       |    |                 |                                                                                                                                           |
|-------|----|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| 16:00 | 14 | Puneet Anand    | <i>Stem Cells "The Wonder Cells" in Craniofacial Tissue Engineering. Patient's Own Stem Cells Used to Grow Facial Bone: A Case Report</i> |
| 16:15 | 15 | Leonardo Ciocca | <i>Virtually Planned Guided Bone Regeneration Using Rapid Prototyping and Stem Cells: Animal and Human Reports</i>                        |

**Radiation Therapy**

- |       |    |                             |                                                                                                                                                 |
|-------|----|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| 16:30 | 16 | Corsalini, M.<br>Rapone, B. | <i>Oral Hygiene in Patients with Oral Cancer Undergoing Chemotherapy and/or Radiotherapy after Prosthesis Rehabilitation: Protocol Proposal</i> |
| 16:45 | 17 | Ana Soares Mello            | <i>Intensified Oral Care Combined with Lasertherapy Prevents Oral Complications Induced by Head &amp; Neck Cancer Treatment</i>                 |
| 17:00 |    | Session Adjourns            |                                                                                                                                                 |

13:30-17:00 **Concurrent Session II- Panel Session- Meeting Today's Complex Challenges in Involving the the Patient and their Families in Head and Neck Cancer Treatment Selection**

**Sala Oleandro**

*"...the best interest of the patient is the single most important factor in decision making in head and neck oncology care".*

As undisputed as this statement may seem, frequently what is not well appreciated is that for the clinician as well as the patient, the question of what is best for the patient becomes remarkably difficult to resolve.

The audience will be asked to participate and to provide questions to the panel in order to provide a personal exchange of ideas on this provocative subject.

**Moderator:** Johan Wolfaardt

- |       |  |                                             |                                                                                                                                        |
|-------|--|---------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| 13:30 |  | Geert J. van der Laan                       | <i>Introduction</i>                                                                                                                    |
| 13:40 |  | Chiquit G.F.E.<br>van Linden van den Heuvel | <i>Patients' Perspectives</i>                                                                                                          |
| 14:00 |  | Jan L.N. Roodenburg                         | <i>Logistics in Care: Interdisciplinary Head and Neck Oncology Team</i>                                                                |
| 14:30 |  | E. Mary Wells                               | <i>Giving the Missing Team Member a Voice: Integrating Patient Experiences of Head and Neck Cancer into the Treatment Pathway</i>      |
| 15:00 |  | PM Break                                    |                                                                                                                                        |
| 15:30 |  | Florence J. van Zuuren                      | <i>What Types of Counseling and Outcome Research Can Improve Patient's Treatment Decisions in the Field of Head and Neck Oncology?</i> |
| 16:00 |  | Kris C.P.Visser                             | <i>Crossing Borders From Curative to Palliative Care</i>                                                                               |

Thursday, May 20<sup>th</sup> (continued)

**PROGRAM SCHEDULE**

16:30	Geert J. van der Laan	<i>Summary, Proposal for Improvements and Panel Discussion</i>	<b>Sala Oleandro</b>
17:00	Session Adjourns		
17:00-19:00	<b>Exhibit Reception</b>	<b>Exhibit Area &amp; Corale &amp; Belvedere Patios</b>	

**Friday, May 21<sup>st</sup>**

08:00	Conference Registration Opens		
08:45	Conference Announcements		<b>Congress Hall</b>
09:00 - 11:15	<b>General Session</b>		<b>Congress Hall</b>
<b>Moderators:</b> David Reisberg & Harry Reintsema			
	<u>Abstract #</u>		
9:00	18	<b>Pier Francesco Nocini</b>	<i>Microsurgical Reconstruction in Maxillofacial Oncology</i>
9:30	19	<b>Gianfranco Gassino</b>	<i>Facial Defects: Alteration at Surgery to Enhance the Prosthetic Prognosis</i>
10:00	20	<b>Takahiro Ono</b>	<i>Masticatory and Swallowing Rehabilitation after Oral Tumor Resections</i>
10:30	Discussion		
10:45	AM Coffee Break		<b>Exhibit Area</b>

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11:15 - 12:30 **Concurrent Session I- Maxillofacial Prosthetics** **Congress Hall**

**Moderators:** Paolo Pera & Alvin Wee

	<u>Abstract #</u>		
11:15	21	Elisabetta Bellia	<i>SET: Simplified Edentulous Treatment</i>
11:30	22	Gianfranco Gassino	<i>The Application of the SET Method to the Treatment of Patients with Maxillectomy</i>
11:45	23	Hisham El Fattah	<i>Pre-Prosthetic Surgical Alterations in Maxillectomy to Enhance the Prosthetic Prognoses as Part Of Rehabilitation Of Oral Cancer Patient</i>

**Facial Prosthetics / Materials**

	<u>Abstract #</u>		
12:00	24	Nina Ariani	<i>Microbial Biofilms in Relation to Facial Prosthesis</i>
12:15	25	Federico Mussano	<i>Improving Dental Materials by PECVD-Grown A-SiOx Coatings</i>

12:30 - 14:15 ISMR Business Lunch (*Members only*) **Sala Oleandro**

12:30 - 14:15 Conference Lunch **Corale & Belvedere Patios**

Friday, May 21<sup>st</sup> (continued)

**PROGRAM SCHEDULE**

11:15 - 12:30 **Concurrent Session II- Digital Technology** **Sala Oleandro**

**Moderator:** Martin Osswald

		<u>Abstract #</u>	
11:15	26	Stephen C. Tam	<i>Immediate Implant-Supported Auricular Prosthesis Using Surgical Navigation &amp; CAD/CAM Technology: In Vitro Trial</i>
11:30	27	Joerd Van Der Meer	<i>Digital Designed Surgical Guides for Extra-Oral Implants</i>
11:45	28	Suzanne Verma	<i>The Use of Surgical Navigation Systems for Virtual Preoperative Planning in Craniofacial Reconstructions</i>
12:00	29	Yimin Zhao	<i>Advanced Applications of Computer-Aided Design and Rapid Auto-Manufacture in Maxillofacial Restoration and Prosthetics</i>
12:15	30	Guofeng Wu	<i>Integration of Multi-Digital Techniques Applied for Infant Clefts Researches</i>

12:30 - 14:15 ISMR Business Lunch (Members only) **Sala Oleandro**

12:30 - 14:15 Conference Lunch **Corale & Belvedere Patios**

11:15 - 12:30 **Concurrent Session III- Rehabilitation** **Sala Ginepro**

**Moderator:** Ruben Rosenberg

		<u>Abstract #</u>	
11:15	31	Joaquim Augusto Piras Oliveira	<i>Prosthetic Reconstruction of Severe Facial Defects With or Without Use of the Osseointegrated Implants</i>
11:30	32	Francesco Bassi	<i>Kinesiographic Evaluation of the Motor Performance of the Mandible Based on "Reaching" Tasks in Patients after Hemimandibulectomy</i>
11:45	33	Lisette Van Der Molen	<i>A Randomized Preventive Rehabilitation Trial in Advanced Head and Neck Cancer Patients Treated with Chemo-Radiotherapy: Feasibility, Compliance &amp; Short-Term Effects</i>
12:00	34	Jien Morimata	<i>The Influential Factors Affecting Health-Related Quality of Life of Maxillectomy Patients</i>
12:15	35	Weihong Ren	<i>Speech Assessment for Patients with Maxillary Obturators</i>

12:30 - 14:15 ISMR Business Lunch (Members only) **Sala Oleandro**

12:30 - 14:15 Conference Lunch **Corale & Belvedere Patios**

14:15 - 16:30 **General Session** **Congress Hall**

**Moderators:** Joacim Stalfors & Neal Garrett

		<u>Abstract #</u>	
14:15	36	<b>Spadola Bisetti Massimo Raimondo Simona</b>	<i>Dysphagia and Dyslalias in the Outcomes of Maxillofacial Surgery: Evaluation, Phoniatric and Logopedic Remediation</i>
14:45	37	<b>Sabastian Sauerbier</b>	<i>Regenerative Medicine in Head and Neck Rehabilitation</i>
15:15	38	<b>Paolo Pera &amp; Marco Bevilacqua</b>	<i>Biological and Biomechanical Factors on Bone Reparation in Immediate Loaded Implants</i>
15:45		Discussion	
16:00		PM Coffee Break	

Friday, May 21<sup>st</sup> (continued)

**PROGRAM SCHEDULE**

16:30 - 17:30 **Concurrent Session IV- Digital Technology** **Congress Hall**

**Moderators:** Arun Sharma & Enrico Conserva

<u>Abstract #</u>		
16:30	39	Trevor Coward <i>The Development of a Stereophotogrammetry Technique to Assess Facial Change Following Surgery for Head and Neck Cancer</i>
16:45	40	Edmond Bedrossian <i>Computer Guided Planning: Treatment of Patients with Complex Maxillofacial Defects</i>
17:00	41	David Morris <i>Bringing Three-Dimensional Plans for Orthognathic Surgery to Reality: One Center's Experience with Rapid-Prototype Splints and Cutting Guides</i>
17:15	42	Roberto Scotti <i>New CAD-CAM Protocols for Constructing Facial Prostheses Using Rapid Prototyping Technology</i>
17:30		Session Adjourns

16:30 - 17:30 **Concurrent Session V- Digital Technology** **Sala Oleandro**

**Moderator:** Gerald Grant

<u>Abstract #</u>		
16:30	43	Zhihong Feng <i>Reconstruction of Maxillary Defect through Dentoalveolar Distraction Osteogenesis with Personalized Curvilinear Distractor Designed through Computer Technology</i>
16:45	44	Fumi Yoshioka <i>The Evaluation of Several Kinds of CAD/CAM Systems for Fabricating Facial Prosthesis</i>
17:00	45	Ting Jiao <i>Numerical Study of the Upper Airway Airflow Dynamics in the Radical Maxillectomy Patient</i>
17:15	46	Tong-Mei Wang <i>It's Not Just A Beginning: On The Use of Stereolithographic Models for Mandibular Rehabilitation</i>
17:30		Session Adjourns

16:30 - 17:30 **Concurrent Session VI- Rehabilitation** **Sala Ginepro**

**Moderator:** Peter Gerngross

<u>Abstract #</u>		
16:30	47	Alvin Wee <i>Relationship between Treatment for Head and Neck Cancer and Obstructive Sleep Apnea</i>
16:45	48	Craig Barclay <i>British Oral Rehabilitation Research Network Head and Neck Cancer Touchscreen Database</i>
17:00	49	Hideki Sekiya <i>A Study of Effectiveness of Functional Recovery Using Palatal Augmentation Prosthesis for IDysphagia After Oral Cancer Surgery. Comparative Study of Postoperative Status Between Cases Wearing and Those Not Wearing Palatal Augmentation Prosthesis by Means</i>
17:15	50	Marco Bonelli <i>Comparative Evaluation In Animal Models Of Osteogenesis With "Bio-Inspired"Space-Maintainer</i>
17:30		Session Adjourns

18:30 - 23:00 **ISMR Banquet** **Hotel Nettuno**  
*Poster Awards and Acknowledgements- Elective- fee required* *Seaside Restaurant*

**Saturday, May 22<sup>nd</sup>**

**PROGRAM SCHEDULE**

08:00 Conference Registration Opens

09:00 - 12:30 **General Session**

**Congress Hall**

**Moderators:** Nareshj Jha & Francesco Bassi

Abstract #

9:15 51 **Ranieri Cancedda** *Bone Graft Materials Related to Mesenchymal Stem Cells: a Potential Tissue Engineering Approach to Guided Bone Regeneration*

9:45 52 **Sidney Fels** *Simulation of Oral and Pharyngeal Function*

10:15 Discussion

10:30 AM Coffee Break

**Moderators:** Gösta Granström & Jan L.N. Roodenburg

Abstract #

11:00 53 **Pravin Patel** *The Coming of Age of Virtual Craniofacial Surgic Planning: From Imaging to Finite Element Analysis*

11:30 54 **Rainer Schmelzeisen** *Advanced Digital Technology in Reconstruction Of Head and Neck*

12:30 Conference Adjourns

12:30-14:00 ISMR Board Meeting Officers/Council Members only- *working lunch* **Sala Mimosa**

14:00 - 17:00 **Elective Concurrent Workshops** (*select one- elective- fee required*)

Industry Workshops (1&2), CE Workshops (3, 4 & 5)

*See following pages for details*



## INDUSTRY WORKSHOPS

### Industry Workshop #1- Southern Implants

Room: Sala Ginepro

#### *Maxillofacial Implants- Does the Implant System Matter?*

Fee: \$50

**Course Description:** The craniofacial skeleton has a complex, but effective anatomy for human function. However, when this and oral anatomy is disrupted by resorption, surgical and/or traumatic ablation, the oral environment becomes hostile to implant supported reconstruction.

With 20 years of collaborative research, we can offer innovative implant designs and abutments to overcome the anatomic constraints of the maxillo-facial skeleton including after resorption and ablation in order to restore with implant supported prostheses. One of the greatest advantages in the bulk of these cases is the vastly reduced need for minor and major bone grafts. This generally ensures greater stability and fewer complications.

Join us on an inspiring journey as we debate:

- Does the implant system actually matter?
- The restoration of the severely resorbed maxilla
- The protocols for implant supported reconstruction of the ablated maxilla
- Outcomes for maxillo-facial reconstruction
- Understanding bone biomechanics and solutions for distortion and prosthetic misfit



**Instructor: Dale G. Howes, B.Sc. (Dent); BDS; M.Dent (Pros); FCD (SA)**

Professor Howes is in Private Practice in Johannesburg, and is a senior consultant in the Department of Prosthodontics at the University of the Witwatersrand, South Africa. He has published and lectured extensively internationally, including as keynote speaker at the International College and the American Academy of Prosthodontists, the International College of Prosthodontists as well as the Australasian Osseointegration Society. Research collaboration with their team and Professor PI Brånemark won the scientific session at the Academy of Osseointegration (Boston, 2008). Previous prizes include the World Congress of Osseointegration in Las Vegas (2003).



**Instructor: John G. Boyes-Varley, BDS, Dip Dent, MDent, FFD**

Dr. Boyes-Varley is in private Maxillofacial surgical practice in Johannesburg, and is a senior consultant and senior lecturer in the Division of Maxillo-Facial & Oral Surgery at the Department of Surgery, University of the Witwatersrand in South Africa where he is also completing his Ph.D. He has published and lectured extensively internationally, including as keynote speaker at the British Association of Oral and Maxillofacial Surgeons and the Australasian Osseointegration Society. He is involved with Prof Howes with research collaboration with Professor PI Brånemark. A previous prize includes the World Congress of Osseointegration in Las Vegas (2003) and has written a chapter on craniofacial implantology “operative Maxillofacial surgery” text book, edited by Professor John Langdon.

## Industry Workshop #2- Piezoelectric Surgery

Room: Sala Oleandro

### *Piezosurgery for Dental as well as Oral and Maxillofacial Surgery Applications*

Fee: \$50

**Course Description:** Piezoelectric surgery, devised by Tomaso Vercellotti, uses a new ultrasound instrument to perform osteotomies and osteoplasties. Features of ultrasound bone surgery are:

- Selective cutting effect on bone tissue, with no effect on soft tissue. Convenient when it is necessary to perform osteotomies near delicate anatomical structures.
- Perform reduced-thickness cuts, which are more regular and neater if compared to those made by common surgical burs.
- It is possible to draw any osteotomic line pattern and have improved control of the insert during procedure in total assurance of not damaging soft tissues. Particularly useful in oral bone surgery.

Clinical applications will be shown in cases of extraction therapy and endodontic surgery, parodontal surgery, implant surgery, and maxillary sinus surgery i.e. sinus lifting with vestibular or crestal access. Piezosurgery® in maxillofacial surgery is employed to perfect the precision of mandibular and maxillary osteotomies. Significant clinical advantages are:

- Preservation of the alveolar and lingual nerves, of the infra-orbital nerve and of the optic nerve.
- Craniofacial stenosis interventions are performed safely.
- Osteotomies carried out by ultrasonic microvibrations promote outstanding tissue healing.
- The cavitation of cooling saline reduces intra-surgical bleeding and post-op edema.
- Shock-wave impact on sensory neurotransmitters reduces post-op pain.

The presentation shows the many results of histological, bio-molecular and neurosensory research. The outcomes for the patient are remarkably reduced morbidity and recovery period.



#### **Instructor: Domenico Baldi, MD, DDS**

Dr. Domenico Baldi graduated from Genoa School of Medicine in 1987 and was Health Officer at the Genoa Military Hospital from 1988-1990. In 1990 he was certified cum laude in Odontostomatology at Genoa School of Medicine and educated in Implantology at Pisa School of Medicine in 1998. Dr. Baldi has submitted several scientific articles and is a member of the Italian Society for Implantology and Prosthodontics. He is Adjunct Professor at the University of Genoa, has a private practice in Genoa and has been a speaker at national and international symposiums. He is also a Professor in the Surgery High Level Course at La Sapienza-University of Rome and an editorial board member for the QDT Quintessence dental technology (Italian edition). Dr. Baldi is an active and founding member of the Piezo Surgery Academy.



#### **Instructor: Tomaso Vercellotti, MD, DDS**

Dr. Tomaso Vercellotti graduated in Medicine and Surgery cum laude in 1979 and specialized in Odontostomatology at University of Studies of Genoa in 1984. He is Honorary Professor at UCL Eastman Dental Institute of London and Visiting Professor in many Italian and international universities. Dr. Vercellotti is an active member of the following organizations: AO, ICOI, AAP, EAO, SidP and an international speaker at: AO, EAO, AAP, NYU, USC and ICOI. He is author of a new bone quality classification for surgical purposes and the first book on Piezoelectric Bone Surgery and authored the first scientific clinical articles on the new surgical techniques and five chapters in international books. Dr. Vercellotti maintains a private practice limited to periodontology and implantology in Genova (Italy). He is the 2005 recipient of the Andi Award from the Italian Dental Association for scientific and cultural merit. He has dedicated for over 25 years to clinical education and the rehabilitation of complex cases. Dr. Vercellotti is founder and President of Piezosurgery Academy and inventor of Piezoelectric Bone Surgery.

## CONTINUING EDUCATION WORKSHOPS

### **CE Workshop #3- *Clinical Research Design: Considerations for Outcomes of Maxillofacial Rehabilitation*** Room: Sala Ginestra Fee: \$50

**Course Description:** The goals of this workshop are to enhance the skills and knowledge necessary to develop a basic understanding of the research process for initiating clinical research projects on the impacts of rehabilitation in the maxillofacial patient population. Included in the discussion will be:

- Review of the research designs commonly used for this patient group
- Outcome measures that are desirable for specific impairments and interventions
- Quality of life and treatment satisfaction & instruments utilized for assessing outcomes
- Complications for research protocols and limitations of research results in maxillofacial research
- Single institution vs. multi-institution protocols



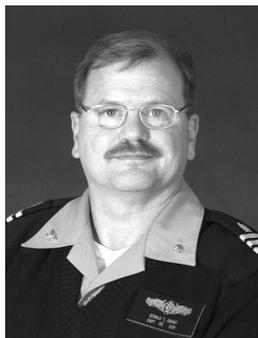
**Instructor: Neal Garrett, PhD**

Neal Garrett is a Professor in the Section of Removable Prosthodontics in the Division of Advanced Prosthodontics, Biomaterials and Hospital Dentistry at UCLA School of Dentistry, Los Angeles, California USA.

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### **CE Workshop #4- *Medical Modeling in Your Daily Practice: What You Need to Know*** Room: Congress Hall Fee: \$50

**Course Description:** Medical Modeling has become an important part of how we provide care to our patients, however, many of us know very little about it or how it can augment our daily practice. An introduction to digital files and formats as well as the pro's and con's of image capture with digital systems and Cone Beam CT, different surgical prediction software's, and the fabrication of surgical guides and devices with rapid prototype machines will be presented. The goal of this workshop is to help the clinician decide what form of modeling to select to help to address a patient's need for reconstruction.



**Instructor: Gerald Grant DMD, MS**

Dr. Gerald Grant completed his training in Prosthodontics and Maxillofacial Prosthodontics at the Naval Postgraduate Dental School in Bethesda, Maryland. He is a Fellow of the American Board of Prosthodontics and is the Service Chief for 3D Applications at the National Naval Medical Center and Walter Reed Army Medical Center. His research has been craniofacial image capture and CAD/CAM techniques in head & neck reconstruction.



**Instructor: Robert M. Taft, DDS**

Dr. Robert Taft completed his training in Prosthodontics at the Naval Postgraduate Dental School and his Maxillofacial Prosthetics training Wilford Hall Medical Center with the Air Force. He is a Fellow and a Board Examiner for the American Board of Prosthodontists. He is presently the Dean of the Naval Postgraduate Dental School. His area of research has been in craniofacial image capture and CAD/CAM techniques in head and neck reconstruction.

**CE Workshop #5- Predictable Osseointegration for Immediately Loaded Implants in Full-Arch Treatment. Surgical, Prosthetic and Laboratory Guidelines**

Room: Sala Segreteria

Fee: \$50

**Course Description:** The Prosthodontics Department of Genoa University has developed a surgical and prosthetic protocol for the fixed treatment of the completely edentulous maxilla with immediately loaded implants. It provides the patient with a full-arch, screw-retained provisional prosthesis within 24 hours by means of 4 to 6 implants placement. Rigid framework is made to fit implants passively by a specific laboratory luting technique. The Workshop will describe and illustrate in detail the operational phases, the biological principles and the experimental evaluations that led to its actual form.



**Instructor: Tiziano Tealdo DDS, MS, DT**

Tiziano Tealdo is Professor of Prosthodontics at the Department of Prosthetic Dentistry, University of Genoa, Italy. After the degree, his interests focused on implant-prosthetic therapy. His training on the immediate loading implant-prosthetic procedures led him to attend courses at the University of Aix-Marseille, Göteborg, Umea and Lisbon



**Instructor: Marco Bevilacqua DDS**

Marco Bevilacqua is working as assistant, lecturer and researcher at the Department of Prosthetic Dentistry, University of Genoa, Italy. He is member, as a reviewer, of the Editorial Board of the Journal of Prosthodontics.



**Instructor: Maria Menini DDS**

Maria Menini is a postgraduate student at the Department of Prosthetic Dentistry, University of Genoa, Italy. Her research is focused on implant surfaces, bio-mechanical aspects and load transmission in implant dentistry as well as clinical outcomes of immediate loading protocols.



**Instructor: Paolo Pera MD, DDS, PhD**

Paolo Pera is Professor and Head of the Department of Prosthetic Dentistry, University of Genoa, Italy. Fellow of Professor Giulio Preti, he is author of several publications in Italian and international journals as well as university text books. He is member, as reviewer, of the Editorial Board of the International Journal of Prosthodontics.

## POSTER PRESENTATIONS

<b>Table</b>	<b>Author</b> (Last, First name)	<b>Title</b>
1	Ahire Gorakh	<i>Man in Lab - Role of Dental Technician in Oncology</i>
2	Implee Somkiat	<i>Patients with Reconstruction of Intraoral Defects at M. D. Faculty of Dentistry, Chulalongkorn University: Measure Quality of Life</i>
3	Anne-Gaelle Chaux	<i>Surface-Rendering 3D-Reconstruction and Cranio-Maxillofacial Implantation: A Case Report</i>
4	Aramini Raffaella	<i>A New Technique for the Arrangement of Maxillary Anterior Teeth in Complete Denture</i>
5	Asami Kazuya	<i>Evaluation of Obturator Prosthesis Regarding to Their Masticatory Function</i>
6	Barut Oya	<i>Oral Rehabilitation of Patients Who Underwent Head and Neck Radiotherapy: 2 Case Reports</i>
7	Bemer Julie	<i>Prosthetic Approach after Total Glossectomy</i>
8	Bevilacqua Marco	<i>Clinical and Radiographic Outcomes of Immediate versus Delayed Loading of Dental Implants in Edentulous Maxillae: A 36 Month Prospective Study</i>
9	Bhirangi Pravin	<i>Fabrication of Extra Oral Implants in Maxillofacial Oncology- A Team Work</i>
10	Brauner Edoardo	<i>Combined Implant and Teeth-Supported Rehabilitation in a Pre-Maxilla Severe Bone Resorption. A 24 Year Follow-up Case Report</i>
11	Casey David	<i>Peri-Abutment Tissue Response To Platform-Switching in Extra-Oral Implants: A Pilot Study</i>
12	Ceruti Paola	<i>Prescription of a Complete Denture: Advantages of the SET Method (simplified edentulous treatment) in the Communication with the Laboratory</i>
13	Cocero Nadia	<i>Dental Extraction Protocols in Patients Treated with Oral Bisphosphonate Therapy</i>
14	Dholam Kanchan	<i>Oral Rehabilitation of Head and Neck Cancer Patients with Implant Retained Prosthesis: TMH Experience</i>
15	Emidio Thais	<i>Maxillofacial Rehabilitation Anchored in Extra-Oral Brazilian Implants Conexão – Systems Prosthesis: Case Reports</i>
16	Escuin Tomas	<i>Biomechanical Study of the Mandible with a Simulation Model of Suprahyoid Muscles</i>
17	Farah Ariane	<i>Colour Stability of Pigments used for the Colouration of Maxillofacial Prosthesis</i>
18	Faulkner Gary	<i>Influence of Flanges on Extraoral Implant Stability</i>
19	Fornengo Davide	<i>Total Rehabilitation of Lates of Reconstruction after Oral Cancer Exeresis by NobelGuide(R) and Teeth in an Hour (R) Technique: Literature Review and Personal Contribution</i>
20	Gastaldi Giorgio	<i>CAD-CAM Procedure for the Construction of an Interlocutory Prosthetic Nose after Rhinectomy</i>
21	Gerngross Peter	<i>International Society of Maxillofacial Rehabilitation's Practice Based Research Network (ISMR's PBRN) – A Proposal</i>
22	Gunay Yumushan	<i>Evaluation of Prothodontist's Effort on Maxillofacial Defect Patients</i>
23	Hanawa Soshi	<i>Three-dimensional Assessment of the Face Asymmetry with Maxillary Defect</i>
24	Hirai Hideaki	<i>The Effect of the Human Posture to the Deformation of Facial Contour by using 3D Data Acquisition System</i>

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27	Ishigami Tomohiko	<i>Maxillofacial Prosthetics using Japanese Magnetic Attachments</i>
28	Ito Rui	<i>Longitudinal Study on Metal Plate Denture with Magnetic Attachments</i>
29	Jayanetti Jay	<i>Zygomaticus Implant Supported Cleft Palate Obturator: Case Report</i>
30	Karayazgan-Saracoglu Banu	<i>Evaluation of Treatment Satisfaction in Patients with Facial Prosthesis</i>
31	Kwon Ho Beom	<i>Evaluation of Speech Function in Patients who Underwent Prosthodontic Rehabilitation after Maxillectomy</i>
32	Latcan Elena	<i>EndoProsthetic Silicone Maxillofacial Rehabilitation</i>
33	Lazic Vojkan	<i>Implant Retained Orbital Prostheses in Irradiated Patient – Case Report</i>
34	Mac Carthy Denise	<i>Baseline Periodontal Status, Oral Hygiene and Smoking Habits in Head and Neck Cancer Patients</i>
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37	Matsuyama Miwa	<i>The Application of Nasal Speaking Valve to Velopharyngeal Incompetence Patients</i>
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40	Menini Maria	<i>The Use of a Masticatory Robot to Analyze the Shock Absorption Capacity of Different Restorative Materials for Prosthetic Implants</i>
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47	Oh Won-Suk	<i>Metal Connector as Link of Obturator to Complete Dental Prosthesis</i>
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49	Oyama Tetsuo	<i>The Biomechanical Effect of Bone-Implant Contact Ratio and Length of Implant</i>
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54	Prayadsab	Peeranuch	<i>Quality of Life in Hemi-mandibulectomy Patient, Subjective and Objective Assessment. Part I : To Compare the Maximum Bite Force Between the Patients who Undergone Hemi-mandibulectomy Restored with Conventional Removable Dentures Versus Implant Supported Denture</i>
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60	Teoh	Khim Hean	<i>Implant Prosthetic Rehabilitation of Orbital Defects – A Clinical Report of Treatment Outcomes and Complications</i>
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Thursday, May 20, 2010

General Session

1

## **Osseointegration and Radiation Therapy**

**Granström, G.**

**Department of Otolaryngology**

**Head and Neck Surgery**

**Sahlgrenska Academy, University of Gothenburg, Sweden**

**Gothenburg, Sweden**

Osseointegration is now a well-established technique to anchor dental bridges and resection prostheses to improve function and esthetics. Especially cancer patients that might have large tissue defects after cancer surgery can benefit from a firm anchorage of their prostheses from osseointegrated implants. Factors that can reduce benefits are related to side effects from the radiotherapy *per se*. This includes risk for osteoradionecrosis, implant failures, xerostomia and soft tissue infections in the irradiated area.

This lecture will present our data on cancer patient survival, rehabilitation aspects, implant survival, complications observed and measures undertaken to improve the outcome. It will further present consequences from postoperative radiotherapy with osseointegrated implants in radiation field. Finally cases of osteoradionecrosis that have occurred will be discussed and reasons for these will be analyzed.

### Conclusions

It is of the utmost importance to understand risk factors for complications of osseointegration in the irradiated cancer patient. It is today possible to avoid several complications and improve the functional outcome of the rehabilitation for cancer patients.

2

## **Implants for Pediatric Patients: Growth and Implant Placement**

**Sharma, A.**

**Department of Prosthodontics**

**University of California San Francisco**

**San Francisco, CA USA**

Patients with ectodermal dysplasia and alveolar clefts have been a part of clinical research and patient management at UCSF since 1992. Long term follow-up and clinical experience has allowed UCSF to establish a protocol for the use of osseointegration in children. We are often asked the question, "What is the appropriate time to use implants in children?" While there is no single appropriate answer, we evaluate the pediatric patient and plan treatment in three separate categories: Group I: For the growing child who is missing a single tooth with adjacent natural teeth, implants should not be placed until dento-alveolar development is complete. Group II: For the completely edentulous growing child, implants can be planned as early as 7 years of age. Although surgery may be necessary when growth is complete to correct the jaw size discrepancy. The prostheses may have to be remade and Group III:

For the partially edentulous growing child the decision as to when to place implants is more complex, and is dictated by the extent of the edentulous space and its proximity to natural permanent teeth. Our treatment approach is to first make conventional removable prosthesis after orthodontic treatment is complete. If this provides a satisfactory result, we will wait for growth to be completed before implant placement. If the conventional treatment is unsatisfactory, implants can be placed, but the need for surgery and/or remake of the prostheses must be anticipated at the end of growth.

## **Accuracy of Virtual Reality and Stereolithographic Models in Maxillofacial Surgical Planning**

**Robiony, M.**

**Associated Professor of Maxillofacial Surgery (MFS)**

**Department of MFS University of Udine School of Medicine**

**Udine, Italy**

The author emphasize the role of reverse engineering (RE) and RP, suggesting a model of cooperative work, with the interaction of maxillofacial surgeons, radiologists, and engineers.

Computed tomography is a medical instrument that can be useful not only for diagnostic purposes, but also for surgical planning, thanks to the fact that it offers volumetric information which can be translated in three-dimensional models. These models can be visualized, but also exported to Rapid Prototyping (RP) systems, that can produce these structures thanks to the rapidity and versatility of the technologies involved.

The literature reports various cases of stereolithographic models used in orthopedic, neurological, and maxillo-facial surgery. In these contexts, the availability of a copy of the real anatomy allows not only planning, but also the practical execution of surgical operations, within the limitations of the materials. Nevertheless, the Rapid Prototyping model also presents some disadvantages that can be reduced if practical simulation is accompanied by virtual simulation, performed on a digital model. The purpose of this lecture is to examine and present the use of Virtual Reality (VR) and Rapid Prototyping for surgical planning in Maxillo-Facial surgery.

## **Skin Response with Skin Penetrating Implants**

**Stalfors, J.**

**Consultant in Otorhinolaryngology / Middle Ear Surgery**

**Sahlgrenska University Hospital**

**Göteborg, Sweden**

Soft tissue reaction at the point of percutaneous implant penetration remains an important clinical issue because it causes discomfort and can result in loss of the implant. This presentation will review scientific evidence for the different hypothesis explaining the aetiology of skin reactions. Most papers presented are from studies regarding BAHA or facial prosthesis applications but experiences from other extra oral implant sites will also be presented.

Hypothesis covered will be surgical technique and especially the reducing of the soft tissues around the implant. Post-operatively inflammation caused by foreign body reactions, allergy or infection have also been suggested as reasons for skin reactions and will be discussed. Hygiene and compliance with cleaning routines and use of local treatments may play a role in skin reactions and this topic will be reviewed. Also, the significance of the design of the implant and the abutment type and size will be discussed as well as the recent changes in implant design. It is the clinical experience that soft tissue reaction can cause implant loss and results regarding this will be discussed.

## 5

### **Saliva Preserving Strategies in Management of Head & Neck Cancer**

**Jha, N.**  
**Cross Cancer Institute**  
**Radiation Oncology**  
**Alberta, Canada**

**Purpose:** Radiation induced xerostomia remains a severe morbidity in the management patients with carcinoma of head and neck region. It adversely affects quality of life. Several strategies are being explored to reduce or prevent the onset of xerostomia.

**Methods & Materials:** Some of approaches are: Use of muscarinic agonist stimulation, Amifostine, Accupuncture, hyperbaric Oxygen treatment, Intensity modulated radiation treatment, submandibular salivary gland transfer, combined approach of use of IMRT and salivary gland transfer and gene therapy. Studies have focused on the amount of saliva and/or quality of life following intervention. It has been noted in literature that the amount of saliva does not always correlate with the quality of life of patients. How should we be assessing the preservation of salivary functions? Different strategies to reduce radiation induced xerostomia have wide ranging potential morbidities and economic impacts.

**Conclusion:** These strategies have met with varying degrees of success and will be reviewed

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**Thursday, May 20, 2010**

**Concurrent Session I**

**Osseointegration, Regenerative Medicine & Radiation Therapy**

## 6

### **Maxillary Reconstruction Following Gunshot Wounds to the Face**

**Boyes-Varley, J.G.\*, Howes, D.G., Michael M., McAlpine A.J.**  
**University of the Witwatersrand**  
**Prosthodontics**  
**Witwatersrand, South Africa**

**Purpose:** The rehabilitation of the maxilla following facial gunshot wounds is not extensively documented in the literature; however, gunshot wounds to the face are commonplace in South Africa. The resultant anatomical defect after facial gunshot wounds presents the rehabilitation team with surgical, restorative and psychosocial challenges.

We have been faced with significant time and financial constraints in South Africa and have developed an effective multidisciplinary protocol to meet these restorative challenges. This clinical report will present our surgical/prosthodontic reconstructive protocol for patients who have sustained maxillary gunshot wounds similar to hemimaxillectomy defects after oncology resection

**Methods & Materials:** 8 hemi maxillary gunshot wounds were rehabilitated over an 8 year period, using various applications of the Zygomatic implant concept. Patients were reconstructed prosthodontically using fixed-removable over dentures or fixed prostheses, with and without separate obturators. Evaluation quality of life complications and surgical and restorative visits was undertaken

**Results:** Implant loading periods range from six to ninety six months and to date no implant losses (zygomatic or standard) have been recorded. Treatment success was evaluated using strict clinical and patient comfort criteria and by post operative radiographs taken at six month post loading intervals. Results were recorded and will be presented. No deaths were recorded in the gunshot series. The majority of prosthetic complications included speech disturbance (39%), and Nasal leakage (11%).

**Conclusion:** The protocols presented here for the treatment of maxillary defects after gunshot can be integrated into the armamentarium for the rehabilitation of the maxilla and facial region. This provides the patient with an opportunity to undergo reconstruction in a more cost effective manner whilst still optimizing function and aesthetics which also allows for regular and effective maintenance

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## **Rehabilitation of Severe Upper Jaw Atrophy by Zygoma Implants**

**Olivo, A.\*, Cappello, A.**  
**Medical Center Padova**  
**Maxillo-Facial and Prosthodontics**  
**Padova, Italy**

**Purpose:** This study aimed to show the possibility of rehabilitate patients with severe bone reabsorption of maxilla with zygoma implants and one surgery in order to avoid bone graft.

**Methods & Materials:** Since 2005 and spring 2009 we have treated 21 patients (mean age 55) with severe bone loss in the maxilla, placing 36 zygomatic fixture and 63 conventional implants. Five patients received a mono lateral treatment and all the others were totally edentulous. In all cases, except 3 (2 because of our learning curve 1 because of an insufficient primary stability) , we did an immediate loading. The patients received in less the 48 hours a fixed prosthesis. In 2 cases patient complaint a light disesthesia in zygomatic area, spontaneously resolved after 2 months. In 1 case we had and extended hematoma in periorbital area. In 10 cases we did an immediate post extraction treatment.

**Results:** No patient had any kind of sinus complication. Until today we have a 100% success rate according with literature data. All the patients are completely satisfied both in terms of treatment discomfort either in terms of working time lost.

**Conclusion:** In our opinion zygomatic implants thanks to the extremely high success rate, the short time of treatment request and thanks to one surgery, are one of the best options we have to restore an edentulous patient.

8

## **Zygoma Implants Placement with Flapless Computer Guided Surgery: A New Protocol Proposal**

**Schirotti G\*. -Angiero F., Benedicenti S.**  
**University of Genoa DISTIBIMO**  
**University Mikan, Bicocca**  
**Genoa, Italy**

**Purpose:** The aim of this contribution is to describe the zygoma implant placement by using the Image-guided implantology. The image guided implantology gives today an important and different approach to

the implant placement in terms of accuracy, mini-invasive approach and improvements of restorative final results.

**Methods & Materials:** Four clinical cases have been enrolled with the clinical indication of severe maxillary atrophy for the zygomatic implants. All patient were edentulous in the upper arch and were not post- oncological or major trauma, but needed to assess a predictability functional and rehabilitative therapy. Twenty-five implants were placed of which seventeen inserted in the premaxilla, seven in the zygomatic and one in the pterygoid bone. . The study was divided in two phases; in the first phase with a cone beam an anatomic evaluation in 3D was carried out to exclude sinus diseases and to evaluate the anatomic condition of the premaxilla. Than four or three implants (primary implants) have been placed in the premaxilla with conventional or guided surgery before zygoma implant placement. In addition bone block grafts have been also performed if necessary (one case). After the conventional healing period a functional valuation of primary implants was done. During the final CT radiological acquisition, the conventional template for the double scanning procedures had been screwed-in on the primary implants. Subsequently after the routinely planning we received a mucosa supported stereolytographic surgiguide, with the sleeves for the anchorage on the primary implants and in addition those for the zygomatic . For our protocol a stereolytographic model is also necessary. With an original customized surgical Kit we simulated the surgery on the stereolytographic model to define and check the finally depth drill control (all steps are planned before). In the second phase we proceeded to the flapless surgery placing the zygomatic implants in its correct position. The surgiguide was anchored on the primary implants before the zygomatic osteotomy.

**Results:** The clinical results showed 2 implants failure in the premaxilla area (replaced before the zygomatic step) no failure on the zygomatic implant. Follow-up at 4 months to 39 months showed a good aesthetic, phonetic and functional results.

**Conclusion:** Although the limited number of cases ad its short follow-up, in our opinion the results seems to encourage our surgical procedures. Despite of the difficulties of driven angulation of osteotomy related to the implants zygomatic length, we reached a correct zygomatic position according to the planning in all cases. More study and randomized clinical trials are needed to assess the predictability of the presented procedure

## 9

### **Sinus Floor Elevation Using Osteotomes or Piezoelectric Surgery: A New Approach**

**Baldi, D.\*, Menini, M., Bonica, P., Ravera, G., Pera, P.**

**Genoa University**

**Department of Fixed and Implant Prosthodontics**

**Genova, 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 installed in 25 patients in the atrophic posterior maxilla immediately after sinus floor elevation. Sinus floor elevation was performed with a crestal approach using either osteotomes and burs or piezosurgery. Standardized intraoral radiographs 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 patients who drop out of the study. In the 23 patients completing the study, one implant failed, while the remaining 33 implants were stable 12 months post surgery (CSR 97.05%).With respect to implant type installed, a statistically significantly higher bone height was achieved with tapered implants

as opposed to cylindrical implants ( $p < 0.05$ ). No statistically significant differences were found in bone level using osteotomes or piezosurgery.

**Conclusion:** The study found that piezosurgery for sinus floor augmentation using a 1-step crestal approach, where the residual bone is  $< 7.5$  mm and installation of tapered implants yielded the best result.

10

## **Immediate Loading Dental Implants in Osteoporotic Patients Treated With Oral Bisphosphonates**

**Arata, V., Mozzati, M.**

**University of Turin, Italy**

**Oral Surgery Unit, Dentistry Section**

**Department of Clinical Physiopathology**

**Turin, Italy**

**Purpose:** The use of bisphosphonates is becoming increasingly widespread, and the duration of such treatment is increasing. This class of drug is widely used for treatment of diseases such as multiple myeloma, bone metastases and malignant hypercalcemia, as well as for the prevention and treatment of osteoporosis.

If bisphosphonates are administered via the intravenous route, like in cancer patients, all invasive oral procedures (including implant surgery) are contraindicated, and should be avoided unless absolutely necessary. Clinical indications are more controversial in case of bisphosphonates administered via the oral route, like for postmenopausal osteoporosis. There is few literature on the influence of oral bisphosphonates upon bone repair, and there are few published cases of mandibular or maxillary osteonecrosis among patients that receive such medication.

The requirement of dental implants increased enormously in recent years and new protocols like immediate function became, when possible, the gold standard. Because of the increasing request for the placement of dental implants in osteoporotic patients treated with oral bisphosphonates it would be of interest to evaluate the risk factor and implant survival rate.

**Methods & Materials:** We placed 116 implants with immediate loading protocol, in both maxillary and mandibular regions, in 20 osteoporotic patients treated with oral bisphosphonates.

**Results:** On 116 immediate loading dental implants we have a success rate of over 99% after 12 month of follow-up.

**Conclusion:** In accordance with American Dental Association we think that no modification in the oral bisphosphonates treatment plan are necessary when contemplating invasive oral procedures and we confirm that there are no contraindications to implant surgery.

11

## **Peri-Implant Keratinised Soft Tissue Grafting in Oral Cancer Patients: Rationale and Novel Techniques**

**Butterworth, C.J.**

**University Hospital Aintree**

**Maxillofacial Surgery**

**Liverpool, England**

**Purpose:** To present our experience of keratinised soft tissue grafting techniques around dental implants placed in oral cancer patients with and without the use of dressing plates constructed on conventional or stereolithographic models.

**Methods & Materials:** Patients presenting to the merseyside regional head and neck cancer centre for whom dental implants were placed at time of resection or as a secondary procedure usually undergo peri-implant soft tissue grafting where radiotherapy has not been used. Soft tissue grafts are harvested from the hard palate (unilateral or bilateral harvest) and inset around the implants in order to obtain 360 degree keratinised tissue around the implants. Grafts are held in place by means of healing abutments, sling-type over-sutures and dressing plates.

**Results:** The use of conventional dressing plates constructed on diestone models is presented as well as the construction of dressing plates on stereolithographic models with and without direct implant retention. In the maxilla, the use of a novel "trouser leg" buccally pedicled flap is also presented to provide keratinised tissue around anterior maxillary implants with papillary reconstruction.

**Conclusion:** Keratinised grafting around implants placed in head and neck cancer patients allows the restoration of a normal healthy peri-implant environment which facilitates hygiene measures and improves ongoing disease surveillance in the oral cavity by reducing peri-implant mucositis and inflammation which can prevent the prompt diagnosis of secondary peri-implant malignant disease.

## 12

### **Treatment Outcomes With Mandibular Implants Placed Per Ablationem in Head and Neck Oncology Patients: An Evaluation of Five Year Survivors**

**Reintsema H\*, Korfage A, Schoen PJ, Raghoobar GM, Bouma J, Burlage FR, Vissink A, Roodenburg JLN.**  
**University Medical Center Groningen, University of Groningen,**  
**Oral and Maxillofacial Surgery and Maxillofacial Prosthetics**  
**Groningen, The Netherlands**

**Purpose:** Surgical treatment of tumors in the head and neck area, and more often followed by subsequent radiotherapy, in general result in anatomical and physiological conditions unfavorable for prosthodontic rehabilitation. The use of implants to retain prostheses has improved the possibilities to obtain rehabilitation and as such are thought to 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 to report on are small and diverse. Treatment strategies are more often based on expert opinions and local arrangements

**Methods & Materials:** In the UMCG in a prospective study regarding implant treatment in the edentulous mandible during ablative surgery for malignancies in the oral and oropharyngeal area, the effects 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 in 50 patients with 195 implants installed. About two-thirds of the patients (n = 31) had radiotherapy post-surgery (dose > 40 Gy in the interforaminal area).

**Results:** At the 5 years evaluation, 26 of the 50 patients had passed away and 4 patients had to be excluded from the analyses, because superstructures were not present, due to persistent local irritation (n=2), loss of 3 implants (n=1), and the impossibility of making an overdenture related to anatomical limitations (n=1). In the remaining 20 patients the prosthesis was still in function (76 implants). During the 5-years follow-up, in total 14 implants were lost, 13 in irradiated bone (survival rate 89.4%, dose > 40 Gy) and 1 in non-irradiated bone (survival rate 98.6%). Peri-implant tissues had a healthy appearance and remained healthy over time. Surviving patients were satisfied with their dentures. In these 20 patients oral function remained unchanged during the five years follow-up period. Global health had deteriorated in six patients due to concurrent comorbidity. Global health and QoL for the patients without known comorbidity was very high. Patients that survived five years also had a significantly higher global health and better oral functioning at the one year evaluation than non-survivors.

**Conclusion:** It can be concluded that oral cancer patients can benefit from implants placed during ablative surgery, with a high survival rate of the implants, and a high percentage of rehabilitated patients up to 5 years after treatment. Oral function and denture satisfaction was high and did not change over time for the 5 years survivors. The observed deterioration in overall global health and QoL was strongly associated with concurrent comorbidity in a small number of patients.

13

## **Rehabilitation of Cancer Patients Utilizing the Osseointegration Concept. A Comparison Between Two Cancer Rehabilitation Centers in Sao Paulo and Gothenburg**

**Dib, LL, Oliveira, J.A. P., Gränström, G.**  
**Universidade Paulista - São Paulo - Brazil,**  
**Gothemburg University, Gothenburg, Sweden**

**Purpose:** Purpose: osseointegrated implants installed in irradiated cancer patients over a 27-year period.

**Methods & Materials:** The files of 177 patients followed since 1981 were evaluated. Factors influencing implant survival as oncological treatment, radiotherapy protocols, patient and implant related elements were analyzed.

**Results:** There were significantly higher implant failures in the Gothenburg material. When analyzing reasons for this, it was found that this patient group had received almost 25 Gy higher radiation dose compared to the Sao Paulo material. This was considered to be due to principal differences in cancer treatment between Sweden and Brazil. In Sweden, irradiation is generally delivered before cancer surgery, and the opposite is present in Brazil. High implant failures were seen after high dose radiotherapy and long time after irradiation. All craniofacial regions were affected but highest implant failures were seen in frontal bone, zygoma and nasal maxilla. Lowest implant failures were seen in mandible and maxilla. The use of long fixtures, fixed retention and adjuvant hyperbaric oxygen therapy (HBO) decreased implant failures. Non-contributing factors to implant survival were sex, age, smoking habits, tumor type and size, surgical oncological treatment and osseointegration (OI) surgery experience.

**Conclusion:** Principal cancer treatment regimes affect survival of osseointegrated implants. Primary cancer surgery followed by low-dose irradiation will therefore be considered as the best option for cancer patients that are intended to rehabilitation with osseointegrated implants.

14

## **Stem Cells “The Wonder Cells” In Craniofacial Tissue Engineering. Patient’s Own Stem Cells Used To Grow Facial Bone-A Case Report**

**Anand, P.**  
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**Ghaziabad, India**

**Purpose:** Craniofacial Surgery is an important conduit for tissue-engineering applications. Craniofacial tissue-engineering promises the regeneration or de novo formation of dental, oral, and craniofacial structures lost to congenital anomalies, trauma, and diseases. As interdisciplinary collaborations improve, we can expect to see remarkable progress in de novo tissue synthesis, replacement, & repair.

Ultimately, we may one find that gene-modified cell-based tissue engineering strategies will succeed today's reconstructive strategies. In a first-of-its kind procedure, stem cells have been taken from the fat tissues of a 14-year-old boy & combined them with growth protein & donor tissue to grow viable cheek bones in the teenager.

**Methods & Materials:** A case report

**Results:** Facial bone growth was significant with the help of stem cells, which reduces the size of the defect, which in turn reduces the size of the planned prosthesis.

**Conclusion:** Craniofacial tissue engineering with the help of patients own stem cells are a boon for patients requiring maxillofacial prosthetics.

## 15

### **Virtually Planned Guided Bone Regeneration Using Rapid Prototyping and Stem cells: Animal and Human Reports**

**Ciocca L.\***, **Fantini M.\*\***, **De Crescenzo F.\*\***,  
**Donati D.\*\*\***, **Marchetti C.\***, **Scotti R.\***

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**\*Department of Oral Sciences \*\*Virtual Lab, IInd Faculty of Engineering \*\*\***

**Laboratory of Bone Tissue Regeneration, Rizzoli Institute, Bologna, Italy**

**Purpose:** To obtain new bone constructs for bone regeneration and to restore insufficient bone due to atrophy or following cancer resection.

**Methods & Materials:** Animal model: Custom-made rapid-prototyped hydroxyapatite (HA) scaffolds were used to replace both temporomandibular condyles of six sheep: one with bone marrow stem cells and one without. The Cr-Co surgical guides used to drive the cutting of the condyle were custom-made using computer-aided design and machining (CAD-CAM) and rapid prototyping (RP) to transfer the virtual plan into the surgical environment.

Human model: The CAD-CAM computed tomography (CT) evaluation and augmentation planning of the bone volume to regenerate were related to the final implant position. The projected bone volume was used either for manual modeling on two-dimensional titanium meshes or for direct 3D printing of 3D titanium meshes. The same mesh construction procedure was used to prototype a titanium meshed prosthesis, with surgical plates incorporated, for bone reconstruction after tumor removal.

**Results:** Animal model: Porous HA scaffolds can be customized using a CAD-CAM process for block reduction using RP. The surgical templates accurately guided bone cutting during surgery. Primary stability was obtained using titanium surgical plates that were designed and prototyped using CAD-CAM. Functional results were achieved immediately. At the 4-month follow-up evaluation, the histology showed new bone apposition around the scaffolds with the differentiation of chondral tissue at the articular surface of the condyle and with perfect osseointegration and initial reabsorption of the HA. Human Model: In the atrophic maxillary arches, minimal intervention surgery was performed before implant placement. For the bone resected during tumor surgery, the continuity and natural volume of the mandible were recovered, with satisfactory esthetic and functional results.

**Conclusion:** New bone constructs can be obtained using CT data and CAD-CAM HA scaffolds, for seeding with stem cells harvested from bone marrow. Titanium mesh can be custom-made for prosthetic guided bone augmentation before implant placement. The new concept of maxillofacial prosthodontics improves the esthetic and functional results even when large portions of the maxilla and mandible are resected during tumor removal.

## **Oral Hygiene in Patients with Oral Cancer Undergoing Chemotherapy and/or Radiotherapy after Prosthesis Rehabilitation: Protocol Proposal**

**Corsalini, M\*.; Rapone, B\*.; Gassino, G\*\*.**

**\*University of Bari-Italy. \*\*University of Torino-Italy.**

**Department of Odontostomatology and Surgery, School of Dentistry.**

**Purpose:** This study was designed to assess the effectiveness and the importance of an oral hygiene protocol in patients undergoing radiation therapy and chemotherapy after prosthesis rehabilitation, in order to reduce or minimize oral complications.

**Methods & Materials:** This study was carried out in the Department of Odontostomatology and Surgery, University of Bari-Italy from December 2003 to May 2009 on thirty selected patients with primary oral cancer receiving chemotherapy and radiotherapy after prosthesis rehabilitation. They were divided into 2 groups, comparable for age (average 65 years), sex (7 males, 8 females), type of cancer therapy (head and neck surgery, chemotherapy, head and neck irradiation and blood and bone marrow transplant). There were fifteen patients in the control and fifteen in the experimental group. In the experimental group, patients underwent an oral hygiene protocol. Patients in the control group received usual care according to the study's clinical setting. All the patients gave written informed consent.

**Results:** Results show that after the beginning of the oral hygiene protocol, complications and the risks of infection and permanent dental problems have been minimized. Overall, of the fifteen dental assisted-patients, 70% obtained positive results in relation to those of not assisted patients. The oral cavity in fact was free from sources of irritation and infections and patients were satisfied with the program outcome.

**Conclusion:** Patients who have been treated for oral neoplasiae do not recognize that they may minimize oral complications by changing their behaviours in their oral hygiene. Indeed, oral hygiene protocols may ameliorate and prevent oral complications of cancer therapy and improve the quality of their life. Thus, health care providers should continue to educate patients and advise them to begin daily oral hygiene home care routine as soon as possible and adhere to prescribed oral hygiene procedures.

## **Intensified Oral Care Combined With Lasertherapy Prevents Oral Complications Induced by Head & Neck Cancer Treatment**

**1-Mello, A. L. 2- Hanriot, R. M. 3-Smaletz, O. 5-Paes, A 6-Riechelmann, R**  
**Albert Einstein Hospital**  
**Radiotherapy, Oncology**  
**São Paulo, Brazil**

**Purpose:** To evaluate the rate of treatment-induced oral complications with an Oral Care Protocol (OCP), including Low Level Laser Therapy (LLLT), in patients who received IMRT with /without chemotherapy for HNC.

**Methods & Materials:** Retrospectively reviewed the charts of all consecutive HNC patients treated Between January 2004 and December 2007 at Albert Einstein Hospital, São Paulo, Brazil by chemoradiation or radiation (IMRT) alone and who received an experimental Oral Care Protocol were entered into the study. Data about demographics, radiation dose and schedule and chemotherapy regimens were collected. The intervention to prevent OM was the OCP, which consisted in a combination of lasertherapy and mouthwash delivered in 2 phases, prior and during the treatment. Phase

1: All patients received instructions about side effects, use of daily mouthwash QOD, oral care procedures and LLLT protocol. The LLLT was prophylactic applied on the 7 first days of treatment on 70 different points (30 jugal mucosa, 30 tongue, 10 soft palate), with a total energy per point of 2, 25 J/cm<sup>2</sup>, and the total energy was 157, 5 J. Phase 2: LLLT (same doses) was applied once qw for patients without OM and as needed for those who developed OM (at the OM site lesions). Mouthwash: Maalox and 0, 9% saline solution QOD.

Topical and systemic medication for Candida and herpes was prescribed as needed. OCP duration was 6 weeks average. Presence of oral mucositis (OM) and other oral symptoms were prospectively collected by using 2 self-report measures: a symptom check list for oral symptoms which was performed weekly (0=absence of symptom, 3=function impairment) and a numeric scale for pain (0 = absence of pain, 10 worst possible pain). Severity of OM was assessed using the OMS criteria.

**Results:** Forty-four patients were included on study: 21 patients were treated by exclusive IMRT (G1) and 23 received IMRT combined with chemotherapy (G2). In exploratory analysis, no statistically significant differences were found between G1 and G2 with respect to rate of OM. 30 (68,2%) patients needed LLLT after reaching 30 Gy.40 (91%) patients had OM (any grade) by the end of 6 weeks.14 (31,8%) had grade 1, 24(54,61%) had grade 2 and 2 (4,50%) patients had grade 3 OM .The most common sites for OM were lateral and tip of tongue and the median ulcer diameter was 0.5 com (0-1.5 cm).11(25 %) patients required feeding tubes, being only 1 for OM. The average percentage of weight loss during treatment for patients without feeding tube was 5%.9 (20, 5%) patients needed unplanned breaks, with a median of 9 days (range 5-15), reasons associated with skin toxicities and disphagia.

**Conclusion:** Our study showed that a protocol with intensive patient monitoring, using LLLT, comprises a promising supportive therapy to reduce acute complications from HNC treatment. Currently no intervention exists that is completely successful at preventing oral mucositis. As a recent technology more studies to evaluate the side effects from IMRT, especially about OM, are needed. Randomized trials are warranted to better define its role on patient quality of life.

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**Thursday, May 20, 2010                      Concurrent Session II- Panel Discussion**

## **SPECIAL SESSION WITH AN INTERDISCIPLINARY PANEL**

### **Meeting Today's Complex Challenges in Involving the Patient and their Families in Head and Neck Cancer Treatment Selection**

**“The best interest of the patient is *the* single most important factor in decision making in head and neck oncology”**

Management of cancer of the head and neck is frequently a complex and long duration care pathway involving numerous disciplines. The care is often accompanied by significant morbidity with relatively unchanged and challenging survival rates. The intensity and complexity of surgical, radiation oncology, medical oncology, oral rehabilitation, rehabilitation medicine and other treatment modalities are bewildering to patients and their families. With new modalities of care, it is perceived that there is increasing pressure on patients to enter into early decision making with regard to acceptance of treatment pathways. In these decisions it is important to always adhere to the principle that “...*the best interest of the patient is the single most important factor in decision making in head and neck oncology care*”. As undisputed as this statement may seem, frequently what is not well appreciated is that for the clinician, the question of what is best for the patient becomes remarkably difficult to resolve.

During this special session, a series of topics that impact a patient-centred approach to treatment selection will be addressed through integrated lectures. The presentations will address the question of how far the basic assumption holds that what is best for the patient is truly the treatment paradigm driver. The presentations will focus on raising questions of importance for our future understanding of a patient-centred approach to treatment selection in head and neck oncology management.

The audience will be asked to participate and to provide questions to the panel so as to provide a thought provoking exchange of ideas on this provocative subject. Through this process, formulating directions for future research as well as guiding principles for reconsidering current practice are ultimate goals of the session.

Moderator:

**Dr Johan Wolfaardt, BDS, MDent, PhD**  
**Professor and Director**  
**Institute for Reconstructive Sciences in Medicine**  
**Division of Otolaryngology - Head and Neck Surgery**  
**Department of Surgery**  
**University of Alberta, Edmonton, Alberta, Canada**

## **INTERDISCIPLINARY PANEL**

- 13:30      *Introduction*  
**Geert J. van der Laan, DDS.**  
**University Medical Center Groningen**  
**Dept. of Maxillofacial Surgery, Center of Special Dental Care**  
**Groningen, The Netherlands**
- 13:40      *Patients' Perspectives*  
**Chiquit G.F.E. van Linden van den Heuvell, PhD.**  
**University Medical Center Groningen**  
**Dept. of Maxillofacial Surgery, Center of Special Dental Care**  
**Groningen, The Netherlands**
- 14:00      *Logistics in Care: Interdisciplinary Head and Neck Oncology Team*  
**Jan L.N. Roodenburg, Prof. PhD**  
**University Medical Center Groningen**  
**Dept. of Maxillofacial Surgery**  
**Groningen, The Netherlands**
- 14:30      *Giving the Missing Team Member a Voice: Integrating Patient Experiences of Head and Neck Cancer into the Treatment Pathway*  
**E. Mary Wells, RGN. BSc.(Hons) MSc. PhD.**  
**School of Nursing & Midwifery**  
**University of Dundee,**  
**Dundee, Scotland, UK**
- 15:00      *Break*
- 15:30      *What Types of Counseling and Outcome Research Can Improve Patient's Treatment Decisions in the Field of Head and Neck Oncology?*  
**Florence J. van Zuuren, Associate Prof. PhD.**  
**University of Amsterdam**  
**Faculty of Social and Behavioural Sciences**  
**Amsterdam, The Netherlands**
- 16:00      *Crossing Borders From Curative to Palliative Care*  
**Kris C.P. Vissers, Prof. PhD.**  
**Radboud University Nijmegen Medical Centre**  
**Dept. of Anaesthesiology**  
**Nijmegen, The Netherlands**
- 16:30      *Summary and Panel Discussion*  
**Geert J. van der Laan, DDS.**  
**University Medical Center Groningen**  
**Dept. of Maxillofacial Surgery, Center of Special Dental Care**  
**Groningen, The Netherlands**

Friday, May 21, 2010 (9:00-11:15)

General Session

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## Microsurgical Reconstruction in Maxillofacial Oncology

**Nocini P.F.**

**Section of Maxillofacial Surgery**

**Department of Morphological & Biomedical Sciences**

**Hospital G.B. Rossi, Verona, Italy**

State of the art of surgical reconstruction of large maxillary bone defects, following oncological ablation, requires vascularized bone free flaps. Stated the greater complexity of the reconstructive needs it is essential to carefully plan each step of the reconstruction in the preoperative setting.

“Stereolithographic model surgery” is by far the most useful method to simulate preoperatively each of the following surgical steps. Use of the fibula osteocutaneous free flap to reconstruct the facial skeleton is highly reliable and our flap of choice for lower maxillary defects. Moreover fibula free flap can achieve excellent reconstruction of entire upper maxilla. However, when orbito-zygomatic support is the primary objective or in cases which is not possible fibula’s harvesting, the utility of this flap may be limited. Because of the complexity of this procedure, the choice of midface reconstruction technique should be individualized for each patient; in such cases it can be considered iliac crest free flap. At least in extended surgical ablation, multiple flaps reconstruction could be considered. Secondary corrective osteotomies represent a reasonable option after microvascular alveolar bone reconstruction of the maxilla, when additional movements are required to restore facial symmetry and occlusion if they occurred after primary reconstruction. Delayed implant endosseous positioning and implant-supported prosthesis are the gold standard.

Owing the great impact of final aesthetic result on patient’s expectation and confidence, secondary esthetic procedures like rhinoplasty, lipofilling and malarplasty have become essential components of the rehabilitation plan.

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## Facial Defects: Alteration at Surgery to Enhance the Prosthetic Prognosis

**Gassino, G.**

**University of Torino, Biomedical Sciences and Human Oncology**

**Oral and Maxillofacial Rehabilitation and Dental Implants**

**Torino, Italy**

**Purpose:** Many patient prefer masking a small defect with their own tissue rather than with a prosthetic restoration. It is safe to say however, that it is difficult, if not impossible, for the surgeon to fabricate a facial part that is as effective in appearance as well as a well-made prosthesis. The application of osseointegrated implants in facial defects has, in part, changed patient perceptions about facial prostheses because of the effectiveness of retention achieved.

**Methods and material:** The choice between surgical reconstructions versus prosthetic restoration of large facial defects is difficult and complex and depends on the size and etiology of the defect as well as the wishes of the patient. Surgical reconstruction of small facial defects is possible and in most cases is preferable but a variety circumstances may dictate prosthetic restoration of rhinectomy-orbital defects: If

recurrence of tumor is likely, it is advantageous to be able to monitor the surgical site closely. A prosthesis permits such observation, whereas primary surgical reconstruction may make it more difficult.

Surgical restoration of large defects is technically difficult and requires multiple procedures and hospitalizations. Patients confronted with this type of defect are usually older and less able or willing to tolerate the multiple procedures required for surgical reconstruction.

Increasing numbers of these types of tumors are being treated with radiation therapy. Reduced vascularity, increased fibrosis, and scarring of the tissue bordering the defects increase the risk of complications associated with reconstruction. In many patients, a full course of radiation therapy precludes successful surgical reconstruction.

Even when surgical reconstruction is deemed possible, significant delay may be necessary to ensure control of the tumor. Many surgeons prefer to wait at least one year after a large resection before beginning surgical reconstruction of a facial defects resulting from removal of malignant tumor.

**Results:** The experience gained in the surgical treatment of defects resulting from surgical resection of tumors of the nose, eyes and ears has brought improvements in prosthetic prognosis.

Careful study of the anatomical site to be treated, the treatment of bone and soft tissue margins and the use of implants osseointegration have led to these results.

**Conclusion:** Functional results of a well-made prosthesis allows the surgeon and the patient to monitor over time the wound, but the aesthetic results are very important for the social life of the patient, for that reason it is important to improve as much as possible the prognosis facilitating prosthetic rehabilitation the patient into society.

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## **Masticatory and Swallowing Rehabilitation after Oral Tumor Resection**

**Ono, T.**

**Department of Prosthodontics and Oral rehabilitation  
Osaka University Graduate School of Dentistry  
Suita, Osaka, Japan**

Over the last several years, the importance of rehabilitation for restoring postoperative QOL has attracted attention following improvement in the treatment outcome of oral cancer. For the early and advanced functional recovery, there should be a rational clinical pathway with objective functional assessment as well as a deep collaboration between surgical and prosthodontic departments. However quantitative evaluation of masticatory and swallowing function has yet to be widespread because of lack of easy-to-handle procedure. In this presentation, a few novel methods for the functional assessment will be shown and their utility in the postoperative rehabilitation will be discussed.

In our department, masticatory performance has been measured by testing gummy-jelly as a routine functional assessment for oral tumor patients. This method takes only 3minutes for measuring the glucose concentration dissolved from the surface of comminuted jelly which has good correlation with the increase of surface area of jelly. From the results of statistical analysis, influence of factors such as extent of resection, number of remaining teeth and occlusal supporting units, mouth opening, radiation therapy and so on could be quantified on the multivariate models, which were useful for predicting the outcome of prosthetic rehabilitation.

Recently we have developed the tongue pressure measurement system for evaluating tongue motor biomechanics. Tongue pressure exerted on the hard palate during swallowing can be recorded by the sensor sheet attached to the hard palate directly or palatal surface of maxillary denture. Tongue motor deficits during swallowing can be evaluated quantitatively by comparing the parameters such as an order of onset, magnitude and duration at 5 measuring point with those in the normal subjects. We have applied this system to the diagnosis and prosthetic rehabilitation using palatal augmentation prosthesis of glossectomy patients.

**Friday, May 21, 2010**  
**Maxillofacial Prosthetics & Facial Prosthetics /Materials**

**Concurrent Session I**

**21**

### **SET: Simplified Edentulous Treatment**

**Bellia, E., Preti, G., Ceruti, P., Gassino, G.**  
**University of Turin, Prosthodontics**  
**Torino, Italy**

**Purpose:** Nowadays the age of the edentulous patient is higher than it once was. Moreover, they are often affected by disabling diseases causing motility difficulties and/or economic problems. These factors prompted the set up of an innovative method with fewer and briefer sittings.

**Methods & Materials:** SET requires fewer sittings than the traditional method; provides more information for the technician, offers a good outcome and all the relevant clinical data are recorded and filed. SET has a flexible modular procedure that may be done in one sitting when the patient has serious deambulation problems, or has to travel long distances, or when an implant immediate loading prosthesis is required.

**Conclusion:** After two years of clinical practise in multicentre Specialised University departments, SET is now an accepted and proved treatment used by the University of Torino by their Dental students.

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### **The Application of the SET Method to the Treatment of Patients with Maxillectomy**

**Gassino, G.**  
**University of Torino, Biomedical Sciences and Human Oncology**  
**Oral and Maxillofacial Rehabilitation and Dental Implants**  
**Torino, Italy**

**Purpose:** The application of the SET method in the treatment of patients with maxillectomy is described.

**Methods & Materials:** The prosthetic treatment of patients with maxillectomy should be planned before the surgical exeresis and the final treatment realized from three to six months after it. The exeresis often make normal nutrition and speaking very difficult and some time impossible, furthermore those patients are most of the times not independent in the transfer to the dental clinic. The technique and its clinical advantages are described:

- 1) Definitive impression, orientation of the occlusal plan, maxillomandibular relationships recording and anterior teeth arrangement may be done in the same clinical sitting.
- 2) The first impression taken with the MIT (multilayer impression tray) can relieve good details in the defect area.
- 3) The definitive impression is precise and stable; using this as a stable base for the maxillomandibular relationships recording is easier and allows to reduce errors in the procedure.
- 4) The technician obtains after the first clinical sitting in one shot all the necessary clinical information for the construction of the definitive denture (or a wax try-in if needed).

**Conclusion:** The SET method makes the clinical and technical procedure for the construction of the obturators faster, easier and more precise.

## Pre-Prosthetic Surgical Alterations in Maxillectomy to Enhance the Prosthetic Prognoses as Part of Rehabilitation of Oral Cancer Patient

**El Fattah, H.**

**National Cancer Institute Cairo University**

**Cairo, Egypt**

**Purpose:** After maxillectomy, prosthetic restoration of the resulting defect is essential step because it signals the beginning of patient's rehabilitation. An obturator used to restore the defect should be comfortable, restore adequate speech, deglutition, and mastication, and is acceptable cosmetically; success will depend on the size and location of the defect and the quantity and integrity of the remaining structures, in addition to Pre-prosthetic surgical preparation of defect site.

Preoperative cooperation between the surgeon oncologists and the maxillofacial surgeon may allow obturation of a resultant defect by preservation of the premaxilla or the tuberosity on the defect side and maintaining the alveolar bone adjacent to the defect of an abutment tooth. This study was carried out to evaluate the importance of Pre-prosthetic surgical alterations at the time maxillectomy on the enhancement of the prosthetic prognoses as part of rehabilitation oral cancer patient.

**Methods & Materials:** The present study was carried out on 66 cancer patients (41 male-25 female) Their age ranged from 33 to 72 mean age years) seeking the treatment at National Cancer Institute, Cairo university between 2003- 2008 whom under went immediate prosthetic rehabilitation after maxillectomy surgery to remove malignant tumor as apart of cancer treatment.

**Results:** Patients were divided into groups according to Pre-prosthetic surgical preparation before prosthetic restoration.

Group (A): Resection of maxilla followed by preprosthetic surgical preparation 24 cancer patients (13 male – 11femal).

Group (B): Resection of maxilla without any preprosthetic surgical preparation with. 42 cancer patients [(28 male-14 female).

**Conclusion:** Outcome variables measured included facial contour and aesthetic results, speech understandability, ability to eat solid foods, oronasal separation, socializing outside the home, and return-to-work status. Flap success and donor site morbidity were also studied. This study concluded that corner stone to improve the prosthetic restoration of maxillary defect resulting maxillary resection as part treatment of maxillofacial tumor depend on the close cooperation between prosthodontist and surgeon, and also can be achieved by combination of surgical and prosthetic technique which can be controlled pre-prosthetic surgery during maxillectomy.

## Microbial Biofilms in Relation to Facial Prostheses

**Ariani, N.1,2, van Oort, R.P.3, van der Mei, H.C.1, Vissink, A.3, Kusdhany, L. 2, Djais, A4, Rahardjo, T.B.W.2, Krom, B.P.1.**

**1 J.W. Kolff Institute, Department of BioMedical Engineering, University Medical Center Groningen and the University of Groningen, Groningen, The Netherlands**

**2Department of Prosthodontics, Faculty of Dentistry University of Indonesia, Jakarta, Indonesia**

**3Department of Oral Maxillofacial Surgery and Maxilofacial Prosthetics, University Medical Center Groningen, Groningen and University of Groningen, The Netherlands**

**4Department of Oral Biology, Faculty of Dentistry University of Indonesia, Jakarta, Indonesia**

**Purpose:** Facial prostheses made from silicone elastomer share common clinical problems such as degradation/discoloration of the material which limits the longevity of the prostheses and skin irritation. Other than environmental factors, interactions at the interface between host and materials in the form of

biofilms are thought to be one factor underlying these problems. Biofilms are sessile microbial communities that readily develop on inert surfaces such as silicone elastomer and have been shown to colonize various medical devices such as voice prostheses and urinary catheter. The aim of this study was to investigate the presence, origin and composition of microbial biofilms on retrieved silicone facial prostheses.

**Methods & Materials:** Samples consisted of retrieved facial prostheses (P) as well as skin swabs from healthy skin (HS) compared to skin underneath prosthesis (PS) of the particular patients. Forty three prostheses (Mean= 1.6 years) were retrieved from patients at the Maxillofacial Prosthodontics Department UMCG, The Netherlands. Prostheses samples were analyzed by scanning electron microscopy (SEM), culturing and denaturing gradient gel electrophoresis (DGGE) using bacteria and fungal specific primers. Skin samples were analyzed by culturing and DGGE.

**Results:** SEM of the prostheses showed presence of biofilms on and deterioration of the surface of the prostheses. Culturing of retrieved prostheses revealed presence of fungi and bacteria. More colony forming unit (CFU/cm<sup>2</sup>) were present on PS compared to HS for aerobic bacteria ( $p=0.008$ ), anaerobic bacteria ( $p=0.031$ ), and fungi ( $p=0.004$ ). Typing of microbial isolates showed presence of potentially pathogenic species, including *Staphylococcus aureus*, *Pseudomonas aeruginosa*, and *Candida* spp. DGGE analysis of the microbial community of P, PS and HS showed that P had lowest diversity and PS the highest. Bacterial diversity exceeded fungal diversity in all samples. The highest DGGE similarity profile was 62% (P – PS) and 65% (HS – PS) for bacteria and fungi, respectively.

**Conclusion:** Presence of microbes on retrieved silicone facial prosthesis was evident from culturing and DGGE analysis, and microbial biofilms were found using SEM. Biofilms deteriorated the surface of the prostheses causing material defects. Similarity of microbial DGGE profiles between P and PS illustrate that the colonization probably originate from the skin. Difference in DGGE profile between PS and HS illustrates the changing conditions of PS as a result of skin covering with prosthesis affecting the composition of the bacterial community of the skin.

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### Improving Dental Materials by PECVD-Grown $\alpha$ -SiO<sub>x</sub> Coatings

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University of Torino

Department of Biomedical Sciences and Human Oncology

Section of Oral Rehabilitation Maxillofacial Prosthetics and Dental Implants

Torino, Italy

**Purpose:** Silicon-oxygen amorphous thin film alloys ( $\alpha$ -SiO<sub>x</sub>) were grown at room temperature by plasma enhanced chemical vapor deposition (PECVD) onto ceramic and microcomposite resin samples, in order to assess whether they could diminish in-vitro bacterial adhesion.

**Methods & Materials:** Ceramic (Signum Heraeus-Kulzer Germany) and microcomposite (Gradia GC Japan, Noritake Japan, Adoro Ivoclar Germany, Sinfony 3M Espe USA) dental materials were used as substrates for the deposition of  $\alpha$ -SiO<sub>x</sub>. The 10 mm x 10 mm x 2 mm samples were hand-prepared following producers' protocol. Sample surfaces were eventually finished by mechanical polishing. A substrate cut from a c-Si wafer of b111N orientation and 50  $\mu$ m thickness was also added to allow FTIR characterization. The deposition of  $\alpha$ -SiO<sub>x</sub> films of about 2  $\mu$ m thickness on dental materials was performed by a radio frequency plasma enhanced chemical vapor deposition (RF-PECVD) reactor, using silane (SiH<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O) as silicon and oxygen precursors respectively. Coating thickness was measured by a Tencor PL-10 mechanical profiler. Surface roughness of the samples was determined before and after the deposition process, recurring to the same instrument. The film bonding structure was studied by Fourier transform infra-red spectroscopy (FTIR): the transmission spectrum in the IR spectral region of the film deposited on c-Si (one sample) was measured by a Perkin Elmer System 2000 FTIR spectrophotometer and the film spectrum was obtained calculating the ratio between the transmitted

spectrum of the film+substrate structure and the one measured on the virgin Si substrate. Surface energy was estimated through the contact angle by a dynamic contact angle tester, according to Wu's theoretic method. Bacterial adhesion (*S. mitis* and *S. mutans*) assays were performed at Confocal Laser Microscopy.

**Results:** Coated and uncoated samples were characterized as described. A significant reduction in the number of adherent bacteria on coated microcomposite resin samples was determined, when *S. mitis* was incubated. Instead, no significant difference between coated and uncoated samples was found as for *S. mutans*, due to its poor adhesion capacity. As expected, ceramics resulted less prone to bacterial adhesion.

**Conclusion:** PECVD-grown silicon-oxygen amorphous thin film alloys (a-SiO<sub>x</sub>) may reduce bacterial adhesion of one common oral bacterial strain on composite resin dental materials, thus representing a good candidate to improve hygiene in immunologically compromised and cancer patients.

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**Friday, May 21, 2010**

**Concurrent Session II- Digital Design**

**26**

### **Immediate Implant-Supported Auricular Prosthesis Using Surgical Navigation and CAD/CAM Technology – an In Vitro Trial**

**Tam, S., Luk, H., Pow, E., Wong, M., Lo, J., Cheung, L.**

**The University of Hong Kong**

**Faculty of Dentistry**

**Hong Kong, China**

**Purpose:** To investigate the feasibility of provision of immediate implant-supported auricular prosthesis using surgical navigation and CAD/CAM technology.

**Methods & Materials:** A stereomodel was generated by rapid-prototyping (RP) based on the CT Digital Imaging and Communications in Medicine (DICOM) data set of a patient with a defective right auricle. By using the RP software, a mirrored image of the contralateral intact ear was produced and used for implant planning. The thickness of overlying soft tissues at the defect side was also measured by the software. The surgical field was then defined and a disc of 120 mm in diameter, centred at the external acoustic meatus, was segmented out from the stereomodel according to the data measured to simulate the mastoid bone. The defect was filled with a translucent silicone material to simulate the skin. A silicone mould of the mirrored ear was fabricated by RP. A wax pattern was produced from the mould and the silicone ear was processed with a housing made of acrylic resin. During operation, a silicone flap was raised and two dummy implants were inserted as planned using the surgical navigation system. The flap was thinned and closed. After the post-operative CT was taken, appropriate abutments were selected and inserted into the implants. Magnets were placed on the abutments and picked up by the acrylic housing inside the silicone ear with cold-cured acrylic resin. The data of the post-operative CT were compared with the planned trajectories by image fusion technique using surgical navigation software. Drill depth, angle in axial and coronal plane, and entry point position of each implant were measured.

**Results:** The mean deviation of the post-operative data from the planned ones were as follows: drill depth (0.7mm), angle in coronal plane (1.6°), angle in axial plane (1.5°) and entry point position (2.6mm). The whole process including preoperative planning, software manipulation, operation by navigation, fabrication and insertion of auricular prosthesis appeared to be feasible and acceptable for clinical application.

**Conclusion:** Immediate implant-supported auricular prosthesis using surgical navigation and CAD/CAM technology seems to be feasible for clinical application.

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## Digital Designed Surgical Guides for Extra-Oral Implants

**Van Der Meer, W.J.; Vissink, A; Raghoobar, G.M.; Visser, A.**  
**UMCG (University Medical Center Groningen and University of Groningen,**  
**Groningen, the Netherlands)**  
**Department of Orthodontics and Department of Oral and**  
**Maxillofacial Surgery & Maxillofacial Prosthetics**  
**Groningen, The Netherlands**

**Purpose:** When planning extra-oral implants, insight into the bone volume in the implant area is needed to plan and place extra-oral implants at the most appropriate spot from a prosthetic and surgical perspective. No commercial software for digital planning of extra-oral implants is yet available. This technical note describes a method enabling digital planning of extra-oral implants utilizing commercially available CAD software and rapid prototyping techniques to manufacture a corresponding surgical guide.

**Methods & Materials:** With the aid of CAD software, designed for reverse engineering and 3D animation software, a digital implant planning on basis of a cone beam CT (CBCT) scan was performed. On basis of this planning a surgical guide was digitally designed to facilitate placing dental implants in the mastoid area. The guide was fabricated using rapid prototyping. The appropriateness of the digitally designed surgical guides for placing extra-oral implants was tested on two human cadaver heads with simulated bilateral ear defects. After implant placement, a new CBCT scan was made.

**Results:** The surgical guide enabled the surgeon to place the implants at the preoperatively planned positions. The actual placed implants were shown to be within 1.5 mm relocated from the planned position. The location of the implants was very suitable for fabricating ear prostheses.

**Conclusion:** The developed method for digitally planning extra-oral implants in the mastoid area and digitally designing surgical guides allows for placement of implants in the mastoid area in very close proximity to the pre-operatively planned implant position.

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## The Use of Surgical Navigation Systems for Virtual Preoperative Planning in Craniofacial Reconstructions

**Verma, S.N.\*, Gonzalez, M., Ding, M.P**  
**Baylor College of Dentistry, Texas A&M Health Science Center**  
**Oral and Maxillofacial Surgery**  
**Dallas, Texas USA**

**Purpose:** Navigational systems not only provide the benefit of real time intra-operative visualization and eliminate the need for a physical surgical guide, but they can offer numerous features to aide in pre-operative planning. This technology was utilized pre-operatively for implant and prosthetic planning, and intra-operatively to place craniofacial bone anchored implants (CBAI) for patients receiving an implant retained facial prosthesis.

**Methods & Materials:** Using a navigational planning system, (Stryker iNtellec Cranial, Stryker Navigation), virtual visualizations of soft tissue and bone were created by segmenting images acquired from spiral CT data. For patients with unilateral facial defects, the unaffected anatomy was mirrored onto the skull of the defect side to visualize the future prosthesis. When pre-operative planning for patients with bilateral defects or disfigured opposing anatomy, the patient's spiral CT data was paired with Cone

Beam CT (CBCT) data from scanned models of donor anatomy. Implants were then planned in the anatomical area with appropriate bone height that would lead to the best aesthetic prosthetic result. The surgical sites were located intra-operatively with the integrated navigational instrumentation, allowing implants to be placed in the planned locations without using a surgical guide.

**Results:** Implant locations were determined solely by virtual planning using navigational technology, thus eliminating the need for a CT template and surgical guide. The surgical team was able to accurately establish implant locations when using the navigational technology. Pre-operative planning using the navigational system improved the accuracy of implant placement by the oral maxillofacial surgeon, thus leading to a more predictable restorative treatment outcome for the Anaplastologist.

**Conclusion:** The utilization of navigational systems for pre-operative planning in facial prosthetic restorations, and intra-operative surgical placement of CBAI enhanced clinical efficiency, eliminated the need for a traditional or prototyped surgical guide, and provided the specific patients with improved prosthetic treatment outcomes

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## **Advanced Applications of Computer-Aided Design and Rapid Auto-Manufacture in Maxillofacial Restoration and Prosthetics**

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**Purpose:** Intraoperative navigation systems help practitioners to accurately carry out preoperative plans without injuring anatomically important structures. New three-dimensional imaging methods are widely employed in maxillofacial restorations. Simulational analysis of axial computed tomographic images and optical scanning data have recently been described. Mostly, current reports have concentrated on applications relative to individual case interests. This research emphasizes maxillofacial restoration applications other than those previously reported in the surgical and radiological literature. Meanwhile, surgical reconstruction sometimes is usually unsatisfying due to the special anatomical and histological structure around the facial region. Thus, facial prostheses are considered as an ideal approach for maxillofacial rehabilitation, which traditionally generated from hand-sculpted wax patterns. New advanced computer-aided design and manufacture technologies have recently been introduced and demonstrated significant advantages for Maxillofacial Prosthetics. However, the usefulness of these techniques for fabricating facial prostheses has still been proved beyond a shadow of a doubt. The purpose of this research was to present advanced applications of computer-aided design and rapid auto-manufacture in maxillofacial restoration and prosthetics.

**Methods & Materials:** Advanced reverse engineering methods were employed to achieve simulational rehabilitation for the maxillofacial restorations. Both hard and soft tissues of patient were rebuilt based on the computed tomography (CT), which was then used for the three-dimensional navigation in maxillofacial restoration. A novel approach to the diagnosis of bone available for maxillofacial implant positioning was discussed in cases which required maxillofacial rehabilitation due to tumor removal. A mirrored volume of the healthy bone tissue was rapidly prototyped for a clinical trial in an appropriate position relative to the patient's face. The ideal positions for the implant were chosen in the inner of the volume of the mirrored tissue. The same positions were transferred to a diagnostic template that was rapidly prototyped with a positioning arm for the fibular graft. CT revealed errors in the planning of the fibular graft position and, as a clinical consequence, implant sites were determined for surgical planning. A virtual elaboration for fibular graft transplant was used to define the correct implant site in relation to the available bone, and implants were correctly positioned in the rest maxillofacial bone. A new optical (structured-light) scanner was achieved to develop a color digital model of patient's defect contour, which was copied and then mirrored to generate the facial prosthesis contour data. On the base of the digital impression got from the scanner, according to the symmetrical feature of man's facial organs, CAD software used the 3D digital model to reverse patient's normal tissue data and got the

defect tissue data by changing the corresponding dimensional coordinate. This method fulfilled the emulational prosthesis design of unilateral orbital defects, unilateral ear-lost cases and nasal defects. The project of virtual nasal design was proposed at one time. It built up the first three-dimensional digital database of Chinese normal noses contour. The appropriate normal nose model that matched the features of defect nose was then transferred from the database. On the software platform, the normal nose models were compared with the patient's facial model one by one. The most suitable nasal model was adjusted carefully and precisely in order to obtain a satisfied effect on the screen. The digital data of the suitable normal nasal model and the digital facial model were merged smoothly to get the final design of the nasal prosthesis.

This research firstly employed a new rapid prototyping system named Selective Laser Sintering (SLS) which was based on the three-dimensional printing approach. The rapid prototyping equipments directly and precisely transformed the STL data model of the organ prosthesis into the resin or wax pattern, realizing the individualized prosthesis manufacture rapidly and precisely.

**Results:** Practitioners viewed the target area freely on computer screen or directly held the solid model generated by the SLS machine to design the surgical proposal. This new method allowed the customized manufacture for the individual artificial surgical template and the bone substitution. This research group fulfilled three-dimensional emulational design and the related research of individualized rapid manufacture for maxillofacial tumor resections and rehabilitations. It offered a new development direction for surgeons. Some individual surgical guide templates were successfully designed and fabricated with this new CAD/CAM approach.

Digital color models of the patient face were acquired which consisted of thousands of triangles. The duration time of scanning was about 4 seconds. The contour of facial prosthesis was successfully designed by software combining with the 3D ocular model. Solid patterns of the facial prosthesis were automatically customized by SLS machine in about two hours and fitted the patients' faces very well. The patients were very satisfied with the definitive facial prostheses. New method successfully completed clinical cases of different kinds of facial defects, and evaluated the results. Since that the prosthesis was made based on the information of patient's own organ, it repristinated the patient's face in a preferable condition. The clinical results showed that this technique could realize the emulational prosthesis design successfully. It also greatly shortened the period of prosthesis manufacture because the solid patterns of the prostheses greatly reduced dentists' handworks.

**Conclusion:** This research presents a novel approach that integrates computed tomography, optical digitizing (scanning) technique, 3-dimensional ocular prostheses database and Selective Laser Sintering technique to achieve the computer-aided design and manufacture for maxillofacial restoration and prosthetics. It is time and cost more effective, which can be supposed to replace the traditional handmade techniques of facial prostheses in the future. The results achieved in this research have a exemplification in the future. This new protocol also solved several critical problems associated with conventional maxillofacial surgery, such as the pre-surgical simulation design procedure, difficulties in shaping solid organ models. Therefore, it is significantly important to realize the three-dimensional navigation and to improve the life quality of patients afflicted with maxillofacial tumor or traumas. It has a promising potential in the fields of oral & maxillofacial surgery, orthodontics, and plastic reconstruction surgery.

## 30

### **Integration of Multi-Digital Techniques Applied for Infant Clefts Researches**

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**Department of Prosthodontics**  
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**Purpose:** The aim of this study was to establish multi-digital approaches using latest three-dimensional scanning, reversed engineering and rapid prototyping techniques for the researches of infant clefts.

**Methods & Materials:** Infants within 1 week old with clefts were investigated in this study and scanned weekly for their facial digital impressions by a new optical scanner until lip repairs. Meanwhile, plaster models of infants' palate clefts were also prepared for the scanning to fabricate the digital palatal models. All the above original data were carefully compared and documented under a reversed engineering software condition to observe the laws of development. Three dimensional virtual and rapid prototyping approaches were applied to realize the individual design and rapid auto-manufacture for the appliances of infant's preoperative nasal-alveolar molding. With the new chromatosis technique and special silicone material of Maxillofacial Prosthetics the simulational face of infant lip cleft were fabricated, which was used for the simulation surgery and surgical teaching.

**Results:** The detailed three-dimensional information of infant nasal-lip and palate clefts from 1 week old to 12 weeks old were firstly successfully acquired. According to each patient's condition, the individual preoperative nasal-alveolar molding programs were generated and computer fabricated the series alliances directly. Firstly the simulational facial model of lip cleft was designed and prepared for simulation surgery and teaching.

**Conclusion:** New advanced techniques of industry showed their great values and will reveal more interests for the clefts researchers.

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**Friday, May 21, 2010**

**Concurrent Session III- Rehabilitation**

**31**

### **Prosthetic Reconstruction of Severe Facial Defects With or Without Use of the Osseo Integrated Implants**

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Head and Neck Surgery - Rehabilitation  
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**Purpose:** Compare Prosthetic Rehabilitation for severe maxillofacial defects with or without osseo integrated implants.

**Methods & Materials:** Planning and making of 10 maxillo facial prosthetic complexes. In 5 cases the implants were contra indicated.

Five patients using implants were compared with 5 patients without implants, regarding clinical aspects. The main questions were the difficult to set and to remove the prosthesis, the weight of the prosthesis, the comfort to mastication and swallowing, the coloration aspects and the stability and retention of them.

**Results:** Five patients related difficult to set the prosthesis; two to remove the prosthesis; nobody complained of the weigh of the prosthesis; the mastication and swallowing was compromised in 4 cases; the stability and retention was difficult in 3 cases; all the patients complained the difficult to revised the prosthesis because de discoloration.

**Conclusion:** There is advantage when the implant osseo integrated is used, but we couldn't consider discard the necessity to make prosthesis without implants in several cases.

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### **Kinesiographic Evaluation of the Motor Performance of the Mandible Based on “Reaching” Tasks in Patients After Hemimandibulectomy**

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**2 Neuroscience Department, Section of Physiology**

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**Purpose:** 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, to define and to evaluate clinically a protocol useful for head and neck cancer patients.

**Methods & Materials:** By using a kinesiograph and an adapted software a method to evaluate objectively the motor activity of the mandible in healthy subjects first and then in pathological patients (hemimandibulectomy) was performed.

**Results:** The presented technique allows to detect different motor ability in the different subjects and shows a good repeatability. For the analyzed pathological subjects a significant improvement was observed.

**Conclusion:** The ease and the good repeatability of this procedure allow to evaluate the motor control performance in different clinical situations. It can 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.

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### **A Randomized Preventive Rehabilitation Trial in Advanced Head and Neck Cancer Patients Treated with Chemo-Radiotherapy: Feasibility, Compliance and Short-Term Effects**

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**Department of Head and Neck Oncology and Surgery**

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**Purpose:** Assessing effect of (preventive) rehabilitation on swallowing and mouth opening after concomitant chemo-radiotherapy (CCRT).

**Methods & Materials:** Forty-nine patients with advanced oral cavity, oropharynx, hypopharynx and larynx, or nasopharynx cancer treated with CCRT, were randomized into a Standard (S) or an Experimental (E) preventive rehabilitation arm. Structured multidimensional assessment (i.e. videofluoroscopy, mouth-opening measurement, structured questionnaires) before and 10 weeks after CCRT was performed.

**Results:** In both S and E arm feasibility was good (all patients could execute the exercises within a week), and compliance was satisfactory (mean days practiced per week: 4). Nevertheless, mouth opening, oral intake and weight decreased significantly. Compared to similar CCRT studies in our

Institute however, fewer patients were still tube-dependent after CCRT. Furthermore, some functional outcomes seem less affected than studies in the literature that did not incorporate rehabilitation exercises. Patients in the E arm practiced significantly fewer days in total, and per week, but obtained results comparable to the S arm.

**Conclusion:** Preventive rehabilitation (regardless of the approach, Experimental or Standard) in head and neck cancer patients, despite advanced stage and burdensome treatment, is feasible and in comparison with historical controls seems helpful to reduce extent and/or severity of various functional short-term effects of CCRT.

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## **The Influential Factors Affecting Health-Related Quality of Life of Maxillectomy Patients**

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**Purpose:** Quality of life is receiving significant attention in health care globally. These brought great interest of wide variation outcomes that result from those quality of services and lives of individual. The purpose of this study is to investigate the different influential factors on a functional status on health-related quality of life of maxillectomy patients.

**Methods & Materials:** This is a descriptive cross sectional study conducted via self-administered using UW-QOL questionnaire and medical records of maxillectomy patients (n=29) average age of 68years, between 2008-2009 were participated at the Department of Maxillofacial Prosthetic in Tokyo Medical and Dental University, Japan in a clinical routine follow-up health care provided. As a statistical analysis, Mann-Whitney U-test was applied.

**Results:** Results shows that maxillectomy patients had significant of  $p < 0.05$  of among 12 domain of UW-QOL questionnaire were activity, recreation, swallowing, speech shoulder, and anxiety on functional status and in general question of health-related quality of life with a conditions of neck dissection and post diagnosis years are most common influential factors affecting quality of life.

**Conclusion:** An indicated influential factors on functional status such as activity, recreation, swallowing, speech shoulder, and anxiety may affects on individual's performance of those roles, task and activities, as well as psychological and physical well-being that pertains the behaviors and environment. The patient's perspective may apply as a tool for diagnosis and consultation for evaluation of treatment individually to increase the presence of acquired defect patient's towards society and the treatment plan may focus more on influential factors to recognize the needs of these patients.

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## **Speech Assessment for Patients with Maxillary Obturators**

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**Beijing, CN**

**Purpose:** The aim of this study was to evaluate the speech outcome of patients with maxillary obturator from 3 months to 1 year follow-up.

**Methods & Materials:** This study included a group of 9 subjects which had unilateral surgical resection of the maxillae for the removal of carcinomas and rehabilitated with obturators. In order to compare the speech outcome between the open obturators and closed hollow obturators, the open obturators were covered with wax to imitate the closed hollow obturators. The speech outcome were evaluated in subjective and objective ways. In the subjective way, firstly the overall speech qualities were judged by making the patients answer the questions on the questionnaire which consisted of 1-100mm Visual Analogy Scale (VAS). Secondly nasality was tested with judgment of 2 recorded samples which included 6 Chinese vowels( sample 1) , 4 Chinese sentences( sample 2) by five speech pathologists and speech intelligibility was tested with judgment of 1 recorded sample which consisted of a list of Chinese characters (sample 3) by 10 untrained listeners. In the objective way, the spectral pattern of six vowels in speech sample 1 was observed and the formant frequency of nasal resonance (Fn) in the six vowels was analyzed with linear predictive coding(LPC) by using VS-99 3.0 speech lab system.

**Results:** The overall speech qualities of the patients with obturators ( both open and closed) is significantly higher than those without obturators (P

**Conclusion:** Patients with either the open or the closed hollow obturators could produce speech which was significantly superior to the speech produced by those with no obturators. Hypernasality is apparent in the speech of the patients with maxillary defect and can be improved sharply by the open and closed hollow obturators

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**Friday, May 21, 2010**

**General Session**

**36**

## **Dysphagia and Dyslalias in the Outcomes of Maxillofacial Surgery: Evaluation, Phoniatic and Logopedic Remediation**

**Massimo Spadola Bisetti, MD Phoniatics**

**Raimondo Simona, Speech Therapist**

**S.C. Otorinolaringoiatria - Audiologia e Foniatria – U.**

**A.O.U. San Giovanni Battista di Torino (Italy)**

The phoniatic evaluation of the swallowing and the abilities of word are articulated in classical times:

1. Anamnesis
2. Clinical evaluation
3. Instrumental investigations.

The clinical evaluation includes: the evaluation of the oral cavity, of the skills of the mouth and facial, the search of the physiological or pathological reflexes, the tests of swallowing, the phonetic examination. The principal instrumental investigations are the digital videofluorography (VFG) and the fiberoptic endoscopic evaluation of swallowing (FEES). While the VFG is performed by the radiologists with specific equipment and in the special rooms, the FEES is performed by the phoniatics only with a flexible laryngoscope, eventually connected to apparatuses of video-recording, and of small portions of foods of the various consistencies and can be also practiced to the bed or to the domicile of the patient. The aim of these investigations is that to come to identify the principal alterations of the anatomy and the physiology of the swallowing to program a correct rehabilitation.

The targets of the intervention of the speech therapist are to program an appropriate rehabilitation of the swallowing, to reach the greater possible mobility of the residual structures to get a functional communication, eventually to support or to replace the oral language with alternative communicative strategies.

In presence of dysphagia, the primary target of the rehabilitation is the recovery of a normal swallowing or how much more possible next to that physiological. If this is not possible, the re-education tries to get a functional swallowing that accepts some compromises what a greater duration of the swallowing,

dietary limitations, exclusion of particular consistencies, and adoption of particular postures during the meal.

The most complete failure of such objectives will make necessary to use forms of feeding alternatives as the Percutaneous Endoscopic Gastrostomy, eventually limiting the feeding for mouth to small quantities of food without nourishing finality but only hedonistic aim. In case of presence of dyslalias, it is realized a rehabilitation of the articulation of the word and of the production of the voice.

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## Regenerative Medicine in Head and Neck Rehabilitation

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**Objectives:** Oxygen-sensitivity of osteoblasts implies that mesenchymal stem cells (MSCs) are a better source for vitalization of scaffolds because they are able to proliferate under low oxygen tension and differentiate when the oxygen level rises. The aim of the present study is to evaluate the clinical application of chair-side processed bone marrow aspirate concentrate including stem cell for augmentation of the edentulous posterior maxilla.

**Methods:** After successful animal trials a randomized controlled clinical trial on sinus floor augmentation of the posterior maxilla was carried out. The test group was augmented with mononuclear cells derived from bone marrow aspirate concentrate (BMAC<sup>TM</sup>, Harvest Technologies, Plymouth, MA, USA) on a bovine bone matrix (BioOss®, Geistlich Wolhusen, Switzerland). The control group was augmented with bovine bone matrix mixed mixed with autologous bone. Biopsies were harvested with a trephine burr when dental implants were inserted 3–4 months after sinus augmentation. Additionally the obtained cells were analysed for their stemcell character by plastic adherence, differentiation assay, and flowcytometrical-analysis of relevant CD-markers. The technique is modified for mandibular reconstruction and tested in a feasibility study.

**Results:** Histologic and histomorphometric analysis of the obtained specimen showed comparable new bone formation in both groups. In addition, implant survival of the placed dental implants was surveyed. FACS-analysis was positive for CD 44, 73, 90, 105, 166 and negative for CD 34 as for 45. Obtained cells showed the potential to differentiate into adipocytes, chondroblasts and osteoblasts.

**Conclusions:** The results demonstrate the feasibility of this procedure. FACS-analysis and in-vitro tests prove that mesenchymal stem cells had been transplanted.

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## Biological and Biomechanical Factors on Bone Repair in Immediate Loaded Implants

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The insertion of a dental implant causes a localized inflammatory reaction in the narrow spaces between the implant surface and the host bone according to a biological sequence that has evolved over time. The biologic mechanisms of bone repair are independent from the stimulus causing the trauma, be it accidental or iatrogenic.

The healing processes occurring after dental implant placement have been compared to bone wound healing. In normal bone wound healing, where micromotion is believed to be noxious, orthopaedic procedures tend to immobilize fractured segments to minimize micromotion between bony segments. In the same way this communication aims to explain that, where stabilization of implants can be obtained and maintained, immediate occlusal loading in edentulous patients should no longer be regarded as having risk factors higher or greater than the risk factors associated with implant placement and unloaded healing protocols.

The authors assert the concept that prosthetic factors, including controlling the timing of occlusal loading, play a key role in reaching and maintaining osseointegration even in areas of poor bone quality, as typically seen in edentulous maxillae.

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**Friday, May 21, 2010      Concurrent Session IV - Digital Technology**

**39**

### **The Development of a Stereophotogrammetry Technique to Assess Facial Change Following Surgery for Head and Neck Cancer**

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**Purpose:** Patients who receive surgery for head and neck cancer may experience many difficulties in relation to oral function. Furthermore changes to facial form may result in patients feeling isolated and lonely. However to date it has been difficult to measure changes to facial form and how this can be restored.

The purpose of this study was to develop a technique in which facial form could be measured on patients who had received surgical treatment for head and neck cancer.

**Methods & Materials:** A stereophotogrammetry 3D image capture and analysis system was used to map the face. The mapping involves recording a photograph of the facial tissues by the use of four digital linked cameras at different angles to the patient. A three dimensional image of the face was then created. The resulting images could be displayed in many different ways permitting examination and measurement of profile. A specific software program was also developed to measure differences between overlaying stereolithographic images by registering areas of the facial tissues that were stable. This was then used to subsequently assess the effects of an obturator on the facial profile.

**Results:** Superimposition of different images of a person with normal facial form showed that the system of recording and overlaying images was accurate to a resolution of approximately 0.5mm. The technique was then explored on patients who had received surgery for the removal of oral tumors and had been rehabilitated with maxillary obturators. The overlaid images of the patient with and without the obturator showed clear changes in facial form which were measured and displayed as difference values.

**Conclusion:** Stereophotogrammetry is a novel technique that can be used to assess changes of facial form. So far it has been successfully used to demonstrate the effects of obturators on the rehabilitation of facial form but is likely to have a wide variety of applications in relation to measurement of changes in relation to growth, as well as congenital and acquired deformity of the tissues of the head and neck.

## **Computer Guided Planning: Treatment of Patients With Complex Maxillofacial Defects**

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**Oral & Maxillofacial Surgery**  
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**Purpose:** Regaining one's dignity through maxillofacial reconstruction after a life changing ablative surgery reestablishing an acceptable quality of life for patients with maxillofacial defects is critical. This is the mission and drive behind the reconstruction of patients with maxillofacial defects. This presentation will demonstrate the use of the maxillofacial software for the treatment planning of patients with orbital, nasal as well as complex orbital-nasal defects. The profile of patients treated for the past 15 years will be presented including data on patients treated with HBO as well as patients who have had radiation therapy.

**Methods & Materials:** The use of computer guided imaging software has allowed a more predictable diagnosis and treatment planning of this group of patients. The use of the maxillofacial Software allows the maxillofacial surgeon, the maxillofacial prosthodontist as well as the anaplastologist to identify the ideal position for the placement of the implants. The available bony volume as well as the trajectory of the implants is modified on the computer screen until all team members are in agreement allowing the final plan to have less number of implants with more optimal platform positioning for fabrication of the maxillofacial prosthesis.

**Results:** The intraoperative position of the implants ( Actual surgery) were the same as the positions collaborated by the surgical team during the treatment planning session using the computer guided imaging software (virtual surgery). The position as well as the length of each implant were determined during the virtual surgery and were executed precisely during the actual surgery. The ability to identify adequate bony volume for placement of implants as well as the ability to avoid vital structures during the actual surgery was made predictable by the use of the Computer guided planning software.

**Conclusion:** The computer guided planning software allows for identification of adequate bony volume for placement of maxillofacial implants. The collaboration of the surgeon and the prosthodontist in the preoperative computer guided planning allows for the use of the least number of implants for the retention of orbital, nasal as well as complex maxillofacial defects lending to adequate space for the development of natural contours of the maxillofacial prosthesis

## **Bringing Three-Dimensional Plans for Orthognathic Surgery to Reality: One Center's Experience with Rapid-Prototype Splints and Cutting Guides**

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**Purpose:** Conventional surgical planning for orthognathic procedures has largely relied on two-dimensional (2D) radiographs combined with clinical findings. There are shortcomings however, in this approach: the first is that there may be significant inaccuracy when applying a 2D-based plan to the

asymmetric facial skeleton – a complex 3D structure; the second is that small inaccuracies can propagate through the multiple steps of model surgery. Multiple groups have thus used three-dimensional (3D) CT to define the deformity and to plan orthognathic procedures. Our group has been using patient-specific cutting guides and splints in an attempt to accurately and directly transfer the 3D surgical plan from computer screen to the operating room. This step of the reconstruction has brought its own challenges; the purpose of this presentation is to discuss the evolution of our approach.

**Methods & Materials:** For the past 5 years our center has used 3DCT-based planning for orthognathic procedures (LeFort 1 and bilateral sagittal split mandibular osteotomy) in treating adolescents and young adults with dentofacial skeletal deformity of either developmental or congenital etiology. Here CT data is processed and segmented using MIMICS (Materialise, Leuven, Belgium), and virtual osteotomies are created and the segments positioned.

The intermediate splint is designed based on these repositioned segments, while the custom cutting guide is designed based on virtual osteotomies. These are then fabricated using rapid-prototyping technology. Such cutting guides/splints have been used intraoperatively for five patients. In the course of this series, the design of the guides has been modified through collaboration of our surgeons (DM, PKP), engineer (LZ), and manufacturer (Medical Modeling, Golden, CO, USA), based on qualitative intraoperative observation of patient anatomy and technical feasibility.

**Results:** Design of splints and cutting guides has been modified in the following forms: whether one or both are required, splint thickness, splint and cutting guide material, size, and whether the cutting guide contains drill holes/saw grooves. These progressive modifications have allowed us to achieve a more ideal design with each case.

**Conclusion:** Converting a virtual surgical plan to reality through the use of patient-specific custom surgical guides is desirable and is technically feasible. Multidisciplinary collaboration (surgeon, engineer, and manufacturer) has enabled this approach to evolve.

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### **New CAD-CAM Protocols for Constructing Facial Prostheses Using Rapid Prototyping Technology**

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**Virtual Laboratory, IInd Faculty of Engineering**  
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**Purpose:** To describe the completely automated protocols used to construct CAD-CAM custom-made ear, nose, and facial prosthesis.

**Methods & Materials:** Provisional eyeglass-supported nasal prosthesis: The computer-aided design of a nasal prosthesis based on preoperative virtual laser scanning of the affected site was adapted to the postoperative laser scanned surface. The mold for the nasal prosthesis was prototyped using computer-aided design and manufacture (CAD-CAM). In addition, the mesiostructure was designed and prototyped.

Diagnostic and surgical templates for craniofacial implant placement: Three ideal positions for the implant were chosen in the inner volume of the nose or mirrored ear. These positions were transferred to a diagnostic template. For the nose, a three-part template was printed in three dimensions: one part was the helmet, which was used to support the others; one part was the starting guide, to mark the skin before flap elevation; and one part was the surgical guide for bone drilling. For the ear, a positioning arm extending to the zygomatic arch was used to stabilize the position during computed tomography (CT). Bone anchored ear and nasal prosthesis: Digitalized anatomic models from a nose and ear library were used to design the prosthesis. The substructure was customized precisely using the original and a

modular reproducible structure to retain the silicone and using the offset for the space for the bar clips. The mold for the ear or nasal prosthesis was prototyped using CAD-CAM. Conventional silicone processing and coloring were used.

**Results:** Instead of a try-in, all corrections can be made on a computer monitor directly. The creation of an “ear and nose library” simplifies the modeling of the external volume, especially when no symmetric volume may be mirrored to develop the prosthesis and when producing an immediate provisional adhesive prosthesis, and a CT diagnostic template, or a provisional prosthesis supported by eyeglasses. Time and costs were also saved.

**Conclusion:** New technologies like digital procedures and rapid prototyping are suitable for simplifying the protocol for constructing ear, nose, and facial prostheses. Time and costs are also minimized.

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**Friday, May 21, 2010**

**Concurrent Session V - Digital Technology**

**43**

### **Reconstruction of Maxillary Defect through Dentoalveolar Distraction Osteogenesis with Personalized Curvilinear Distractor Designed Through Computer Technology**

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**Department of Prosthodontics**  
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**Purpose:** To demonstrate the feasibility of reconstruction for maxillary defect, using dentoalveolar distraction osteogenesis along the arch of original alveolar ridge with curvilinear personalized distractor designed through computer-aided technology.

**Methods & Materials:** In animal experiment, the canine models of left maxillectomy were developed and their three-dimensional skeleton models were reconstructed with CT data using software Minics 12.0. The personalized curvilinear distractor was designed with ProE4.0, the rail of which was strictly along the original alveolar ridge to ensure the regenerated bone was at the original position of ablated alveolar bone. Based on the experimental study, this method had been applied to two patients with different maxillectomy. Before animal and patient surgeries, the virtual and solid model simulations both for osteotomy of bone transport disc and distraction process were developed to testify whether the distractor has the ability to perform the necessary spatial movement of the bone transport disc to the desired position, whether there were any interferences between the bone moved by the distractor and the adjacent anatomical structures during the movement process. According to the result of simulation, the design of the personalized distractor would be revised until it could work perfectly. The simulation experiments also provided a chance to the surgeon to grasp the operation well.

**Results:** The distraction osteogenesis was successful both in animal experiment and clinical practice, and the transport bone disc was distracted to desired site. The radiograph and histology both verified the new bone bridging distraction gap.

**Conclusion:** The novel approach to design personalized distractor and the curvilinear dentoalveolar distraction osteogenesis were confirmed feasible to reconstruct unilateral maxillary defect. However, how to locate the new bone precisely at original position and to functionally reconstruct maxillary defect with distraction osteogenesis will need more study.

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## **The Evaluation of Several Kinds of CAD/CAM Systems for Fabricating Facial Prosthesis**

**Yoshioka, F., DDS, Ph. D, Okazaki, S., DDS, Ph. D, Miyamae, S., DDS, Ph. D, Hirai, H., DDS, Ph. D, Shigemori, T., DDS, Ph. D, Asami, K., DDS, Ozawa, S., DDS, Ph. D, Tanaka Y. DDS, Ph. D**

**Aichi-Gakuin University, School of Dentistry  
Department of Removable Prosthodontics  
Nagoya, Japan**

**Purpose:** Recently, the advancement of digital technology has been remarkable even in the prosthodontic field. Especially, digital facial impression using 3D modeling techniques could have a great potentiality to substitute the conventional facial impression which is uncomfortable for patients. This study evaluates using the 3 types of the 3D data acquisition systems and 2 types of rapid prototyping systems in regard to its accuracy and practicability compared with the conventional method.

**Methods & Materials:** A 66 year-old male who had the defect in orbital area due to cancer participated in this study. Informed consent was obtained prior to the study. Three kinds of data were obtained using the laser scanning digitizer, the photogrammetric system, and the white-light phase-shifting triangulation system respectively. Those images were compared using model analyzing software based on the pre-established landmarks. Each scanned data were converted into the physical models using two types of rapid prototyping machines, the ink jet 3D printer and the selective laser sintering machine. These models were compared in terms of the surface texture and accuracy.

**Results:** Each data from three types of 3D data acquiring systems showed well accuracy and practical usefulness. The white-light phase-shifting triangulation system had the highest resolution among the three systems while the photogrammetric system required the shortest time for data acquisition. Physical model fabricated by the 3D inkjet printer had rougher surface texture compared to the model fabricated by the selective laser sintering machine.

**Conclusion:** In this study, three kinds of data acquisition systems and two kinds of rapid prototyping systems were evaluated for fabricating facial prostheses. Each of 3D modeling technique could utilize to reproduce the facial curvature in detail and the clinical application of each system as an alternative method to conventional facial impression is promising.

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## **Numerical Study of the Upper Airway Airflow Dynamics in the Radical Maxillectomy Patient**

**Jiao, T., Qian, Y.M., Wu, Y.D.**

**Shanghai Jiao Tong University, School of Stomatology  
School of Aeronautics and Astronautics  
Prosthodontics  
Shanghai, China**

**Purpose:** Radical maxillectomy results in defect of hard and soft palates, oro-antral communication, and part of nasal mucosa missing. Patients complained of nasal dryness, crusting and recurrent nosebleed. The aims of this study were to numerically simulate the upper airway airflow dynamics of radical maxillectomy patient and evaluate the changes of the upper airway morphology and respiratory function of these patients.

**Methods & Materials:** Based on the data of spiral CT images of a radical maxillectomy patient, a three-dimensional numerical model of the upper airway was constructed by using Mimics software and ANSYS ICEM. The model was meshed into 1,831,033 tetra-elements. Airflow was assumed to be turbulent at an inspiration rate of 10.5L/min. An unsteady numerical simulation of airflow dynamics was performed by using computational fluid dynamics (CFD) method.

**Results:** The main air stream on the defect right side passed through the top of maxillary defect cavity, while on the left side, it mainly passed through the middle meatus. High-velocity areas and the greatest reduction in pressure were prominent in the nasal valve region, velopharynx, up and downstream of the epiglottis at a maximum flow rate during inspiration. Spacious vortices of low velocities throughout the entire maxillary defect cavity occurred, causing a serious loss of energy. A postoperative enlargement (5.71%) was observed on the cross-sectional surface area on the left side.

**Conclusion:** Radical maxillectomy disturbed the upper airway airflow patterns. It suggested that a compensatory breathing might happen on the healthy side. CFD numerical simulations make great contribution to understand the upper airway airflow aerodynamic effects of the radical maxillectomy patient, which help to explain the various pathological symptoms.

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## **It's Not Just A Beginning: On the Use of Stereolithographic Models for Mandibular Rehabilitation**

**Wang, T.M.**  
**National Taiwan University**  
**School of Dentistry**  
**Taipei, Taiwan**

**Purpose:** Due to great progress in computed tomography and CAD/CAM techniques, stereolithographic (STL) models are used in planning and pre-fabricating fixation plates for mandibular reconstruction. However, most cases in literature are relied on surgeons' experience to fix the pre-adapted plate on the mandible. In cases with severe swelling or distortion of mandible, it's difficult to place the plate at planned position for less experienced surgeons. This presentation is to report a treatment protocol to assist surgeons in mandibular rehabilitation by using STL models.

**Methods & Materials:** Patients who will have a mandibular resection are arranged to Cone Beam CT scanning. A STL model is made base on the patient's CT data. The treatment plan and resection area are discussed between team members and marked on the model. If the mandible is deformed, the model is adjusted as the ideal shape. A titanium reconstruction plate is adapted on the reshaped model. "Screw-hole-positioning guides" are made to transfer and secure the pre-adapted plate accurately on the resected mandible. After the bone graft is healed, tissue debulking and free gingival graft is indicated for tissue-supported or implant-supported prostheses. Using the STL model, a surgical stent is made to adapt the gingival graft well on bony surface. This surgical stent is fixed on the reconstructed mandible either by circumferential wiring or connected with implant components.

**Results:** The "screw hole positioning guides" and the surgical stents for gingival graft fabricated on the STL models not only decrease the time of surgery but also provide good treatment outcome. The mandibular shapes are kept symmetry. The soft tissue attaches on the bony surface firmly. Those results are also helpful in fabrication of prostheses. If there is need to change the mandibular shape or other surgical modification, it can be found before surgery and explained to the patient to prevent disagreement.

**Conclusion:** The use of STL models is not just for the planning and pre-adapted fixation plate for mandibular resection. More applications on them are helpful in surgical reconstruction and fabrication of a stable prosthesis with good prognosis.

Friday, May 21, 2010

Concurrent Session VI - Rehabilitation

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## **Relationship Between Treatment for Head and Neck Cancer and Obstructive Sleep Apnea**

**Wee AG\*, Bista, S.R.**

**University of Nebraska Medical Center**

**Otolaryngology - Head and Neck Surgery**

**Lincoln, Nebraska, USA**

**Purpose:** The purpose of this presentation is a literature review of the relationship between head and neck cancer treatment and occurrence of obstructive sleep apnea. The presentation will propose a sleep apnea screening for head and neck cancer patients, as well as treatment options.

**Methods & Materials:** Obstructive Sleep Apnea (OSA) is increasingly recognized as a significant health problem. An estimated 18 million people (9.1% of middle-aged males and 4% of middle-aged females) suffer from OSA. Untreated OSA can contribute to excessive daytime sleepiness, as well as an increased risk for high blood pressure, myocardial infarction, stroke, diabetes, obesity and driving accidents. The literature has shown that cancer or treatment for cancer in the oral, pharyngeal or laryngeal region may be related to OSA. Patients who have initially presented with OSA symptoms have subsequently been found to have cancer in the head and neck region that contributed to the OSA. Treatment modalities for head and neck cancer can cause physical changes and restrict airflow in the pharyngeal airway. Prevalence of OSA in patients treated for head and neck cancer ranges from 12% up to 72% as reported in two separate research studies. Surgical resection of the cancer and reconstructive surgery (addition of flaps) may predispose these patients to OSA. Complications related to radiation treatment, such as xerostomia, thyroid dysfunction, osteoradionecrosis, tissue fibrosis and airway edema may also predispose these patients to OSA.

**Results:** Studies indicate an increased incidence of OSA in patients after treatment for head and neck cancer. Screening for patients who might be at risk for OSA syndrome is recommended with the Epworth Sleepiness Scale and the Berlin Questionnaire. Treatment options for these patients with OSA include the use of a CPAP or a mandibular advancement prosthesis.

**Conclusion:** Identification and treatment of OSA may be an important factor in improving the quality of life for patients with head and neck cancer. More definitive studies are needed to determine what patient and treatment factors are relevant to the development of OSA following treatment for head and neck cancer.

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## **British Oral Rehabilitation Research Network Head and Neck Cancer Touchscreen Database**

**Barclay, C.W ., Butterworth, C. J., Sharrock, A.**

**Central Manchester University Hospitals NHS Foundation Trust University**

**Hospital Aintree, Oral Rehabilitation**

**Manchester, England**

**Purpose:** To develop a touch screen software program that would be versatile to allow for multiple quality of life questionnaires to be stored and allow for patient data collection to be simple and streamlined.

**Methods & Materials:** This database is now completed, having been written in 2004/2005 as a front and back end microsoft access type database program and it was piloted by four centers nationally in 2006/2007 and modified to its current status in 2008. The innovation was developed using the IT skills and links previously fostered with Manchester Computing. The project lead developed the initial prototype which after the evaluation period was further developed to its final format allowing for new QOL questionnaires to be added simply to the program.

**Results:** The patient directly enters the data onto a touch screen computer, no data entry clerk is required, no questions can be omitted as the program will not progress until all questions are answered. The data is automatically saved on completion and can be imported straight into SPSS for analysis. This software was piloted in 4 national Head and Neck Cancer units and a five question evaluation section was added. The time the patient took to complete it is automatically recorded. The results of this initial pilot project showed no data to be lost, patients preferred this tool to paper questionnaires and also filled them in quicker with no gaps in the data collected. To resolve some minor issues, an updated version was produced that allowed for patient response sheets to be printed immediately and placed in their case-notes. Also free text and visual analog scales were developed as well as the ability to add new questionnaires when they were developed.

**Conclusion:** With advancements in technology over the last decade health related quality of life assessments has been an important addition to the conventional measures of outcome. Previously, QoL has been collected using paper copies and then this data was transcribed into a computer. This innovation allows several QoL questionnaires to be purely computer-based, to be mobile and allow data collection to be carried out in the ward, out patient clinic, at the rehabilitation clinic or wherever the patient happens to be. This has the added advantage of real time scoring and presentation of QoL data immediately to the clinical setting.

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## **A Study of Effectiveness of Functional Recovery Using Palatal Augmentation Prosthesis for Dysphagia After Oral Cancer Surgery ~Comparative Study of Postoperative Status Between Cases Wearing and Those Not Wearing Palatal Augmentation Prosthesis by Means of Multivariate Analysis According to the Quantification Method~**

**Sekiya, H., Sonoyama, T., Fukui, A., Hamada, Y., Horie, A., Horiuchi, T., Kawaguchi, K., Seto, K. and Kudoh, T.**  
**School of Medicine, Toho University**  
**Department of Oral Surgery**  
**Tokyo, Japan**

**Purpose:** Palatal Augmentation Prosthesis: PAP is effective for dysphagia due to tongue disorder after resection of oral tumor, but the evidences are not less shown and the mechanism of effect are not demonstrated yet. The purpose of this study is to demonstrate the most important factor in postoperative status with the cases of wearing PAP.

**Methods & Materials:** This presentation draws a comparison about the postoperative status and dysphasia (range of resection, neck dissection, method of reconstruction, diagnosis of dysphagia) between the 20 cases of rehabilitation using Palatal Augmentation Prosthesis and the 20 cases of that not using one after oral cancer surgery in 180 patients by means of multivariate analysis according to the quantification method.

**Results:** The results showed the method of reconstruction was significant difference between PAP Group and No-PAP Group.

**Conclusion:** In conclusion, the results of this study suggest that indication of PAP depends on appropriate choice of flap for the defect.

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## **Comparative Evaluation In Animal Models Of Osteogenesis With "Bio-Inspired" Space-Maintainer**

**Bonelli, M.; Rimondini, L.  
University Of Eastern Piedmont "A. Avogadro"  
Novara - Italy**

**Purpose:** Comparison of osteogenesis in critical circular defects on scaffold-based nano-hydroxyapatite, dextran, polylactic-polyglycolic copolymer, compared to a control consisting of the same wet scaffold with promoters of cell adhesion. The evaluation was performed by histological and histomorphometric examinations at 3 and 6 months.

**Methods & Materials:** 10 healthy adult not pregnant sheep were studied. 3 and 6 months after the surgery, a group of 5 sheep has been sacrificed with an overdose of thiopental and embutramide. After euthanasia, the proximal epiphysis of the tibia are removed. The explants were washed in saline and fixed for histological examination and histomorphometry. For osteogenesis, the percentage of newly formed bone was evaluated and hardness of the newly formed bone was compared to that of the proximal bone.

**Results:** The histological and histomorphometric results indicate that the osteogenesis was good in all sites treated with different space-maintainers. However, the bone formation was enhanced by the presence of promoters of cell adhesion.

**Conclusion:** The osteogenesis can be enhanced by the presence of promoters of cell adhesion.

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**Saturday, May 22, 2010**

**General Session**

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## **Bone Graft Materials Related to Mesenchymal Stem Cells: A Potential Tissue Engineering Approach to Guided Bone Regeneration**

**Cancedda<sup>1</sup>, R., Mastrogiacomo<sup>1</sup>, M., and Komlev<sup>1,2</sup> S.**

**<sup>1</sup>Istituto Nazionale per la Ricerca sul Cancro, & Dipartimento di Oncologia, Biologia e Genetica, Universita' di Genova, Genova, Italy**

**<sup>2</sup>A.A. Baikov Institute of Metallurgy and Materials Science  
Russian Academy of Sciences, Moscow, Russia**

In this work, we adopted a well-established model of ectopic bone formation in which bone marrow-derived mesenchymal stem cells were loaded onto different porous ceramic scaffolds, namely synthetic 100 % hydroxyapatite (HA; Engipore), synthetic calcium phosphate multiphase biomaterial containing 67% silicon stabilized tricalcium phosphate (Si-TCP; Skelite<sup>TM</sup>) and natural bone mineral derived scaffold (Bio-Oss®) and subcutaneously implanted in immunodeficient mice. Scaffolds implanted in the mice for 8 and 16 weeks were analyzed by microCT and registration of several series of images was performed.

The obtained results demonstrate the benefits of using registration imaging treatment to investigate the scaffold fate. Engipore scaffold before and after implantation was well superimposed with high accuracy. This result well correlates with literature data that HA is non biodegradable material. Moreover the observed and quantified general biodegradation behavior of Skelite™ and Bio-Oss® was in agreement with those reported in literatures.

Inadequate vascularization of the implant still remains one of the major limitations in tissue engineering and in particular in bone tissue repair. Indeed, the ultimate efficiency of an artificial bone construct depends on timely delivery, exchange of oxygen and nutrients from surrounding blood vessels to the MSC and removal of waste products. Therefore, mastering the control of angiogenesis as a microvascular network with properly structured spatial organization will be crucial to any attempts to obtain bone regeneration/repair by a tissue engineering approach. Standard X-ray microtomography (microCT) is a technique that allows a good visualization of the structure of mineralized tissues and biomaterials, but it fails to finely discern soft tissues. We used phase contrast synchrotron radiation micro-CT, to visualize in three- dimensional (3D), the microvascular networks for the first time with no need for contrast agents, and to extract quantitative structural data in a bone engineered construct.

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## Dynamic Modeling of the Oral, Pharyngeal and Laryngeal Complex

Fels, S.

**Associate Professor and Director of the Media and Graphics Interdisciplinary Centre (MAGIC), Head of the Human Communication Technologies Research Lab, Dept. of Electrical and Computer Engineering, The University of British Columbia, Vancouver, BC, Canada**

We are contributing to the state of the art of dynamic computer simulation of physiological structures by creating physically-based models of the human oral, pharyngeal and laryngeal (OPAL) complex and using them to study medical disorders of this area, including speech pathologies, dysphagias, and obstructive sleep apnea (OSA). The modeling process begins by extracting the 3D geometry of anatomical components from medical imaging data, using both data-driven and model-driven approaches, to create representative geometric models of the OPAL complex structures. We are also studying techniques and workflows for using patient-specific data to register these generic models to individual subjects. Once the geometry has been determined, it is used to create dynamic biomechanical models, the forward simulation of which allows us to investigate the functional behavior of the OPAL complex as well as simulate modifications of the soft and hard tissue components including muscle activation. To date, we have been investigating dynamics of coupled tongue, jaw, and hyoid structures with muscle behaviors during chewing and swallowing for normal and hemi- mandibulectomy patients. We have also used inverse modeling techniques to derive muscle activation patterns based on kinematic trajectories of jaw motion for different behaviors. We are currently extending our models to include the face and pharyngeal components.

The physical simulation is done using ArtiSynth, an open source biomechanics platform that we have created. It provides a cross-platform environment in which researchers can create and interconnect various kinds of dynamic and parametric models to form a complete integrated biomechanical system. Various GUI devices are available for interactively editing the models and controlling the simulation, including a graphical timeline allowing the temporal arrangement of input/output channels that can control or observe different model properties. Support is available for particles, rigid bodies, springs, and linear and non-linear finite element models, along with constraints and collision handling including friction.

This dynamic modeling of the OPAL complex provides researchers and clinicians new tools to understand the complexities and behaviors of this highly sophisticated region. Through this improved understanding, better diagnosis, treatments and care may be developed.

**Acknowledgement:** This research has received funding from the Natural Sciences and Engineering Research Council grant in Canada, ATR and CRL in Japan, and the Peter Wall Institute of Advanced Studies.

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### **The Coming of Age of Virtual Craniofacial Surgical Planning: From Imaging to Finite Element Analysis**

**Patel, P.**

**Professor of Surgery and Chief of Craniofacial Surgery**

**University of Illinois**

**Chicago, IL USA**

For nearly half-a-century, reconstructing children and young adults with craniomaxillofacial deformities has relied primarily on two dimensional photographic images and radiographs. It was the surgeons eye and experience that integrated the two dimensional records to generate the virtual three dimensional image for surgical planning. In fifty years, surgical planning and assessing the outcome of that planning remained largely unchanged. In the last decade of the twentieth century, multidimensional visualization of the skeletal deformity became possible with the emergence of computerized tomography. This allowed the surgeon the ability to visualize the complexity of the deformity but not the ability to simulate surgery. It is only within the last several years that computational software began to transform the pure visual imagery of CT to allow surgical simulation to become a reality. Today surgeons are beginning to have the tools to simulate various craniofacial skeletal osteotomy patterns, ability to manipulate each of the bony elements and have the potential to simulate the soft tissue response.

In parallel the last half-a-century saw a rapid advance of application of finite-element methodology (FEM) to solve complex engineering problems. With advance of 3D modeling and computational power, this powerful design tool had a significant impact in many industrial applications. FEM substantially decreased the time from product concept to product production: increased accuracy, enhanced design with insight into critical parameters, need for fewer prototypes, a efficient and less expensive design cycle. Within the last decade, FEM has proven to be a tool to a better understanding of biomechanical aspect of the craniofacial skeleton, but its full potential to influence surgical 'design' remains to be explored.

Surgical planning has traditionally relied on restoring morphologic form without integrating 'function' as a critical element in the design process. These advances make it possible today to build patient-specific finite element models to investigate the biomechanical response of the skeletal structure, subject to various loading conditions to optimize reconstruction. The future craniofacial surgeon will have the tools to accurately design the surgical procedure that optimizes the facial form and function before entering the operating theater.

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### **Merging Digital and Biological Techniques for Maxillary Augmentations**

**Schmelzeisen, R., Metzger, M., Sauerbier, S.**

**Department of Oral and Craniomaxillofacial Surgery**

**University Clinic Freiburg**

**Freiburg, Germany**

The insertion of dental implants is only possible after bone augmentation procedures with autologous, alloplastic or composite materials. For reconstruction the gold standard is still the autologous bone harvested from the iliac crest, the mandible or the maxilla. Disadvantages are the limited availability of bone and the necessity of an additional surgical procedure which always implies the risk of donor site morbidity.

Tissue-engineering procedures for hard tissue augmentations of the maxilla offer significant advantages compared with conventional grafts, as there is minimal or no donor site morbidity. Ideally, these procedures are used under outpatient conditions under local anaesthesia, using only autologous material with boneforming ability.

Current research aims at investigation the influence of stem cells on biomaterials. In animal experiments stem cell application in combination with a bio material (BioOss) show lamellar bone formation and bone invasion into the micropores. The volume preservation was better in the test side than in the control side where cancellous bone was applied only. The new bone formation is comparable between both groups.

In a clinical multi center study 50 sinus were augmented with BioOss and stem cells (test) and 25 sinus were treated with a mixture of BioOss and cancellous bone (control). Stem cells were identified by flowcytometrical analysis and their ability to differentiate into various cell lineages like osteoblasts, chondroblasts and adipocytes. Biopsies were obtained with a trephine burr when dental implants were inserted 3 months later. The new bone formation was evaluated by histomorphometry. Implant survival is surveyed as long-term parameter.

Further evaluation of data is necessary to determine the possible future role of stem cells in augmentation procedures. Also methods of biplotting of combined autologous/alloplastic materials are under investigation.

Also allogenic block grafts (BioOss/Geistlich Pharma AG, Schweiz) enriched with stem cells show good initial results. CAD/CAM evaluation of typical maxillary and mandibular defects will allow for an individualization and standardization of preshaped implants that can be enriched with stem cells. Also first impressions on simultaneous cultivation of different cell types on suitable carriers are promising.

**Table 1**

## **Man in Lab - Role of Dental Technician in Oncology**

**Ahire, G S\*, Dholam K P, Gurav S V**

**Tata Memorial Hospital, Department of Dental and Prosthetics  
Mumbai, India**

**Purpose:** The purpose of this paper is to focus on the contribution of persons who are not in direct contact with cancer patients but play a key role in rehabilitating them by prosthesis fabrication for, during, and after completion of treatment.

**Methods & Materials:** The prostheses fabricated for radiotherapy [radiation source prosthesis] help radiotherapist to avoid side effects of radiation on healthy tissues by keeping radiation source in direct contact with lesion and shielding other normal structures.

Immediate, Interim maxillary obturators, Bite guide prosthesis are some of the prostheses indicated immediately after surgery to reduce and control the debilitating effects following surgery and facilitate recommence of function during treatment.

On completion of cancer control treatment namely surgery, radiation, chemotherapy lies task of restoring the patient to have optimum quality of life. Thus rehabilitation with permanent obturators, tongue prosthesis, palatal augmentation, partial and complete restoration of dentition, is planned after treatment.

**Results:** Treating the disease, fabrication of a comfortable, cosmetically acceptable prosthesis that restores the impaired physiologic activities of speech, deglutition and mastication is the object of prosthodontic care. Man in the lab is a silent figure actively working to attainment of this goal.

**Conclusion:** Dental Technician plays a major role in contributing to body image and restoring the individual to society, by fabrication of silicone orbital, ear, nose prostheses following resection when affected by diseases.

**Table 2**

## **Patients with Reconstruction of Intraoral Defects at M. D. Faculty of Dentistry ,Chulalongkorn University : Measure Quality of Life**

**Aimlee, S. and Serichettapong, P.**

**Faculty of Dentistry, Chulalongkorn University  
Maxillofacial Prosthetics, Bangkok, Thailand**

**Purpose:** The introduction of 'quality of life' questionnaires helps identify issues of concern to the individual patient and triggers discussions of these issues in the clinical setting. Questionnaires raise the important issue of what is 'quality of life'? To the patient it is an implicit state of being, something known that cannot be told. Whilst to the researcher it is a difficult measurement problem and to the clinician, just one of many other equally relevant inputs into a clinical judgment.

Patient with reconstruction of intraoral defects experience a profound impact on their Quality of life (QOL). This impact on QOL is influenced by the patient's medical conditions and the treatment interventions. The treatment of head and neck pathology has profound and long-term effects on patient's overall health, appearance, speech, communicate, eat and swallow. Quality of life is measure that encompasses many of these variables and can be used as an outcome measure. The purpose of this study was investigate the relationship between Quality of life (QOL) pre-treatment and post-treatment maxillofacial prosthesis

**Methods & Materials:** Study is a Univ. of Washington Quality of Life Scale (UW-QOL) questionnaire.

The advantages of the UW-QOL head and neck questionnaire are that 1) it is brief and self-administered, 2) it is multi-factorial, allowing sufficient detail to identify subtle change, 3) it provides questions specific to head and neck cancer, and 4) it allows no input from the health provider, thus reflecting the QOL as indicated by the patient. The nine domains are pain, activity, recreation, employment, disfigurement, speech, swallowing, chewing and shoulder function. The highest level or “normal” function is assigned 100 points, whereas the lowest level or greatest dysfunction scores 0 points. A Quality of life Questionnaire was delivered to 20 intraoral prosthetics patients to elucidate their degree of satisfaction with several parameters.

**Results:** The views of 20 respondents demonstrated a general satisfaction with their prostheses. A majority believed that their prostheses fit comfortably, and most were satisfied with cosmetic. In addition, a preponderance of respondents reported no substantial alteration in social activity after rehabilitation.

**Conclusion:** The survey revealed a high degree of patient satisfaction with maxillofacial prostheses

## Table 3

### Surface-Rendering 3D-Reconstruction and Cranio-Maxillo-Facial Implantation: A Case Report

**Bodard A.G., Salino S., Fortin T., Coudert J.L.**

**CRLCC Léon Bérard Dental Faculty, University Claude Bernard Lyon I  
Oral Surgery, Lyon, France**

**Purpose:** The use of extra-oral implants for the stabilization of epistheses dramatically increases patient quality of life. The choice of the implant’s axis may be difficult from an aesthetic point of view. 3D reconstruction, coupled with computer-assisted surgery, allows precise surgical planning and facilitates the choice of implant diameter, length and axis.

**Methods & Materials:** A 35-year-old patient, treated by exenteration at the age of 3 for a tumor of the right orbit, was referred for implant-supported epithesis therapy. Extra-oral implantation had previously been realized but 2 out of 3 implants had failed: one did not osteointegrate, the other induced severe frontal sinusitis. The patient presented with a unique remaining implant, which was insufficient to attach the epithesis.

Because of his recent surgical history, an image-guided approach was proposed. A non invasive repositioning system inspired from Alfano’s system (1) was used for the placement of a radiosurgical guide. It was composed of an intra-oral custom-made template made from an impression of the maxilla, a linkage rod and a radiosurgical guide representing the future prosthesis where fiducial markers were inserted. Surface-rendering 3D reconstruction was achieved by means of the MVS® software (Hospices Civils de Lyon, France).

**Results:** 3D reconstruction was particularly useful to highlight the remaining bone volume, considering past failures. Several studies (2, 3) have reported the use of stereolithographic guides, but these remain expensive and difficult to use. The major cons of conventional guides are their inability to consider intra-operative modifications and the difficult transition from virtual to reality.

**Conclusion:** Surface-rendering reconstruction remains useful for details and small elements, even if volume-rendering reconstruction has dramatically progressed over the past few years.

1 - Alfano SG, Robinson RF, Webber CM, Erickson KK. Fabrication of a craniofacial implant surgical and treatment planning guide. *J Prosthet Dent* 2005;93(1):91-4.

2 - Verdonck HW, Poukens J, Overveld HV, Riediger D. Computer-assisted maxillofacial prosthodontics: a new treatment protocol. *Int J Prosthodont* 2003;16(3):326-8.

3 - Sammartino G, Della Valle A, Marenzi G, Gerbino S, Martorelli M, Di Lauro AE, Di Lauro F. Stereolithography in oral implantology: a comparison of surgical guides. *Implant Dent*. 2004;13(2):133-9.

**Table 4**

## **A New Technique for the Arrangement of Maxillary Anterior Teeth in Complete Denture**

**Aramini, R\*, G. Preti, P. Ceruti, G. Gassino**

**University of Torino**

**Department Of Biomedical Sciences and Human Oncology**

**Section Oral and Maxillofacial Rehabilitation and Dental, Torino, Italy**

**Purpose:** A new technique for the arrangement of the maxillary anterior teeth in complete denture and the clinical results obtained with it are represented. The placement of the anterior teeth is a very important step of a complete prosthetic rehabilitation and it is indispensable for the determination of the height of the occlusal plane and for the aesthetic restoration of the face.

The methods used until now for the placement of the anterior teeth show many limits: they need very long sittings and high costs or they excessively simplify the procedure, losing the characterization of the teeth placement or giving inadequate information to the technician. Moreover involving the patient in the choice of shape, colour and placement of the anterior teeth is essential to obtain a shared and successful outcome. The new technique allows to try-in the arrangement of anterior teeth in a short clinical sitting involving the patient in the choice and to give to the technician accurate and complete information for the laboratory procedures.

**Methods & Materials:** The technique is based on the use of sticking adhesive paper teeth which simulate dimension, color, shape and position of the anterior teeth of the future denture. Moreover, paper teeth may be used to make a preliminary aesthetic evaluation of a new denture, simply sticking the selected paper teeth to the old complete denture.

This new technique has been used for the treatment of edentulous patients in the rehabilitation with complete denture. The correspondence between the try-in arrangement with paper teeth and the final arrangement, and the performed necessary modifications have been evaluated

**Results:** A correspondence between the placement of paper teeth and the definitive teeth arrangement evaluated during the wax try in was verified and rarely was found the necessity to modify the arrangement of the teeth.

**Conclusion:** These considerations demonstrate the new method's ability to transmit accurate information to the technician for the placement of maxillary anterior teeth. The limit of bidimensionality of paper teeth seems to be insignificant; the necessity to modify shape and orientation of maxillary canines during the wax try in was found in some patients.

**Table 5**

## **Evaluation of Obturator Prosthesis Regarding to Their Masticatory Function**

**Asami, K.\*, Miyamae, S., Okazaki, S., Ozawa, S., Yoshioka F., Hirai H., Shigemori T., Tanaka, Y.**

**Aichi-gakuin University School of Dentistry**

**Department of Removable Prosthodontics, Aichi, Japan**

**Purpose:** Maxillary resections due to cancer or injury result in serious functional problems to the patients, and those are required prosthetic rehabilitation. Since patients who suffered maxilla resection

have various confound factors that might affect maxillofacial function, a definite index of masticatory performance with obturator prosthesis has not been established. The aim of this study was to access contributing factors to the masticatory performance with obturator prosthesis.

**Methods & Materials:** Maxillectomy patients who had been treated in our clinic participated on this study. The masticatory ability test by using “gummy jelly” and “wax cube”, measuring the occlusal force, questionnaires to the patients were performed. The contributing factor involved the number of remaining teeth, occlusal support and defect classifications. Pearson correlation coefficients of the masticatory performance and the contributing factors were analyzed.

**Results:** The masticatory ability tests which utilize “gummy jelly” and “wax cube” demonstrated objective value of this function, which were correlated to the subjective masticatory scores that were calculated from the questionnaires. The increased surface area of “gummy jelly” had significant higher correlations with masticatory score, contact points and contact area. Whereas the mixing ability scores calculated from “wax cube” had no significant correlation with any factors except for the masticatory scores.

**Conclusion:** These results suggested that contact points and contact area of the prosthesis strongly affected masticatory function of the maxillectomy patients. Continuing study for other contributing factors should be needed in larger sample size.

## Table 6

### Oral Rehabilitation Of Patients Who Underwent Head and Neck Radiotherapy - 2 Case Reports

**Barut, O. Özcan, I. Sermet, B. Erdem, T.**  
**Istanbul University, Faculty of Dentistry**  
**Oral Diagnosis and Radiology, Istanbul, Turkey**

**Purpose:** Radiation therapy (RT) is a local regional treatment modality. RT alone may be used in the management of head and neck cancers to preserve function and cosmetics, also to avoid the morbidity associated with a major operation. RT may be combined with surgery postoperatively to destroy known or suspected residual cancer. Chemotherapy may be administered in conjunction with RT to improve local-regional control and improve survival. Our purpose with this report is to mention how cancer therapy affects the quality and quantity of saliva, alter the normal morphology of the oral cavity, reduce the healing capacity of oral hard and soft tissues and how all these effects also can directly affect the mood and the quality of life of those patients.

**Methods & Materials:** The cases reported here are a 32 years old male and a 56 years old female who underwent both radiotherapy and chemotherapy after being diagnosed with nasopharyngeal cancer. They had severe trismus (also had difficulties with eating and oral hygiene), speech disability, xerostomia, rampant dental caries. The esthetic and functional disabilities had started to be depressing for them.

**Results:** After increasing mandibular opening with tongue blades and physical rehabilitation, needed dental treatments and esthetic management of patients were done.

**Conclusion:** Proper dental evaluation and management prior to the initiation of RT and chemotherapy is critical of comprehensive cancer care of head and neck cancer patients'. The pretreatment evaluation permits a comprehensive dental evaluation and an opportunity to make patients aware about altered oral environment that results from cancer therapy.

**Table 7**

### **Prosthetic Approach After Total Glossectomy**

**Bémer J.\*, Dolivet G.\*\* ,Toussaint B.°, Lacave ML\*\*\*., Maire F\*.**

**Centre Alexis Vautrin, Nancy, France.**

**\*/\*\*/\*\*\* Centre Alexis Vautrin, Vandoeuvre-les Nancy, France. ° Centre Hospitalier Universitaire de Nancy, ENT Surgery, France.**

**\* Odontology \*\* ENT Surgery \*\*\* Orthophonist**

**Purpose:** The oral carcinoma often affects the tongue, floor of mouth and the base of the mandible. Tongue is one of the entities anatomico-physiological major performing essential functions such as swallowing, speech. Postoperatively, patients with a total glossectomy have difficulty or inability to control these functions and a prognosis sufficiently compromised. A surgical reconstruction associated with prosthetic rehabilitation and speech therapy approach, can reduce these functional problems, but remains a challenge.

**Methods & Materials:** Three partial or total toothless patients, who were treated for squamous cell carcinoma of floor of mouth by surgery and radiotherapy/curiethérapie, are presented.

**Results:** The design of a tongue prosthesis in this context depends on the patient's needs (food, phonation). It is more difficult in the edentulous patient. An artificial language prosthetic silicone, with or without a prosthesis to lower the palate can be considered. A follow-lingual coming in contact with the flap reconstruction of floor of mouth and base of tongue can also be designed. It helps guide the food to the back of the mouth. Dental implants can help stabilize the device.

**Conclusion:** The prosthetic design after total glossectomy stays a very difficult aspect of the maxillofacial prosthesis. The combination of the prosthesis to the advancement of reconstructive surgery, providing improved swallowing and speech, oral feeding is facilitated, the tissues are protected. Finally, the quality of life of the patient improved, but needs to be evaluated more objectively.

**Table 8**

### **Clinical and Radiographic Outcomes of Immediate versus Delayed Loading of Dental Implants in Edentulous Maxillae: A 36 Month Prospective Study**

**Bevilacqua, M., Tealdo, T., Menini, M., Pera, P.**

**University of Genoa, Department of Prosthetic Dentistry**

**Genoa, Italy**

**Purpose:** The aims of this study were to compare clinical and radiographic outcomes of immediate and delayed implant loading in edentulous maxillae during 36 months of function.

**Methods & Materials:** Forty-nine patients who needed maxillary full-arch treatment were randomized into two groups: immediate loading (test group, n=34) or delayed loading (control group, n=15). A total of 260 implants (test, n=163, control, n=97) were placed and subjects were treated with screw-retained full-arch prostheses. Bone levels were measured at time 0 (provisional prosthesis insertion for the test group; implant placement for the control group), and at the 1, 2 and 3-year follow-up visits. Changes in bone levels were analysed using the 2-way analysis of variance (ANOVA). The alpha was set to .05.

**Results:** All 49 patients appeared at the scheduled recall visits. The Cumulative Survival Rate (CSR) between groups was not statistically significant. Ten implants (6.1%) failed in the test group; four implants (4.1%) failed in the control group. At the 36-month follow-up appointments, the prosthesis

CSRs were 100% for both groups. Statistical analysis of the radiographic measurements showed significant differences in bone loss between the two groups at all of the intervals. The average bone level from the implant-abutment connection at time zero was at 0.5 mm for both groups. At 12 months it was at 1.3 mm in the test group; 1.9 mm in the control group. At 24 months it was at 1.5 mm (test) vs. 2.2 mm (control). At 36 months it was at 1.6 mm (test) vs. 2.3 mm (control).

**Conclusion:** This prospective clinical trial showed no differences in CSR between immediate and delayed loading of implants in edentulous maxillae after 36 months of function. A favourable 3 year marginal bone response was observed around implants that were immediately loaded with fixed implant prostheses, although the levels were significantly different than the bone levels around the implants that were loaded conventionally. It is concluded that the immediate loading protocol described in this study for supporting full-arch maxillary prostheses represents a therapeutic option for edentulous maxillae when compared to conventional two-stage procedures.

## Table 9

### **Fabrication of Extra oral Implants in Maxillofacial Oncology- A Team Work**

**Bhirangi P.\*, Dholam KP, Karthik MS**  
**TATA Memorial Hospital, Dental and Prosthetic Surgery**  
**Mumbai, India**

**Purpose:** Demonstration of technical steps in fabrication of the various silicone implants namely skull, nasal, ocular, chin, and mandible for reconstruction and rehabilitation.

**Methods & Materials:** Steps in the fabrication of various silicone implants are as follows:

- Impression of the defect in irreversible hydrocolloid to obtain a negative replica.
- Pouring the impression in high density dental stone and preparation of the model.
- Marking the defect on the model and adapting the foil.
- Using clay to replicate the defect and achieve positive replica.
- Investing this clay replica in metal molds
- Compression molding technique is used in packing the material.
- Dry heat oven curing
- Trimming, finishing and polishing.

**Results:** The customized implants are fabricated and used as alloplastic replacements

**Conclusion:** Silicone implants are one of the multiple means of restoring a defect in combination with surgical reconstruction for improving the quality of life of patients with severe facial defects.

## Table 10

### **Combined Implant and Teeth-Supported Rehabilitation in a Pre- Maxilla Severe Bone Resorption. A 24 Years Follow-Up Case Report**

**Brauner, E., Battisti, A., Brauner, M., Ascenzi, P, D'angelo G., Valentini, V.**  
**University of Rome "Sapienza"**  
**Maxillo-Facial, Rome, Italy**

**Purpose:** We present a case report of a 38 years old male, with a 24 years follow-up period (from June 1986 to February 2010) affected by loss of bone in the pre-maxilla region and an oro-nasal fistula as a result of a lymphatic leukemia.

**Methods & Materials:** The patient has undergone several surgical operations in order to reconstruct lost soft tissues, the pre-maxilla and nose bones. The patient was treated with a tongue flap, two iliac crest grafts for the pre-maxilla and, a rib associated to cartilage for the nasal bones. During this period the patient was rehabilitated with a removal prosthesis fixed to the residual teeth. However this condition wasn't satisfying either functionally nor esthetically.

In 2006 a new iliac crest bone graft was performed to correct the bone resorption. In January 2007 the patient was reevaluated for a new rehabilitation. The X-ray showed a class III malocclusion due to upper maxilla retrusion and mandible protrusion. Moreover the pre-maxilla was edentula. To solve the skeletal situation and, to better positionate and load the future implants, orthognathic surgery was performed using a surgical dime. A 1 cm advancement was obtained by a Le fort I osteotomy and a skeletal I class relation was obtained by a mandible bilateral sagittal ostetomy. The patient underwent surgery on October 2007 and on February 2009, 16 months later, five fixtures were positioned in pre-maxilla region.

The prosthetic project consisted in two main structures, the first one had to line up the implant portion to the residual teeth, covered by telescopic crowns, and the second one had to combine the natural teeth to the implant fixtures. Both manufactures had titanium core and the second one was covered by composite materials in order to obtain the maximum of lightness and aesthetics. The main structure was fixed to implants by screws and the second structure was fixed to the main one using transverse screws. The implant supported prosthesis was finalized on February 2010.

**Conclusion:** At the end, after a good bone reconstruction and with the combination of orthognathic surgery and implant loading, we obtained a successful functional and aesthetical result.

## Table 11

### **Peri-Abutment Tissue Response To Platform-Switching In Extra-Oral Implants: A Pilot Study**

**Casey, D.M , Sullivan, M.A.,  
Roswell Park Cancer Institute, Dentistry and Maxillofacial Prosthetics  
Buffalo, NY USA**

**Purpose:** There is evidence in the oral implant (IO) literature that platform switching (PS) slows the rate of horizontal bone loss. The presumed reason for the decreased bone loss around IO implants with PS is due to the shift of the microgap away from the platform edge and places it further away from the bone. A similar horizontal bone loss has been noticed around extraoral (EO)implants with conventional abutments. The purpose of this paper is to describe a system developed to create PS in EO implants, using currently commercially available parts, and to begin investigating whether PS in EO implants will be beneficial, as in IO implants.

**Methods & Materials:** A technique for platform switching of EO implants has been developed and is described. Peri-implant soft tissue reactions to platform switching on 14 EO implants in five patients is described. Method of grading was based on the work of Holgers et. al. 1987.

**Results:** PS abutments were in place an average of 7 months. Evaluation of the peri-implant tissues around the 14 PS abutments showed 11 abutments in 4 patients to have no skin reaction. One patient with 3 implants had moderate skin reaction.

**Conclusion:** Results of the small sample size of this preliminary study are similar to results in the literature of peri-abutment response around non-platform switched EO implants. The conclusion is that platform switching in EO implants is feasible using the technique developed and described in this paper. Further enlarged prospective controlled multi-center studies using a PS system in EO implants, studied at the clinical, microscopic, and cone CT level, will be necessary to determine if this is an advantageous alternative to current EO implant/abutment designs, especially in terms of decreasing bone loss over time. It may also serve as a foundation for future designs.

## Table 12

### **Prescription of a Complete Denture: Advantages of the SET Method (Simplified Edentulous Treatment) in the Communication with the Laboratory**

**Ceruti, P., Gilardi, G., Previgliano, V., Preti G.**

**University of Torino, Dept of Biomedical Sciences and Human Oncology  
Oral and Maxillofacial Rehabilitation and Dental Implants, Torino, Italy**

**Purpose:** The advantages of the new technique SET in the communication with the laboratory are shown. Results obtained with this technique are presented.

**Methods & Materials:** The term prescription indicates in a broad sense all the information about the clinical case, useful and fundamental in the finalization of the denture by the technician. With the SET technique the laboratory receives, in one shot, all the necessary clinical information already verified on the patient. Furthermore the material sent to the laboratory can be maintained until the end of the treatment to double check the results with the initial information. On 60 edentulous patients treated with the SET technique the correspondence between the information sent to the laboratory and the wax try-in denture has been studied recording number and type of adjustments done during this session.

**Results:** Very few adjustments have been done.

**Conclusion:** The SET method, allowing a simple, clear and complete communication and data transfer to the laboratory, can provide a high quality treatment for the edentulous patient.

## Table 13

### **Dental Extraction Protocols in Patients Treated with Oral Bisphosphonate Therapy**

**Cocero, N., Mozzati M.**

**University of Turin, Oral Surgery Unit  
Dentistry Section, Department of Clinical Physiopathology  
Turin, Italy**

**Purpose:** Oral bisphosphonates are a widely used class of drugs effective in treatment of non neoplastic disease such as postmenopausal osteoporosis, Paget's disease, osteogenesis imperfecta, idiopathic juvenile osteoporosis and severe steroid-induced osteoporosis. Bisphosphonate-related osteonecrosis of the jaws (BRONJ) is recognised as a significant complication related to the use of bisphosphonates especially after dentoalveolar surgery, but very few cases reported involvement of oral bisphosphonates in BRONJ. In literature the BRONJ's incidence is 0,7-1 cases on 100000 patients in one year. In order to value the incidence of this complication in our patients we compared two different surgical protocols for teeth extractions in patients undergoing oral administration of bisphosphonates therapy.

**Methods & Materials:** A comparative study of two different protocols, from January 2005 to December 2009, on 154 patients taking oral bisphosphonates. We performed 487 dental extractions, 225 in mandible, 262 in maxillary. Patients were enrolled in two groups: in first group (75 patients) patients have been

treated with surgical extraction with intrasulcular incision and primary closure of the mucosa; in second group (74 patients) the extraction wounds were closed with absorbable gelatin sponge haemostatic (Spongostan) and absorbable suture. All patients were treated under antibiotic coverage. Orthopantomogram (OPT) have been performed before and 3 months after surgery

Clinical wound healing have been performed at 7, 14, 21, 30, 60 days and radiological exam have been performed every 3 months with OPT.

**Results:** No bisphosphonates related osteonecrosis of the jaws have been registered in both groups. The diagnosis has been based on clinical and radiological criteria (pain, inflammation, fistula, bone exposition).

**Conclusion:** According to our data, both surgery protocols do not cause BRONJ in patients who received oral bisphosphonates. Therefore, since atraumatic surgery is more comfortable to patients, we suggest to adopt the second surgery protocol, which provides a little trauma to both soft and hard tissues. This new approach can be adopted for the treatment of all patients treated with an oral bisphosphonate therapy.

## Table 14

### Oral Rehabilitation Of Head and Neck Cancer Patients with Implant Retained Prosthesis – TMH Experience

**Dholam, K.P\*. Bachher, G.K., Yadav, P.S., Quazi, G.A., Pusalkar, H.A.**  
**Tata Memorial Hospital, Dental & Prosthetic Unit**  
**Mumbai, India**

**Purpose:** The aim of this prospective study was to assess treatment outcome and impact on quality of life of prosthodontic rehabilitation with implant-retained prostheses in head–neck cancer patients.

**Methods & Materials:** Twenty seven patients who were diagnosed with tumor of the maxilla & mandible underwent reconstruction and dental rehabilitation with implant retained dental prosthesis. After completion of surgical and adjunctive treatment for an amount of time so that the tissues have matured sufficiently to tolerate prosthetic manipulation were selected.

These subjects were assessed clinically and evaluated by standardized questionnaires EortcQIQ-C30 (version3). Subjective evaluation by questionnaire consisting of information on evaluation of deglutition, salivation, status of the mandible and teeth in relation to pre-disease level and objective evaluation of speech parameters by DR Speech soft ware was done before surgical insertion of the implants and at six months interval after fitting the prosthesis for a period of eighteen months.

**Results:** Nonparametric Wilcoxon signed rank test was used to compare QOL scores preoperatively and 18 months after fitting of the implant retained prosthesis. The mean, standard deviation and 95% Confidence Interval was taken into consideration for analysis of speech parameters & swallowing & deglutition questionnaire.

Result of this study will be presented

**Conclusion:** The altered function, esthetics, and quality of life in head and neck cancers following resection, reconstruction and rehabilitation is taken care of, though not to predisease level.

## Table 15

### Maxillofacial Rehabilitation Anchored in Extra-Oral Brazilian Implants Conexão – Systems Prosthesis – Case Reports

**Emidio, T.C.S.; Dutilh, C.M.; Dutilh, J.D.A.M.**

**University of Campinas, São Paulo, Brazil**

**Oral Medicine Department of Hematology and Blood Transfusion Center**

**Purpose:** The loss of facial structures by congenital or acquired defects in addition to altering the function and form of the facial skeleton can produce significant psychological trauma in patients who do not stand a significant change in physical appearance. The rehabilitation of facial defects is essential to the retention and stability of these prostheses. Replacement of extra-oral structures anchored on implants, aimed at retention of facial prostheses for long periods in the skeleton head, eliminating the use of adhesive base degenerative has been widely used. These implants come in a shorter size, 3 to 5 mm, due the fewer bones there are in the orbital, temporal and mastoid sites. The prostheses are made of silicone and anchored by staples and / or magnets. This study was to demonstrate the planning, execution and results of two prosthetic rehabilitations in patients with ocular and ear disabilities, anchored with Brazilian extra-oral implants (Master Extra, Conexão- Systems Prosthesis, São Paulo, Brazil).

**Methods & Materials:** Case 1 (ocular rehabilitation), patient L.O, 56 years, male, caucasian, affected by a basal cell carcinoma that led to exenteration of the right eye region. 3 mm in length implants were installed (Master Extra, Conexão-Systems Prosthesis, São Paulo, Brazil) in the frontal bone, with a waiting time of 6 months to expose, the implants that were osseointegrated. Those 2 implants were chosen for the activation in the prosthesis. Case 2 (auricular rehabilitation), patient A.A.S, 30 years, female, caucasian, mutilated due to an assault which led to the loss of the right ear. 2 three-milimeter implants (Master Extra, Conexão - Systems Prosthesis, São Paulo, Brazil) were installed in the mastoid region, waiting 4 months for osseointegration, and then there was an activation of the implants and fabrication of a metal bar for adjusting the magnets to analog magnets to the prosthesis, facilitating the correct positioning of the prosthesis.

**Results:** The facial aesthetics has been achieved and the expectations of patients affected.

**Conclusion:** Could be observed that the display of extra-oral implants Extra Master® has been satisfactory, as it was observed a clinically appropriate outcome. Moreover, patients demonstrated a high degree of satisfaction and acceptance.

## Table 16

### Biomechanical Study of the Mandible with a Simulation Model of Suprahyoid Muscles

**Escuin, T.\*, Batista J.M., Torne S., Monreal J., Nogueron N., Ros A.**

**University of Barcelona and Polytechnic**

**University of Madrid Barcelona and Madrid, Spain**

**Maxillofacial Prosthetics-Odontoestomatology and Materials Resistance**

**Purpose:** To create and assess the behavior of a simulation model that allows understanding of the stress load to the mandible caused by suprahyoid muscles before and after placement of implants.

**Methods & Materials:** Three duplicates of a human mandible were made of photoelastic resin and were mounted on a plaster poured cast of the cranial base. Six strain gauges were attached to the symphysis

area. A wire arch simulated the hyoid and was suspended by wire ligatures simulating geniohyoid, anterior belly of digastric and mylohyoid muscles, which were exerted with 5N, 10N, and 15N respectively. Traction was repeated 5 times for each muscle and measures were obtained from strain gauges connected to a Wheatstone bridge. The same process was repeated with a duplicate mandible with 3 implants placed in the symphysis and one posterior each mental foramen.

**Results:** Strain differences were observed between simulations. Our model was sensitive to stresses at 5N, 10N, and 15N. An ANOVA did not show an effect between strain gauges and mandibles ( $p>0,05$ ). The photoelastic model demonstrated torsional stress in the basal and crestal areas of the horizontal ramus of the mandible under action of the mylohyoid muscles, and a linear deformation under action of the digastric and geniohyoid muscles. The effect was greater when implants were placed.

**Conclusion:** Torsion or bending has less influence on the symphysis. Placement of implants can generate different stress patterns

## Table 17

### Colour Stability of Pigments: Colouration of Maxillofacial Prostheses

Farah, A. \*, Coward, T.

Kings' College London, Maxillofacial and Craniofacial Prosthetic Rehabilitation  
London, United Kingdom

**Purpose:** Colour instability of pigments and their migration from silicone are thought to be the main cause for colour degradation of facial prostheses. The aim of this study was 1) to determine the colour stability of pigments (Spectromatch) used for intrinsic colouration of maxillofacial elastomer when exposed to artificial weathering over a period of 1000 hours, and 2) inorganic pigments were coated with an organo-functional silane in order to achieve a chemical bond between pigments and elastomers, thus prolonging the colour stability of facial prostheses.

**Methods & Materials:** All samples were tested in a Q-Sun weathering chamber at 40°C which was equivalent to Florida sunlight. Spectrophotometry was used to measure colour difference values, and were expressed as  $\Delta E$ .

**Results:** The results indicated that Spectromatch pigments demonstrated good overall colour stability. However, the organic pigment (Alizarin Magenta Red) reached a maximum  $\Delta E$  value of 5.13. Inorganic and organic pigments combined in a skin colour resulted in a maximum  $\Delta E$  value of 10.04. The second part of the study revealed that coated Titanium White exhibited just visually detectable colour changes ( $\Delta E$  values from 1.14 - 1.24).

**Conclusion:** Organic and inorganic pigments demonstrated colour changes when exposed to artificial weathering conditions. Coating inorganic pigments with a silane did not improve their colour stability. Further research is needed to enhance the colour stability of pigments used for colouring maxillofacial prostheses, thus prolonging their life expectancy.

## Table 18

### Influence of Flanges on Extraoral Implant Stability

Faulkner, G., Raboud 1, D., Mo1, A., & Wolfaardt 2, J.

University of Alberta, Department of Mechanical Engineering 1 and Surgery 2  
Edmonton, AB Canada

**Purpose:** While the majority of the fixtures used for extraoral and in particular Baha® installations have a flange, the rationale for the flange has become increasingly unclear. The use of flanged fixtures is thought to provide a convenient marker to limit penetration during installation and perhaps to provide additional stability during use. Regardless of the original reasons for the flange design, it can lead to adverse skin reactions and in some instances necessitate in vivo removal of the flange. The question is: "Does this

removal compromise the stability of the installation?" To assist answering this question, mathematical models, laboratory testing and clinical measurements were carried out for limited number of cases.

**Methods & Materials:** Using an impact testing technique that employs an analytical model, the effect of the flange on F 3.75 x 4 mm Brånemark flanged extraoral implants. Evaluation of the stiffness of the installation (stability) was done in both the laboratory and the clinic before and after flange removal.

**Results:** While the results from the laboratory indicated that the flange provided a substantial amount of the total support, the clinical evaluation did not. This difference was due to the extraordinary way in which the support was developed in the laboratory. The clinical results, conducted on patients that required flange removal, indicated that the flange provided a minimal amount of support and that its removal did not adversely affect the implant stability.

**Conclusion:** For the cases in which adverse skin reactions suggest that removal of the flange for extraoral implants is necessary, it appears that this removal does not substantially affect the overall stability. In fact, it may be that further clinical evidence would suggest that either reducing the flange size or in some situations eliminating it all together would be appropriate.

## Table 19

### **Total Rehabilitation of Lates of Reconstruction After Oral Cancer Exeresis by NobelGuide(R) and Teeth in an Hour (R) Tecnique: Literature Review and Personal Contribution**

**Fornengo, D.; Fornengo, B.; Ronco, R.  
Ospedale Civile di Ciriè -Torino -Italia  
Odontostomatologia, Torino, Italy**

**Purpose:** To present the state of the art of total rehabilitation in patients who had an intervention for the exeresis of an oral cancer and a reconstruction with modern techniques, like revascularized flaps, but who need of dental rehabilitation.

**Methods & Materials:** Review of the literature and authors personal contribution on this topic.

**Results:** Review of the literature and the authors' personal contribution on this topic demonstrate a great improvement of the quality of life of these patients after dental rehabilitation too.

**Conclusion:** In patients treated for oral cancer, the dental rehabilitation is a good manner to have improvement of quality of life. Today is possible to complete dental rehabilitation with a mini-invasive technique so the patients, after greater interventions for exeresis and reconstruction, can have a total rehabilitation with a less invasive procedure.

## Table 20

### **CAD-CAM Procedure for the Construction of an Interlocutory Prosthetic Nose After Rhinectomy**

**Gastaldi, G.\*; Paraggio, P.\*; Vezoli, L.\*; Furloni, E.\*; Cavallari, V.\*;  
Sansoni, G.\*\*; Gassino, G.\*\*\***

**\*/\*\*University of Brescia, Italy \*\*\*Univeristy of Torino, Italy**

**\*Prosthodontic deparment, Univeristy of Brescia, Italy \*\*Dipartimento di Elettronica per l'Automazione, University of Brescia, Italy \*\*\*Prosthodontic Deparment, Univeristy of Torino, Torino, Italy**

**Purpose:** This case report describes the immediate rehabilitation after rhinectomy surgery, by a combination of the traditional techniques and CAD-CAM techniques.

**Methods & Materials:** Before the surgical phase has been performed a 3D laser scan of patients face. Thus with oral impressions of the two arch and nose impression taken with the traditional techniques (alginoplaster) sets up the starting point for the rehabilitation. The upper oral impression has been used immediately to make a resin palatal cover that was sutured in-situ during the surgical phase. It had also been possible to build an immediate upper prosthesis that has been afterwards adapted to the defect by direct relining with soft tissue conditioner once a week for a month. Three weeks after surgery a new 3D scan of patient's face has been taken to compare it with first scan and evaluate the importance of defect and tissue's healing. In this phase, with the traditional techniques, has been built a temporary rehabilitation supported by glasses and aimed to restore a satisfactory aspect for the patient while tissues healing. After another 3 month a new scanlation of the face has been taken and, for subtraction from the previous, we got the real defect's size. Through the use of this information it was possible to make the definitive prosthesis.

**Results:** Traditional techniques, at the state of art, reveal to be the most quick and versatile in the construction of intraoperative supports and temporary rehabilitation. At the same time new CAD-CAM procedures can provide excellent standards of quality and predictability

**Conclusion:** By the integration of consolidated and new born techniques it was possible to quickly attend all the needs of this delicate case. This could be a pilot case for Brescia's new standards in the rehabilitation of maxillo-facial defects.

## Table 21

### International Society of Maxillofacial Rehabilitation's Practice Based Research Network (ISMR's PBRN) – A Proposal

**Gerngross, P.J., Wee A.G.**

**Michael E. DeBakey VA Medical Center-Dental Department and University of Nebraska Medical Center Eppley Cancer Center  
Division of Oral Facial Prosthetics/Dental Oncology Department of Otolaryngology - Head and Neck Surgery, Omaha, NE USA**

**Purpose:** There are a variety of controversial issues in maxillofacial rehabilitation that need to be addressed. Practice-based research is a form of research that is conducted in clinical practices by practioners and their staff designed to answer questions that the clinician face in the routine care of their patients.<sup>1</sup> Clinicians working in a maxillofacial prosthetic clinical practice entails a wide variety of different patients with a variety of different treatment modalities. In outcome based clinical research the more homogeneous the patient population (e.g. oral cavity cancer versus head and neck cancer patients), strengthen the secondary validity of the results to the population. As the incidence of a particular specific disease site or problem (e.g. maxillary sinus cancer) or treatment modality (e.g. obturators) is relatively low, obtaining appropriate sample size for a particular study will require multiple recruitment sites.

ISMR membership consists of a variety of experts that could contribute to the success of an ISMR PBRN. Members are involved in active practices around the world who might be interested in being part of a PBRN that would move the knowledge base forward to improve patient outcomes. The purpose of this presentation is to elicit discussion on a proposal for an ISMR's PBRN.

**Methods & Materials:**

1. Poster presentation to elicit discussion on this proposal. Determining interest and other possible PBRN around the world in this area.
2. Discussion with members who are interested in being part of ISMR's PBRN. (electronic)
3. Two-day conference on controversial outcome topics related to our maxillofacial prosthetics practice funded by NIH R13 grant mechanism. Discussion of funding opportunities as well as joining existing networks.

**Results:**

1. Proposed possible organizational set up: Executive Committee with external advisory board, and sponsoring agency. This would oversee a network chair and coordinating center as well as the network of practitioners.
2. Options for initial set up includes: starting with one continent and survey of practitioners and then expanding to multiple continents, and more complex projects.
3. Eventually expanding to multiple continents...North America, Europe, Asia, Africa, South America, Australia

**Conclusion:** Setting up an ISMR PBRN is a strong possibility with enormous amount of potential to improve outcomes for the patients we treat on a daily bases.

References: 1, Giannobile WV, Burt BA, Genco RJ. Clinical research in oral health. 1st ed. Wiley-Blackwell; 2010:265-268.

## Table 22

### Evaluation of Prothodontist's Effort on Maxillofacial Defect Patients

**Günay, Y.\*, Karayazgan, B., Gürbüz, B., Atay, A., Urgur, M., Aydil, B.A., Ebrinç, S.**

**Dental Akademi**

**Maxillofacial Prosthesis, Maxillofacial Surgery, Psychiatry**

**Purpose:** Instead of there are too many studies about effects of the facial prosthesis on patients quality of life and psychological status, there isn't any study about effect of the prosthodontist- patient relation on patient's quality of life and psychological status. The main problem is the evaluation of the positive effects of prosthodontics effort on the maxillofacial defects patients' psychological status.

**Methods & Materials:** We evaluated the quality of life of 12 maxillofacial defect patients attended to our maxillofacial prosthodontic department of Gülhane Military Training Hospital by using EORTC-CLC, HADS, ROSENBERG forms.

**Results:** In our study we evaluated the relation between the prosthodontics and patients psychological effects during the prosthodontic rehabilitation.

**Conclusion:** We concluded that the prosthodontist efforts and relation between the patient and clinician has a direct positive effect on the patient's quality of life and psychological status.

## Table 23

### Three-Dimensional Assessment of the Face Asymmetry with Maxillary Defect

**Hanawa, S.[1], Porwal, A.[2], Koyama, S.[3], Yoda, N.[1], Sato, N.[3], Sasaki, K.[1]**  
**[1]Tohoku University Graduate School of Dentistry, [2]Pacific Dental College and Hospital, [3]Tohoku University Hospital**  
**[1]Division of Advance Prosthetic Dentistry, [2]Department of Prosthodontics, [3]Maxillofacial Prosthetics Clinic, Japan**

**Purpose:** The purpose of this study was to verify the availability of three-dimensional (3D) digital stereophotogrammetry for assessing the face asymmetry of patients with unilateral maxillary defect.

**Methods & Materials:** Three patients having unilateral maxillary defect and facial asymmetry participated. Three-dimensional topographic data of the facial surface with and without maxillary prosthesis were acquired by using non-contact 3D digitizer. Previously we determined the appropriate mid-facial reference plane for evaluating facial asymmetry by using 6 normal subjects' faces. In this study, the mid-facial plane was set by overlapping an original facial image with the mirror image of the original image on 3D scanning software. Distances between 9 measurement points including 3 bilateral pairs and the mid-facial plane, angles between 3 measurement lines and the mid-facial plane, and asymmetry indices of 3 pairs of measurement points were calculated. The parameters with and without prosthesis were compared. Also, the distance and direction of displacement of each measurement point were measured by comparing 3D coordinate with and without the prostheses. In the cheek region of defect side, the distributions of distances between with and without the prostheses.

**Results:** Since the mid-facial reference plane used in this study could be set on the asymmetry face, the distance and direction of displacement of the measurement points were able to be measured by using the 3D digital stereophotogrammetry and scanning software. The asymmetry indices of the measurement points of the patients' faces could be also acquired. The influences of the denture border, the obturator and the position of the artificial teeth of the maxillary denture on the patients' faces were detected and visualized by the result of dimensional analyses of the cheek surfaces with and without prostheses.

**Conclusion:** The asymmetry faces with maxillary defect could be assessed by using this 3D digitizer and the 3D analyzing system.

## Table 24

### The Effect of the Human Posture to the Deformation of Facial Contour by Using 3D Data Acquisition System

Hirai, H.\*, Yoshioka, F., Okazaki, S., Shigemori, T., Asami, K.,  
Ozawa, S., Tanaka, Y.

School of Dentistry, Aichi-Gakuin University, Removal Prosthodontics  
Aichi, Japan

**Purpose:** For the successful facial prosthetic treatment, facial impression is necessary though it is stressful for the patient and causes inaccuracy owing to its weight and body posture. Recently, 3D data acquisition systems have been developed and enable us to acquire the 3D data without any contact to the object. In this study, effect of the body posture with regard to the facial surface displacement was evaluated using 3D scanner.

**Methods & Materials:** Five subjects were participated in this study. Digital facial data were obtained by using 3D scanner (Rexcan?, Solutionix ) in 5 kinds of position; 90 degree( upright-position), 60 degree, 45 degree, 30 degree and 0 degree (horizontal position). These data were evaluated using 3D digital inspecting software (Geomagic qualify, Geomagic). The amounts of discrepancy between up-right position and these reclined positions were calculated after the data matching.

**Results:** As the inclination increased, the amounts of discrepancy were increased between up-right position and each reclined positions. Especially, larger discrepancy was observed on the cheek under the zygomatic bone.

**Conclusion:** Facial surface displacement should be considered depending on the body position at the facial impression making. 3D data acquisition systems is useful to obtain precise facial curvature.

## Table 25

### The Efficiency of the Palatal Augmentation Prosthesis on Hyoid Bone Movement

Hori, K.\*, Yahagi, R., Inoue, M.

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Division of Dysphagia Rehabilitation, Niigata, Japan

**Purpose:** Tongue plays an important role in ingestive behaviors including chewing and swallowing. During chewing, tongue mixes it with saliva to make a bolus, resulting in propelling it into the esophagus through the pharynx during swallowing. Therefore, dysfunction or deficit of tongue may result in a critical situation such as aspiration and choking. The palatal augmentation prosthesis (PAP) may be applied to compensate the contact between the tongue and hard palate and propulsion of the bolus into the pharynx. Though it was reported PAP improved the oral stage swallowing, the efficiency of PAP on pharyngeal swallowing has not been fully clarified yet. The aim of this research is to evaluate the effects of the PAP application on oropharyngeal swallowing in the post-glossectomy patients.

**Methods & Materials:** Two patients who had undergone glossectomy because of tongue carcinoma were participated in this study. PAP was applied to them and physical exercise was daily performed by dentists or dental hygienists. Videofluorographic (VF) images were laterally recorded to evaluate the food propulsion during swallowing and to measure the functional movement of hyoid bone. Pressure of tongue surface against the hard palate or PAP was also measured by our original-made sensor sheet with five measuring points. They were all compared between before and after intervention.

**Results:** As a result of rehabilitation with PAP application, ingestive behaviors were improved. The magnitude of tongue pressure with PAP during swallowing was higher than that without PAP. It was also found by VF images that the anterior movement of hyoid bone with PAP was rather dynamic.

**Conclusion:** These results suggested that PAP improved not only oral swallowing including the contact of tongue and PAP, but also the movement of hyoid bone during swallowing.

## Table 26

### Finite Element Analysis of the Displacement of the Maxillary Record Base for an Edentulous Patient with a Hemimaxillectomy Defect

Ino, T.\*, Satoh, G., Okamoto, K., Iwase, N., Fujisawa, M.

Meikai University School of Dentistry, Restorative & Biomaterials Sciences

Sakado, Saitama, Japan

**Purpose:** This study aimed to analyze the relationship between the loading and the displacement of the maxillary record base for an edentulous patient with a hemimaxillectomy defect.

**Methods & Materials:** A three-dimensional finite element method was used for the analysis. The analyzed model, which consisted of 6857 nodes and 25267 elements, had the remaining hard palate and residual ridge that were based on an edentulous patient with a hemimaxillectomy defect. The model consisted of a lining mucosa, maxillary record base, and the plate of a gothic arch tracer. The elements of bone were omitted. The thickness of the mucosa was 2.0 mm in the middle, 3.0 ~ 5.0 mm in the lateral side of the palate, and 3.0 mm in the residual ridge. The nodes corresponding to the surface on the bone side were constrained in all directions. First, a single load of 50 N was applied to the node corresponding

to the center, the crest of the residual ridge of the non-resected side or the point that corresponded to the inner slope of the residual ridge of the non-resected side on a gothic arch tracer. Second, 2 loads, which totaled 50 N, were applied to the gothic arch tracer corresponding to the crest of the residual ridge on both sides.

**Results:**

1. Under loading to the center, the record base of the resected side showed intrusive displacement of 1.57 mm, although that of the non-resected side showed little vertical displacement. Under loading to the crest of the residual ridge of the non-resected side, the record base of the non-resected side showed intrusive displacement. On the other hand, the record base of the resected side showed extrusive displacement of 0.39 mm. When the load was applied at the point corresponding to the inner slope of the residual ridge of the non-resected side, both sides showed intrusive displacement; and the discrepancy between them was slight.
2. Under loadings of 25 N on the crest of the residual ridge on both sides, the record base of the resected side showed a large intrusive displacement. When the load of 41 N and that of 9 N were applied on the non-resected side and on the resected side, respectively, the discrepancy in the amount of intrusive displacement between them was slight.

**Conclusion:** Occlusal loading on the resected side may displace the record base on the resected side for edentulous patients with a hemimaxillectomy defect. Therefore, occlusal force should mainly be applied to the occlusal rim on the non-resected side and slightly on the resected one.

## Table 27

### Maxillofacial Prosthetics Using Japanese Magnetic Attachments

**Ishigami T., Ohyama T., Tsukimura N. and Tyoma H.**  
**Nihon University School of Dentistry, Partial Denture Prosthodontics**  
**Tokyo, Japan**

**Purpose:** In maxillofacial prosthetics the magnetic attachment is applied as a useful tool, however, foreign magnetic attachments have been unsupported to use for dentists. Because the typical problems were inappropriate size and insufficient retentive force. Furthermore, resistance to corrosion which is a crucial point in clinical situation has not improved so far.

The purpose is to demonstrate the applicable potential of Japanese magnetic attachments for maxillofacial prosthetics.

**Methods & Materials:** Japanese magnetic attachments consist of a magnetic assembly and keeper. The magnetic assembly is made from a neodymium magnet which is most popular in Japan, magnetic and non-magnetic stainless steel. The yoke and the seal cap are laser-welded at joints so that the magnet is completely sealed and protected against corrosion. We evaluate the application areas (number, size, position, etc) of Japanese magnetic attachments for Maxillofacial defect patients that were visited and took a treatment at Nihon University dental hospital, maxillofacial prosthetic clinic during past 5 years.

**Results:** The results showed that 29 patients of 184 were tried and 29 patients of 29 obtained the sufficiently high satisfaction by the magnetic attachments treatment as retention for maxillofacial prosthetics. Therefore, Japanese magnetic attachments were supported the efficacy in clinical situation.

**Conclusion:** We conclude that it is necessary to attempt a large number of the magnetic treatments prospectively and to follow up the cases still more long-term progress for maxillofacial patients. Japanese magnetic attachment may be contributed as an available maxillofacial treatment.

## Table 28

### Longitudinal Study on Metal Plate Denture with Magnetic Attachments

**Ito, R. \* Hoshiai, K., Hasegawa, N., Muraji, N., Kawaguchi, T., Noda, K., Watanabe, K., Tanaka, Y.**  
**Aichi-Gakuin University, Department of Removable Prosthodontics**  
**Aichi, Nagoya, Japan**

**Purpose:** Magnetic attachments have been applied clinically in various cases including maxillofacial and craniofacial prostheses. It's useful to carry out postoperative investigations and to confirm results, as it shows the criterion of the clinical application. Thus, magnetic attachments can be used safely.

**Methods & Materials:** Postoperative investigation on 252 magnetic attachments which were applied to 105 metal plates in Aichi-Gakuin University Dental Clinic over the 10 year period from 1993 to 2003, were carried out. The results of this investigation were reported in 2003. In this study, a further 5 years were researched to compose a longitudinal study over approximately 15 years.

**Results:** The survival rate of abutment teeth of metal plates was 77% after 15 years and of resin plates was 53% after 10 years. There were difference of the survival rate between the group of age over 65 of resin plates and the groups of age under 75 of metal plates. This shows the survival rate of metal plates for ages under 75 is high.

**Conclusion:** A significant difference in the survival rate between metal plates and resin plates was found. One of the reasons is design of denture. Metal plates allow for great latitude in design and enable the design of an ideal partial denture. Another major reason for the survival rate of metal plates is that the major connectors are solid.

## Table 29

### Zygomaticus Implant Supported Cleft Palate Obturator: Case Report

**Jayanetti, J., Sharma, A.B., Finzen, F., Obuhoff, M.**  
**University of California San Francisco, Postgraduate Prosthodontics**  
**San Francisco, CA USA**

**Purpose:** This is a case report of a 37 year old woman who presented to our clinic edentulous and with an unrepaired cleft palate.

**Methods & Materials:** Bilateral zygomaticus implants and two additional standard endosseous implants were successfully osseointegrated. A cross-arch Hader bar, splinting all 4 implant, was fabricated. A cobalt-chromium framework was made to house the Hader clips, and to support the speech bulb.

**Results:** The implant supported obturator was successfully delivered. Esthetics and masticatory functions were restored; nasal regurgitation corrected; speech intelligibility improved.

**Conclusion:** Zygomaticus implants were used successfully in rehabilitating this cleft palate patient. Zygomaticus implants offered is a viable alternative to extensive sinus augmentation.

**Table 30**

## **Evaluation of Treatment Satisfaction in Patients with Facial Prosthesis**

**Karayazgan-Saracoglu, B. Atay, A. Gunay, Y.**  
**Baskent University, Faculty of Dentistry GATA Military Training Hospital**  
**Dental Clinic, Department of Prosthodontics**  
**Ankara, Turkey**

**Purpose:** A loss in the facial area due to a congenital or an acquired defect has a functional and psychosocial impact on patient's life. Prosthetic rehabilitation attempts to restore these facial disfigurements and improves the level of function and self-esteem. Limited number of studies measuring the satisfaction after facial prosthetic rehabilitation has been reported. The aim of this study was to evaluate the patients' perceptions of treatment with adhesive-retained and implant-retained prostheses and the effect of age, gender, past prosthetic history like radiotherapy and defect etiology on patients' ratings of satisfaction.

**Methods & Materials:** Facial defect patients who were treated with facial prosthesis with and without extra-oral implants were involved in the study. A questionnaire was delivered to determine patients' responses to their facial defect, and their perceptions of the prosthetic restoration with several parameters before and after rehabilitation. Relationship between the scores and the patients' demographic and past prosthetic histories were assessed.

**Results:** In terms of the patients' opinions, the results demonstrated that a large number of patients were satisfied with the overall quality of their prostheses. The group with implant retained prosthesis reported higher positive ratings when compared with the adhesive retained group. Gender, age and defect etiology were found to have significant correlation with the general satisfaction of the patients.

**Conclusion:** Satisfaction is correlated with age, gender, and past prosthetic history in the patients rehabilitated with adhesive or implant retained facial prosthesis. Although high degree of patient satisfaction with extraoral maxillofacial prostheses is obtained, implant-retained facial prosthesis offers significant enhancement over an adhesive-retained prosthesis.

**Table 31**

## **Evaluation of Speech Function in Patients who Underwent Prosthodontic Rehabilitation After Maxillectomy**

**Kwon, H.B.\*, Kim, M.J., Lim, Y.J., Kim S.K., Heo S.J., Lee J.B., Lee S.H.**  
**Seoul National University, School of Dentistry and Samsung Medical**  
**Center, Sungkyunkwan University School of Medicine**  
**Department of Prosthodontics, Seoul, Korea**

**Purpose:** This study aimed to analyze the acoustic characteristics and speech intelligibility of patients who had acquired hard palate defects and underwent prosthodontic rehabilitations after maxillectomies and to evaluate the influence of palatal defect size on speech outcome.

**Methods & Materials:** This study included 60 normal subjects and 17 maxillectomy patients who underwent postoperative prosthodontic rehabilitations. Maxillectomy patients were composed of 9 men and 8 women, and their ages ranged from 29 to 72 and the mean age was 53.29. The subjects of normal group were composed of 39 men and 21 women, with an age of 22 to 40 years and a mean age of 28.18

years. All of the maxillectomy patients had acquired hard palate defect and they were rehabilitated with definitive obturators at least 4 month after surgery. The three Korean vowels, /a/, /i/, and /u/ were used as sample vowel sounds. Each patient without obturator was asked to pronounce three vowel sounds for 3-4 second and the sounds were recorded directly on the computer using Multispeech software program (Kaypentax, Lincoln Park, NJ, USA). Same procedures were repeated for patients with obturators and for normal subjects. Then acoustic analyses were performed using Multispeech software program. Average values of the first formants (F1), the second formants (F2), and the differences of them(F2-F1) in the 3 groups for the 3 vowels were compared. In addition, the areas of vowel triangles by three corner vowels were compared for analysis of speech intelligence. Then the maxillectomy patient group was divided into 2 groups based on the size of defects to investigate the relation of the defect size and the acoustic characteristics. The formants and the vowel working space areas of large and small defect group were compared with those of normal subjects. Comparisons of the data were made using t-test, paired t-test, and Wilcoxon two sample test with Bonferroni corrections.

**Results:** In the comparison of formant frequency values, there were significant differences between patient group without obturators and those with obturators for /i/ sound, and between the patient group without obturators and the normal subjects for /a/ sound. However, there were no differences between the obturator group and the normal group. The mean vowel working space areas from the obturator group and normal group were significantly larger than that from no obturator group. However, there was no significant difference of the mean vowel working space area between the obturator group and normal group. Without obturators, the large defect group and the small defect group showed significant different values from the normal group in some of the formant frequency values. In addition, the vowel working space areas from normal group were significantly larger than those from both of the large defect and the small defect groups without obturators. However, when the obturators were used, there were no significant differences in the formant frequencies and vowel working space areas between groups based on the defect size and the normal group.

**Conclusion:** Prosthodontic rehabilitation with obturators produced an improvement in the speech function of the maxillectomy patients who had acquired palatal defects. With obturators the speech function of maxillectomy patients seemed to be restored to the level of normal subjects irrespective of palatal defect size.

## Table 32

### EndoProsthetic Silicone Maxillofacial Rehabilitation

**Latcan, E MD. PhD. – Prosthetic Cranio Facial and Body Rehabilitation, Medical Center “PRAIN” Ltd. – For a normal hearing, facial and body rehabilitation.**

**Cristian Radu Popescu MD. PhD. – Head of ENT Department  
Coltea University Hospital Bucharest, Bucharest, Romania**

**Purpose:** The author presents her experience in prosthetic silicone maxillofacial rehabilitation over a period of 11 years (1998-2009) regarding a cohort of 354 patients. In an extensive loss of tissues resulted from congenital malformations (maxilar and mandibular malformations, micro retrognathia, micro stoma), collagenosis (scleroderma, Romberg Syndrome), traffic and work accident, post surgical (cancer and facial nerve paralyze), when usual surgical procedures fail to establish the normal look of the patient silicone endoprosthetic reconstruction (rehabilitation) intervenes.

**Methods & Materials:** Using a special method and materials like implantable silicone after 29 days, obtaining silicone endoprostheses which are introduced by two surgical steps of a reconstruction:

First stage: Wax mould of the local defect

Second stage: Silicone endoprostheses having the shape and volume of the defect

Introducing and fixation of the protheses having inside radioopaque threads.

**Results:** The silicone endoprostheses are very well tolerated for all lifetime with an anatomic reconstruction very near to normal. Sometimes the implantable silicone prostheses won't be accepted and eliminated. Aesthetic and psychological results are obtained for the patient that helps his life in his family and society. Improves the quality of life.

**Conclusion:** For each deformity have to find the proper solution according with patient's desire. Association of prosthetic material with surgical technique can offer a modern solution for reconstruction.

## Table 33

### Implant Retained Orbital Prostheses in Irradiated Patient – Case Report

**Lazic, V.,\* Konstantinovic, V.**

**University in Belgrade School of Dentistry**

**Department for Prosthodontics Department for Maxillofacial Surgery**

**Belgrade, Serbia**

**Purpose:** Malignant tumors can result to serious facial disfigurement and dysfunction. The radiation therapy in the treatment of malignant tumors commonly compromises bone quality and produces significant morbidity, and its consequences are unique tissue management problems. However fabrication of implant retained orbital prostheses offer more retention and stability and easy use for the patient resulting in better quality of life. The purpose of this report was to demonstrate option of facial reconstruction with implant retained orbital prostheses in patient who was undergone radiation therapy after tumor resection.

**Methods & Materials:** The patient, male, 72, underwent partial maxillectomy and orbital exenteration for squamous cell carcinoma invading the maxilla and orbital content on the right side. The resection extends beyond orbital area into mobile tissues laterally and inferiorly. The insertion of implants was delayed because surgery has been followed by radiation therapy (60 Gy). In the meanwhile the patient was using interim obturator prostheses and a PMM acrylic color resin orbital prostheses retained on eye glasses. Six months after radiation therapy a definitive obturator prostheses was delivered to patient and three extra oral implants were placed (BOI, Ihde Dental, Swiss), two in supraorbital rim laterally and one in zygomatic region. After osseointegration period an orbital silicone prostheses was fabricated and retained on implant supported bar. The “O” ring implant supported bar was constructed to provide better stability of the large orbital prostheses that rest on movable tissues.

**Results:** After an unloaded osseointegration phase of 3 months, all implants appeared well integrated in the irradiated bone according to radiologic criteria and clinical stability. At the control examinations after 3, 6, 12 months, respectively, there were no signs of recurrence of the tumor or any complications related to the implants. A satisfied cosmetic result and excellent stability and retention of the orbital prostheses were achieved.

**Conclusion:** The use of osseointegrated implants has made it possible to produce effective bone – anchored large orbital prostheses that rest on movable tissues.

## Table 34

### Baseline Periodontal Status, Oral Hygiene and Smoking Habits in Head and Neck Cancer Patients

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**School of Dental Science, Faculty of Health Science**  
**Trinity College, Dublin, Ireland**  
**Restorative Dentistry & Periodontology**

**Purpose:** Periodontally diseased sites are a high risk for osteoradio-necrosis following cancer therapy, especially furcation involved sites. Smoking is a risk factor for periodontitis as well as oral cancer. The aim of the study was to assess the periodontal status and smoking habits of head and neck cancer patients scheduled for radiotherapy.

**Methods & Materials:** Initial records for 709 patients were reviewed. All patients were dentate and the records had been gathered over a ten year period.

**Results:** There were 163 females and 543 males with 78% in the 45 to 74 age group. The cancer diagnosis was squamous cell carcinoma in 80% of cases, 32% in pharynx & neck and 20% in mouth. 49% had never smoked cigarettes or had quit long-term, 51% had stopped in the previous twelve months or currently smoked. 45% of subjects had more than 21 teeth, 37% of subjects had 11-20 teeth. 53% had a plaque score of > 81% and 11% had a bleeding score >81%. The highest CPITN score was "0" in 1% of subjects, "1" in 5%, "2" in 26%, "3" in 37% and "4" in 31%. Associated periodontal factors were gingival recession (39% of subjects), furcation involvement (32%), mobility (2%) and gingival hyperplasia (0.7%). Subjects who smoked had a significantly higher number of CPITN "4" (p=0.0018). Pre-radiation dental extractions were advised for periodontal reasons in 43% of cases.

**Conclusion:** A highest CPITN score of 4 was recorded in 31% of individuals and 32% had furcation involvement. These clinical findings will have an impact on decisions regarding pre-radiation extraction if affected teeth are in the field of radiation. In conclusion, dental consultation and treatment prior to radiation therapy to the head and neck are an important part of care of the head and neck cancer patient. Dental assessment should include a careful periodontal assessment.

## Table 35

### Oral Rehabilitation with Osseointegrated Implants in Oncologic Patients: A Case Series

**Manfredi, E\*, Lumetti S., Bonanini M., Galli C., Carra M.C., Macaluso G.M.**  
**University of Parma, Dentistry**  
**Parma, Italy**

**Purpose:** Surgical treatment of malignancies in head and neck region, most often practiced in combination with radiotherapy, seems to grant better results in respect to non-surgical protocols. However, it can lead to significant facial deformity and impaired oral function. Advanced reconstructive techniques allowing the graft of autogenous soft tissues and bone improve the functional and aesthetic outcome of ablative surgery, even though the masticatory function has to be restored. Dental rehabilitation in these patients may be difficult to manage due to a lower quality of bone both in grafted and irradiated jaws. Quality, quantity and anatomical location of bone are well known as some of the most important factors to improve osseointegration success. Irradiation therapy especially provokes early

and late alterations and also has a deep effect on bone cells and blood vessels; further, tissue damage extent seems to be dose dependent and influenced by the delivery protocol. However, treatment of cancer patients with a grafted and irradiated jaw can be really challenging and the aim of this study was therefore that of evaluating the clinical outcome of implants in such patients.

**Methods & Materials:** This study included the examination of 39 implants placed in 11 patients with an average age of 62 years (42-72 years). 35 out of these implants were inserted in grafted bone while 20 were also placed after radiotherapy. One single patient (4 implants) was treated with radiotherapy only. 32 implants out of the a.m. 39 implants were placed in mandible and 7 in maxilla. The range of radiotherapy dosage was 50 to 70 Gy (average 63 Gy)

**Results:** Three implants were replaced due to mobility and osseointegration failure. One out of such three implants went lost as the patient did not undergo radiotherapy, but it had been located in grafted mandible with fibula free flap. The two remnant lost implants were to be replaced in the same patient not in correspondence of the graft, but in an irradiated mandible. The total losses percentage was of 7.8% out of 39 implants. Such result is slightly higher than the values concerning implants placed in non-irradiated and non-grafted jaws reported by literature.

**Conclusion:** Implantology offers chances for the improvement of patient's oral rehabilitation by stabilising prostheses. This is the best way to improve the patients' quality of life. Moreover, some of them are unable to wear conventional prosthesis due to therapy affecting soft and hard tissues' quality. On the basis of such results, we can say that irradiation therapy and surgical treatment with autogenous bone reconstruction should not be considered as absolute contraindications for implant therapy.

## Table 36

### **A New Method for Improving the Accuracy in Fixed Prosthesis and Epithesis on Implants**

**Manzella, C., Schierano G, Burello V, Gassino G, Carossa S.**

**University of Torino**

**Biomedical Sciences and Human Oncology Department, Section of Oral and Maxillofacial Rehabilitation and Dental Implants, Torino, Italy**

**Purpose:** The passivity of the superstructure that is fitted onto the abutments of implant-supported prostheses is an important aspect of implant and epithesis prosthesis success. Higher the accuracy of the master model, the better the accuracy of the mesostructure. It is proposed an easy device to verify the position of the implants on the master model, compared to the position in the oral cavity, before the manufacture of prostheses.

**Methods & Materials:** 6 implants were placed on a metal base to simulate a dental arch and 6 Multi-unit Abutment were screwed in implants. 80 identical plaster jigs were built incorporating 6 Temporary Coping Multi-unit titanium. All jigs have been manufactured in the same position described as "standard position" (SP). Different types of inaccuracies have been created from SP to simulate misfits in horizontal, vertical and angle position. It was assessed the ability of the jig to detect such defects.

**Results:** The jig found horizontal inaccuracies of 150 microns, vertical inaccuracies of 50 microns and angle inaccuracy of 1 degree.

**Conclusion:** Plaster jigs are able to detect faults, although minimal, which can compromise accuracy. In clinical practice the use of these devices allows to correct any errors before making the mesostructure of prosthesis and epithesis on implants.

## Table 37

### The Application of Nasal Speaking Valve to Velopharyngeal Incompetence Patients

**Matsuyama, M. 1), Kondo, D.1), Hasegawa S. 2),  
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Section of Removable Prosthodontics, Division of Oral Rehabilitation,  
Faculty of Dental Science 1) Speech Clinic 2), Fukuoka, Japan**

**Purpose:** Velopharyngeal incompetence patients are usually treated by speech bulb appliance or palatal lift prosthesis in order to improve speech and swallowing function. However it is uncomfortable for the patients to wear such devices. Therefore nasal speaking valve (NSV) was contrived as a new device for the management of velopharyngeal incompetence (VPI) in 2008. However the NSV is still not commonly used in the clinical situation. The NSV was applied to two patients of velopharyngeal incompetence in our clinic. The purpose of this study was to report the treatment outcome of NSV for VPI patients.

**Methods & Materials:** Subjects were two VPI patients; a 75 year-old female with amyotrophic lateral sclerosis (ALS) and a 62 year-old male after soft palate resection due to adenoid cystic carcinoma. The ALS patient complained of fatigue during speech due to VPI. The maxillectomy patient had been wearing an obturator prosthesis for four years and felt that articulation had been getting worse (rhinolalia aperta). It was considered that treatment with PLP was not adequate for both patients due to the gag reflex. Therefore the NSV was applied. Speech functional tests; blowing ratio, and nasalance score were evaluated with and without a NSV by a speech therapist. The assessment was performed three times; 2 weeks after, 2 and 4 months after wearing the device. Patient's subjective assessment was also estimated with an original questionnaire about pain, discomfort, unsuitability, instability, dyspnea, and speech disorder when wearing a NSV.

**Results:** By wearing a NSV, blowing ratio prolonged 55.7% and 11.5%, and Nasalance score reduced 26.3% and 7.8%, respectively. Patient's subjective assessment showed difficulty of respiration, unclear speech, painless, comfort, suitability, and stability with a NSV. Speech function was immediately improved by wearing a NSV for VPI patients. However, the device caused the difficulty of respiration.

**Conclusion:** It is suggested that wearing the NSV immediately and objectively improves speech function of VPI patients but may cause respiratory difficulty. Hence, the device requires the further improvement.

## Table 38

### Oral Condition on Patients Taking Intravenous Bisphosphonates in a Public Hospital in Brazil

**Mello,A.L.S.\*; Simon,S.D., Gebrim,LH.; Lazaretti-Castro,M.  
Sao Paulo Federal University/ UNIFESP  
Oncology, Endocrinology, São Paulo, Brazil**

**Purpose:** The aim of this study was to assess the oral conditions from patients from a public hospital on use of intravenous Bisphosphonates, identify cases of Bisphosphonates Osteonecrosis on the jaws (ONJ) and test the knowledge from these patients about the ONJ.

**Methods & Materials:** Between March 2007 and February 2009, all patients who have metastatic breast

cancer and received at least one dose of Bph were including on the study. Patients were submitted to an oral clinical exam and to a panoramic Rx. And after this point all patients received instructions about side effects of the treatment and ONJ. Symptom check-list, and questionnaire about oral care and treatment, healthy stage was performed and data were collected from their healthy past.

**Results:** The data were collected, tabulated and analyzed. 179 patients were identified. 88 died before or during the study. 91 patients were submitted to the study. One patient had the ONJ diagnosis. 35, 3% from the group have at least 1 tooth, and from these 85 % need some dental treatment. 52 % have some kind of protesese and 30 % from these the protesese have bad conditions and hurt themselves. 38, 2% went to a dental service at least once in the last year, and 21% had teeth extraction. In 35% were taking BPh when extraction were performed. One patient had osseointegrated implants. None patient shows knowledge about ONJ.

**Conclusion:** Currently no intervention exists that is completely successful to treat ONJ, and prevention should be the best approach. Our study showed that any patient knows about ONJ which suggest that a specific protocol to prevent ONJ and instructions to the dental public team are needed. As a recent pathology more studies are needed.

## Table 39

### Osseotite™ vs Nanotite™ Implants in Bio-oss™ Grafted Sinus: A Double Blind RCT

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**University of Torino**

**Biomedical Sciences and Human Oncology Department, Section of Oral and  
Maxillofacial Rehabilitation and Dental Implants, Torino, Italy**

**Purpose:** Maxillary sinus lifting has become a routine operation in rehabilitating the distal maxillary sector, when the bone available to insert implants is less than 6 mm in height. In these cases, grafting with alloplastic material alone, or alloplastic material combined with autologous bone, is the gold standard technique. Concomitant implant insertion and substitute bone grafting is possible when the bone height is sufficient to ensure primary stability. Scientific literature and clinical practice have clearly shown that Osseotite™ and Nanotite™ surfaces ensure faster integration times and a higher percentage of bone-implant contact (BIC) than smooth (i.e. machined) titanium surfaces. Furthermore, Nanotite™ surfaces are expected to achieve higher percentage of Bone/Bio-oss/implant contact (BBIC) than Osseotite™ surfaces. This study aimed to compare, by means of a histomorphometric analysis, the percentage of BBIC between the Osseotite™ surface and a new surface known as Nanotite™, on implants inserted in the maxillary sinus augmented with alloplastic material (Bio-Oss).

**Methods & Materials:** A monocentric, prospective, randomised double-blind clinical trial was performed on 7 patients (nine sites) showing the following characteristics:

- Either interrelated or distal maxillary edentulism with at least two teeth missing in which insertion of implants involved the maxillary sinus
- maximum ridge height 4-5 mm

In each of the nine sites, a maxillary sinus elevation was performed with graft of Bio-Oss and concomitant positioning of two threaded mini-implants of diameter 2.18 mm and length 10 mm with Osseotite™ and Nanotite™ surfaces. Mini-implants along with the bone were removed with a customised harvester nine months after sinus graft operation at the same time of definitive implants insertion and underwent histological analysis.

**Results:** A histological analysis of the 18 biopsy samples was performed. BBIC average was 37% and 48% as for Nanotite™ and Osseotite™, respectively.

**Conclusion:** Based on the histomorphometric analysis, there was no statistically significant difference in the percentage of BBIC that was achieved by Osseotite™ and Nanotite™ dental implants.

## Table 40

### The Use of a Masticatory Robot to Analyze the Shock Absorption Capacity of Different Restorative Materials for Prosthetic Implants

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University of Genova, Prosthodontics  
Genova, Italy

**Purpose:** This study aims to measure in vitro the chewing load forces transmitted through crowns made of different prosthetic restorative materials onto the dental implant.

**Methods & Materials:** A masticatory robot that is able to reproduce the mandibular movements and the forces exerted during mastication was used. The forces transmitted to the simulated peri-implant bone during the robot mastication were analyzed, using different occlusal materials. The materials tested were: zirconia (Procera Zirconia, Nobel Biocare, Sweden), a glass ceramic (Empress 2, Ivoclar Vivadent, Liechtenstein), a gold alloy (Ney-oro cb, Dentsply, USA), two resin composites (Experience, DEI@italia, Italy; and Signum, produced by Heraeus Kulzer, Germany) and an acrylic resin (Easytemp 2, DEI@italia, Italia). The sample crowns were put under 350 masticatory cycles, occluding with the flat surface of the masticatory robot in order to evaluate the vertical forces transmitted. Two-way analysis of variance (ANOVA) was used.

**Results:** The statistical evaluation of the force peaks recorded on the vertical z-axis showed median values of 39.529 for Procera Zirconia, 30.127 kg for the Empress 2 ceramic, 20.761 kg for Ney-oro cb gold alloy, 17.491 kg for Experience, 9.510 kg for Signum and 2.471 kg for Easytemp 2 acrylic resin, with all comparisons within materials significant with p-value < 0.0001. Analysis of variance revealed significant differences between the materials and each comparison within materials is significant with p-value < 0.0001.

**Conclusion:** By using the masticatory robot to test the load transmitted through crowns made of different materials to the simulated bone-implant interface, it was found that the greatest forces were transmitted by zirconia, followed in the order by: ceramic, gold alloy, composite resin and finally acrylic resin.

## Table 41

### Investigation of the Parameters for Masticatory Performance in Mandibulectomy Patients

**Miyamae, S. 1)\***, Asami, K. 1), Ozawa, S. 1), Yoshioka, F. 1), Okazaki, S. 1), Hirai, H. 1), Shigemori, T. 1), Tanaka, Y. 1), Hattori, M. 2)  
Aichi-Gakuin University, School of Dentistry, Aichi, Japan  
1) Department of Removable Prosthodontics 2) Department of Gerodontology

**Purpose:** In the mandibulectomy patients, deformation of the jaw movement and displacement of the intercuspal position could cause impairment of masticatory function. In those cases application of the maxillofacial prostheses is essential for their oral rehabilitation. However, their clinical evaluation is more difficult than that of the conventional dentures. In this study various oral conditions were investigated to establish the specific parameter for an index of masticatory performance which is applicable to these cases.

**Methods & Materials:** Nineteen mandibulectomy patients who had treated in our clinic were participated in this study. The masticatory performance was evaluated by using two kinds of test foods (gummy jelly and wax cube). The correlation of the these values and oral conditions such as number of remaining teeth, occlusal force, occlusal contact area and points, masticatory score that was calculated from foods intake questionnaire were investigated.

**Results:** Two kinds of masticatory performance values showed medium grade correlation. However, mixing ability index that was measured by using wax cube did not correlated with any oral condition factors. On the contrary, amount of the surface area of comminuted gummy jelly showed distinct correlations with the occlusal force, contact area, contact points, and the masticatory score. The number of remaining teeth did not have interrelation with the value from gummy jelly.

**Conclusion:** Occlusal factors such as contact area and points including that of artificial teeth of the maxillofacial prostheses closely related with masticatory performance in the mandibulectomy patients. Therefore, the objective parameter evaluated with gummy jelly, measurements of occlusal condition and the masticatory score would be indexes of masticatory performance in maxillofacial rehabilitation.

## Table 42

### Performance Status Outcome of Health-Related Quality of Life (HRQOL) in Glossectomy-Mandibulectomy Patients

**Morimata, J., Murase, M., Sumita, Y.I., Taniguchi, H.**

**Tokyo Medical and Dental University**

**Department of Maxillofacial Prosthetic, Maxillofacial Reconstruction And Function Division of Maxillofacial/Neck Reconstruction, Tokyo, Japan**

**Purpose:** Quality of Life (QoL) assessment in routine clinical practice are recognized as important outcome which makes a communication with patients easier and reveals issue of information about the range of functional status related to health conditions. The accurate prediction of various treatment interventions and evaluation of disease-related symptoms can improve the individual patient's prognosis. The purpose of this study is to describe individual performance status outcome of mandibulectomy patient's health-related quality of life (HRQOL) for accurate prognosis.

**Methods & Materials:** In 2008-2009, a cross sectional study of 31 mandibulectomy patients of more and less than five years post-diagnosis treatment are voluntary participated in this study. Medical records (age, gender, clinical diagnosis, type of surgical reconstruction, and defect areas) with a self-administrated University of Washington Quality of Life questionnaire were collected. The degree of response is interpreted by karnofsky-performance scale index (KPS) to identify the patient's functional impairment of performance status outcome.

**Results:** Through collected data shows that functional status of twelve domain in questionnaire, most frequent score of 50, 70 in the presence of shoulder pain, speech, anxiety, and chewing ability. In the sense of taste, it represents a level of 100 and 70 in less and more than five years of postoperative treatment on mandibulectomy patients. For the three global questions, 60 and 50 on each category were indicated. Above 80 are excluded as normal function The performance status outcome represented in a discrete ordered of dysfunction.

**Conclusion:** A years of postoperative treatment of mandibulectomy patients had discomfort of shoulder, anxiety and disability of speech, chewing and sensation of taste. Improving the outcome of HRQOL is based upon individual scores of patient's performance criteria definition rating of functional impairments which it achieve the patient's needs for social adaptation. These establish an effectiveness of different treatment for evaluation of individual prognosis and a degree of survivor for illness.

## Table 43

### The Evaluation of Speech Outcomes in Maxillectomy Patients at the Rehabilitated Stage

**Murase, M.\*, Nagai, H., Morimata, J., Taniguchi, H.**  
**Tokyo and Dental University, Graduate School, Maxillofacial Prosthetics**  
**Tokyo, Japan**

**Purpose:** Maxillectomy Patients are often left with functional problems after resection of maxillofacial tumors because of the affected structures are required for mastication, deglutition, and speech. The purpose of this prospective study was to investigate the changes in speech outcome in maxillectomy patients collected at the presurgical, postsurgical with/without immediate surgical obturator, and definitive obturator, using objective evaluations.

**Methods & Materials:** Speech data was collected prospectively at three conditions (preoperative condition, postresection with/without immediate surgical obturator, and with/without definitive obturator) Ten maxillectomy patients are participated in this study. Digital acoustic analysis of five vowels and the speech intelligibility (SI) test was performed. All voices were analyzed using a Computerized Speech Lab system model 4500 (Kay PENTAX, Lincoln Park, NJ, USA)

**Results:** This study was performed as one factor repeated measures ANOVA. The ANOVA were revealed for Formant 2 range and SI test significant differences among three conditions. Bonferroni post hoc analysis was revealed that there is a significant differences between the Formant 2 range data of without immediate surgical obturator and preoperative condition ( $p = 0.0029$ ), between the Formant 2 range data of without definitive obturator and preoperative condition ( $p = 0.0033$ ). There is a significant differences between the SI data of without immediate surgical obturator and preoperative condition ( $p < 0.0001$ ), between the SI data of without definitive obturator and preoperative condition ( $p = 0.0007$ ). There was no significant difference of the Formant 2 range and SI test among preoperative, postresection with immediate surgical obturator, and with definitive obturator.

**Conclusion:** It was suggested that the immediate surgical obturator be able to recover patient's speech at the definitive obturator and also the preoperative condition level. Detailed speech analysis and quantitated data of speech improvement are essential for an objective evaluation of patients treatment

## Table 44

### Sinus Floor Elevation Using Osteotomes or Piezoelectric Surgery: A New Approach

**Musante\*, B., Baldi, D., Menini, M., Bonica, P., Ravera, G., Pera, P.**  
**University of Genoa, 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 radiographs 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 after

insertion (CSR 97.05%). 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 results in the sinus floor augmentation with a crestal approach and immediate implant placement in cases where the residual bone is  $< 7.5$  mm.

## Table 45

### Correlation Between OSA and CSS

**Notaro, V. Bassi, F. Gassino, G. Cicolin, A. Carossa, S.**

**University of Turin**

**Departement of Biomedical Sciences and Human Oncology, Section Oral and Maxillofacial Rehabilitation and Dental Implants, Turin, Italy**

**Purpose:** The aim of this study was to investigate whether anatomical and functional variables (oral vertical dimension OVD, interocclusal distance (ID), closest speaking space CSS) influence the occurrence and severity of OSA.

**Methods & Materials:** Fifty subjects have been selected for stable clinical conditions, absence of severe cardiologic, neurologic, and respiratory disease and absence of acute upper or lower airway infections. Ambulatory polysomnography was performed and scored according with ASDA criteria. EEG tracings were used to assess the total sleep time. OVD was clinically evaluated. CSS, and ID were measured by a kinesiograph (K7 Myotronics, USA) and compared with Apnea-Hypopnea Index (AHI). Statistical analysis was performed by SPSS 17.0: T-test for unpaired samples and one-way analysis of variance, linear simple regression

**Results:** AHI score decreases significantly when CCS, ID and OVD are wide ( $P < 0.05$ ).

**Conclusion:** The teeth loss might act by modifying the anatomy, the space and the function of the pharyngeal airway. Edentulism is more frequent in the elderly as well as prevalence of OSA. Prosthetic rehabilitation seems to be useful for partial or complete edentulous patients, to prevent or to improve treatment OSA.

## Table 46

### A Technique to Create an Implant Retained Extra-Oral Wax-Up from the Adhesive Retained Prosthesis

**Obuhoff, M.P., Sharma, A.B., Finzen, F**

**University of California San Francisco, Prosthodontics**

**San Francisco, CA USA**

**Purpose:** This poster will demonstrate a technique that utilizes the patients existing adhesive retained extra-oral prosthesis to fabricate the wax-up for an implant retained extra-oral prosthesis.

**Methods & Materials:** A patient who had cranio-facial implants placed to support and retain an auricular prosthesis is presented. His previously fabricated adhesive retained prosthesis is used to position and sculpt the wax-up thus saving the number of required appointments.

**Results:** A successful method that decreases the number of clinical appointments and recreates the shape and position of a previous prosthesis.

**Conclusion:** A simple method to reduce the number of clinical appointments

## Table 47

### Metal Connector as Link of Obturator to Complete Dental Prosthesis

**Oh, W.S., Zwetchkenbaum, S.R**

**University Of Michigan, Biologic & Materials Sciences Division of Prosthodontics  
Ann Arbor, MI USA**

**Purpose:** An obturator for a soft palate defect is commonly attached to the dental prostheses by means of acrylic resin with wire or metal. However, the obturator often fractures off the dental prosthesis at the connector area due to the extensive cantilever, in conjunction with the velopharyngeal dynamic action of the musculature, risking possible swallowing or aspiration. This presentation is to describe a technique of constructing an obturator connected to a complete dental prosthesis by means of a relatively thin, rigid cast metal connector.

**Methods & Materials:** A thin metal connector with retention loops is cast in a chrome-cobalt alloy. One side of the retention loop is embedded at the posterior region of the maxillary complete dental prostheses. The other side of the loop is connected into the obturator portion, securing its positional stability in extending laterally and superiorly to approximate lateral and posterior pharyngeal walls.

**Results:** The metal connector is rigid and enhances the patient's comfort by minimizing the occupancy of the tongue space.

**Conclusion:** The thin, hygienic metal connector attaches the obturator to the dental prosthesis rigidly, restoring functions of speech and swallowing and reducing the risk of fracture, and subsequent, swallowing or aspiration.

## Table 48

### Evaluation of Accuracy and Utility in the Three Kinds of 3D Measurement Systems

**Okazaki, S., Yoshioka, F., Ozawa, S., Miyamae, S., Hirai, H., Shigemori, T.,  
Asami, K., Tanaka, Y.**

**School of Dentistry, Aichi-Gakuin University, Removable Prosthodontics  
Aichi, Japan**

**Purpose:** Conventional facial impression could be uncomfortable for patients and weight of the impression material could cause inaccuracy in fabricating facial prosthesis. Recently, several rapid prototyping systems had been introduced as simpler modeling methods without making impression. In this study we evaluated three kinds of data acquisition system in terms of accuracy and usability as a pilot study prior to fabricating facial prosthesis.

**Methods & Materials:** Three subjects who have symmetric facial curvature were participated in this study. Informed consent was obtained in each subject. Three kinds of data were obtained using laser scanning digitizer, photogrammetric system, and white-light phase-shifting triangulation system respectively. Actual measurement of the face was performed simultaneously based on the pre-established landmarks. The length between each landmark was calculated using model analyzing software as well as the volume surrounded by the land marks.

**Results:** The measurement result showed well reproducibility, and a significant difference was not admitted between the measurement methods in all systems as a result of comparing the distance between these measurement points with the distance between reference points in acquired data. The laser scanning digitizer required longest measurement time which might cause motion artifact while photogrammetric system required shortest measurement time.

**Conclusion:** Demonstrates that each measurement system is reliable for acquiring facial curvature.

Table 49

### The Biomechanical Effect of Bone-Implant Contact Ratio and Length of Implant

Ohyama T.\*, Ogawa T.\*\*, Tsukimura N.\*, Toyoma H.\*, and Ishigami T.\*

\*Nihon University School of Dentistry Department of Partial Denture

Prosthodontics \*\*UCLA School of Dentistry Division of Advanced Prosthodontics

**Purpose:** Implant treatment is very effective treatment methods for maxillofacial prosthetic patients. Success rate for implant treatments is known to depend on the length of the implant. However, bone condition of maxillofacial patients is sometimes quite compromised situation. Recently the UV treated implant system was developed for improvement of Bone-Implant contact ratio. Therefore, it is necessary to reappraise to biomechanical effect for the new system. And almost every previous FEM analysis for Implant treatment was not considered for Bone-Implant contact ratio. Then the new FEM analyzing methods for Bone-Implant contact ratio was developed. The purpose of this study was to evaluate the biomechanical effect of Bone-Implant contact ratio and implant length.

**Methods & Materials:** Analysis type is static type of three-dimensional finite element method. Implant, cortical bone and cancellous bone were constructed for analysis model. Three types of implant length (7mm, 10mm, 13mm) and two types of Bone-Implant contact ratio (98.2%, 53.0%) were modeled. 98.2% and 53.0% of Bone-Implant contact ratio were UV treated and conventional type of implant. Two types of Load (Vertical Load, Oblique Load at 45degree) of 10N were performed. Minimum principal stress was used for evaluation of biomechanical effect.

**Results:** For minimum principal stress, the UV treated of 7mm implant is smaller than the conventional type of 10mm implant. Minimum principal stress of vertical load to oblique load at 45degree was compared to about two times.

**Conclusion:** Newly developed finite element method considering Bone-Implant contact ratio was very useful of these analysis. From a biomechanical viewpoint, implant system of high rate of Bone-Implant contact ratio has possibility of high clinical safety.

Table 50

### Experimental Study for Application of Milled Tooth to Bone Defects

Ozawa, S., Miyata, Y., Matsukawa, R., Kondo, Y., Tanaka, Y.

Aichi Gakuin University, School of Dentistry

Department of Removable Prosthodontics, Aichi, Japan

**Purpose:** Bone augmentation prior to implant is site often required in order to offer esthetic and functional restoration. Various bone graft materials have been introduced even though autogenous bone graft is a gold standard. One of shortcomings is that those materials are costly. In this study we focus on extracted teeth that are normally discarded. Aim of this study was to develop novel bone graft material composed of recycled extracted own tooth. We conducted preliminary animal study using rat incisal extraction model.

**Methods & Materials:** Extraction socket and calvaria defects in Wistar male rats were adopted to assess a possibility of this new material. An extracted rat incisor was freeze-milled and mixed with a

base material (hydroxypropylcellulose), then injected to the extraction socket and calvarial critical size defects. After healing periods those samples were harvested for investigations of micro CT and histological evaluation.

**Results:** Three dimensional images of the samples were constructed from the micro CT. Four weeks after the surgery, the bone formation of the socket was completed and shifted to bone remodeling, while the calvaria defect did not filled by new bone. In the socket mature bone formation was observed except for the apical area. Histomorphological evaluation showed that in the experimental group, amount of bone formation was significantly increased up to 161% compared to the control group at four weeks. Bone mineral content of the experimental group was also improved up to 130%. Histological observation demonstrated that there were no immunological response from the graft material and more matured bone around the apical area. Interestingly, injection of the base material only decreased bone formation at the two week samples, whereas this group increased 159 % bone formation at the four weeks. In the calvaria defect, however, bone filling had not been completed among any of the groups.

**Conclusion:** Within the limitation of this study, injection of the bone grafting material composed of the milled own tooth has a possibility of bone augmentation material. This material has no risk of the immune reaction and lowers the cost of the bone graft material, limited bone induction character.

## Table 51

### Well-Differentiated Benign Mixed Odontogenic Tumours: Odontomas 3 Case Reports

**Özcan, I. Barut, O. Köseoglu Gürkan, B. Erdem, T.**  
**Istanbul University, Faculty of Dentistry, Oral Diagnosis and Radiology**  
**Istanbul, Turkey**

**Purpose:** Odontomas are the most well-differentiated benign tumours among odontogenic tumours. They often interfere with the eruption of permanent teeth. Most odontomas occur in second decade of life. Many times they are found incidentally during investigation of delayed eruption of adjacent teeth or retained primary teeth. We herein report three cases of odontomas that were incidentally found during the radiographic examinations of patients with an unremarkable medical history.

**Methods & Materials:** Two of the cases are a 13 years old boy and a 17 years old girl who were seeking treatment for their malocclusion and still had some of their primary teeth. In their panoramic radiographs well defined quite large radiopaque lesions with toothlike structures were found. One was in mandibula the other was in maxilla. The third case is a 19 years old girl who was undergoing a routine dental examination. In her panoramic radiograph a quite large radiopaque lesion with a thin radiolucent capsule around it and an unerupted molar tooth were found.

**Results:** All the lesions were removed and routine follow-ups were planned.

**Conclusion:** While more of the compound odontomas occur in the anterior maxilla in association with the crown of an unerupted canine, more of the complex odontomas are found in the mandibular molar area. We reported two compound odontomas, one case in mandibula with the crown of an unerupted premolar, the other is a complex odontoma in the maxillar molar area.

## Table 52

### **Experimental Evaluation of the Optimal Thickness of Radiation Shields to Overcome Normal Tissue Radiomorbidity for Different Types of Irradiation in Head and Neck Radiotherapy**

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**Gulhane Military Medical Academy, Prosthetic Dentistry**  
**Ankara, Turkey**

**Purpose:** The purpose of the present experimental study was to determine the optimum thickness of protective oral radiation shields composed of radiation stent and lead shield in head and neck radiotherapy to minimize normal tissue radiomorbidity for different irradiation energies in order to increase patients' overall quality of life.

**Methods & Materials:** Intraoral protective radiation stents 8, 10 and 13 mm thick with lead shields (2mm or 4 mm thick Pb) inserted into a specially-designed human mandible phantom with 6 TLD100 chips placed on buccal and lingual sites were exposed to three different irradiation sources; Co-60 gamma, Linac 6 MV X and 8 MeV electron irradiation for a model buccal mucosa tumor. 50 cGy irradiation was given each time and TLD100 dose measurements were read for each irradiation type, stent and lead-shield thickness.

**Results:** Protective stents with the 2 mm lead-shield resulted in reducing 20% and 15% of the normal tissue dose for Co-60 and 6 MV X photon radiations respectively, whereas the protective stents with the 4 mm lead-shield achieved a higher reduction in the normal tissue dose; 30% and 23% for Co-60 and 6 MV X photons respectively. However, the difference in stent thickness was more important in 8 MeV electron beam therapy than Co-60 and 6 MV X photon therapies.

**Conclusion:** Protective oral stents are important in immobilizing the lead-shielded treatment volume. Moreover, stent thickness has very little effect on the reduction of the dose on normal-tissue whilst the thickness of lead-shield has proved to lead to a significant reduction.

## Table 53

### **The Challenge of Hemimandibulectomy: Overdentures or Screw Retained Prosthesis**

**Pedemonte, E\*, Martelli I, Valero MC, Torne S, Escuin, T.**  
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**Barcelona, Spain**

**Purpose:** When microvascularized grafts are a rejected option, quality of life for hemimandibulectomized patients depends a lot on the possibility to get functional occlusion in a quite stable position of the mandible, accompanied with an easy maintenance and a prosthetic design adapted to their priorities. These are the objectives of the treatment. The aim of this poster is to show a prosthetic design and processing technique to create an implant supported prosthesis for hemimandibulectomized patients in order to achieve oral rehabilitation.

**Methods & Materials:** We present several clinical cases where the main challenges for rehabilitation are the following: In the first place there is the difficulty to wear a removable prosthesis due to the instability of the tissues of the hemimandibulectomized side. In the second place, the hemimandibulectomized patient has no regular movement at the moment of centric occlusion, presenting

a displacement to the resected side of the absent mandible, tilting over the upper teeth and impairing the chewing function. The third challenge is the technical difficulty to record and translate the functional occlusion with base plates to the articulator and arrange prosthetic teeth. Comparing with the cases where reconstruction with fibula grafts is the solution, implants allow install fixed partial prostheses for rehabilitation of the remaining mandible, so a higher level of comfort and efficiency is obtained. A method to design fixed provisory implant supported prostheses is presented with assessment of occlusal efficiency, using a removable upper prosthesis, implant or dental retained, which allows a convenient occlusion in a double line of teeth.

**Results:** Different Clinical cases with similar prosthetic characteristics show different prosthetic designs over implants placed in the remaining hemimandible.

**Conclusion:** Provisory fixed prostheses allow dentists and patient to decide the best design for hemimandibular prostheses. Removable or fixed prostheses will be assessed in order to maximize the efficiency and maintenance of implant health.

## Table 54

### **Quality of Life in Hemi-Mandibulectomy Patient, Subjective and Objective Assessment. Part I : To Compare the Maximum Bite Force Between the Patients who Undergone Hemi-Mandibulectomy Restored with Conventional Removable Dentures Versus Implant Supported Denture**

**Prayadsab, P.\*, Aimplee, S., Cheungprapakorn, W., Serichetapongse, P.  
Chulalongkorn University, Maxillofacial Prosthetic  
Bangkok, Thailand**

**Purpose:** This study aimed to test the hypothesis that the maximum bite force between the patients who undergone hemi-mandibulectomy restored with conventional removable dentures versus implant supported denture.

**Methods & Materials:** 20 patients were enrolled in this study. 10 patients have worn removable denture and the other 10 patients have had dental implantation for supporting their denture. All of patients used to have an experience on hemi-mandibulectomy and reconstruction by vascularized or non-vascularized bone graft. All prostheses were fabricated by prosthodontist from maxillofacial prosthetic department, Chulalongkorn university. The occlusal force meter GM10 (NAGANO, KEIKI) was used for measuring the maximum bite force of each patient could gain. The method was the machine would apply over the occlusal table of the right and left lower first molar ( defect and non-defect side), then the patients were going to bite as hard as they can without causing themselves any pain or injuries and stop after the meter alarm. The measurement was done 3 times and its mean value of the maximum bite of each tooth was calculated.

**Results:** The mean maximum bite force is highest in dentate patients follow with non-defect side and defect side with implant-support prostheses and defect side conventional prostheses respectively. However there is statistic difference in only dentate patient group and conventional prostheses group at conference interval 95%.

**Conclusion:** Patients who had deformities due to hemi-mandibulectomy causing their difficulties to chew and swallow. Replacing the deformities with dentures combines with patients' adaptation could enhance the chewing ability. Considering from this study the implant-support denture showed the superior outcome over the conventional one.

## Table 55

### **Bisphosphonate-Related Osteonecrosis of the Jaw: Presentation of a “Linking Form” Promoting Prevention**

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**Centre Leon Bérard, Surgery**  
**Lyon, France**

**Purpose:** Bisphosphonate-related osteonecrosis of the jaw (BONJ) is a potential side effect of bisphosphonate treatments. This complication has been the subject of numerous studies since its first description in 2003(1). The treatment is more or less invasive according to the stage of the BONJ, the medical context and the authors (2;3). Whichever option is decided between a conservative and an interventionist treatment, the long term results are not satisfying since the BONJ keeps on developing most of the time. There currently is no consensus between authors as for the treatment modalities of BONJ. This is probably why most recent publications insist on the capital importance of a preventive approach of BONJ (4-7).

**Methods & Materials:** Recent studies have shown that the risk of developing a BONJ is significantly lower among patients who could benefit from preventive measures than among those who did not (8;9). Those measures include a dental assessment and infection treatment before bisphosphonate treatment begins, and a regular dental follow-up afterwards. In order to generalise this practice, the bisphosphonate prescriber and the dental surgeon should be sensitized to this potential problem, and should closely collaborate.

**Results:** A workshop including different specialists elaborated a “linking form”, which purpose is to facilitate the communication of the different actors of the treatment and promote prevention towards the patients likely to develop a BONJ.

**Conclusion:** This form is a triptych kept by the patient and presented by him / her to the different health professionals so that they can write the main information about the bisphosphonate treatment and the dental status down. The objective of this poster is to present this “linking form”.

## Table 56

### **Analysis of the Color Formulation of the Nylon Flocking using the Spectrophotometer**

**Shigemori, T\*., Yoshioka, F., Okazaki, S., Hirai, H., Asami, K., Ito, R., Miyamae, S., Ozawa, S., Tanaka, Y.**  
**School of Dentistry, Aichi-Gakuin University**  
**Department of Removable Prosthodontics, Aichi, Japan**

**Purpose:** Color formulation of facial prosthesis requires not only to coordinate with the surrounding facial skin tone but to reflect underlying dermis. Intrinsic coloring pigment is often too condensed to reproduce the translucency of skin. Clinically, color flocking is used to accomplish the nuance of the skin tone. The purpose of this study is to examine the effect of color flocking added to facial silicone on color facial skin tone using the spectrophotometer.

**Methods & Materials:** Ten subjects were participated in this study. Informed consent was obtained from each subject. Color samples were formulated with silicone for the forehead of each subject. Four kinds of samples were fabricated with only color pigment, 110 mg, 220mg, and 440mg flocking added to the color pigment, respectively. Melanin Index, Hb (Hemoglobin) Index, Hb SO<sub>2</sub> (Hemoglobin oxygen

saturation) Index, spectral reflectance and colorimetric values of sample silicone and forehead were measured using spectrophotometer (CM-700d and Konica Minolta Co.).

**Results:** Melanin Index was not significantly different between each sample. Hb index was increased according to the amount of added flocking while Hb SO<sub>2</sub> Index was decreased. Hb SO<sub>2</sub> Index of 40 mg added group was closely resembled to that of forehead.

**Conclusion:** In this study, the effect of nylon flocking was evaluated using spectrophotometer. It was speculated that Hb SO<sub>2</sub> Index could reflect the amount of nylon flocking. The results in this study could be useful for the construction of computer color matching system for fabricating facial prosthesis though further study should be necessary.

## Table 57

### Impact of Argon Plasma Treatment to Improve Physical Properties of Facial Elastomers

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**Purpose:** This study aimed to find suitable parameters' combination of Argon plasma treatment for reducing water absorption and solubility of both facial elastomers.

**Methods & Materials:** Facial elastomers (SY-1, MDX4-4210) specimens were cured and divided into groups randomly, and then the water absorption and solubility (8w) of the specimens were evaluated before and after the surface treatment of Argon plasma.

**Results:** SY-1 displayed equal or lower water absorption (8w) compared with the control group. Especially under condition of 1T, 50W, 1.5min combination of working parameters, Argon plasma can be most effective in reducing water absorption of SY-1 silicone elastomer from (8.204±0.708)% to (5.126±0.888)%. But it is not an effective combination for MDX4-4210 to lower its water absorption.

**Conclusion:** Argon plasma treatment can reduce the water absorption of SY-1 elastomer, whereas there were no significant improvements in either water absorption of MDX4-4210 or solubility of both materials in chosen and combinations of parameters; effective methods to improve the physical properties are to be found.

## Table 58

### Factors Influencing on the QOL in Patients at 6 Months After Oral Cancer Surgery

Shiroshita, N.\*, Sakagami, J., Yamamoto, M., Tamine, K., Kondo, J., Hamanaka, S.,  
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Osaka University Graduate School of Dentistry, \*\*Niigata University Graduate  
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Department of Prosthodontics and Oral Rehabilitation, \*\*Division of Dysphagia  
Rehabilitation of Oral Biological Science, Niigata, Japan

**Purpose:** Oral cancer patients suffer from various dysfunctions after surgery. Prosthetic rehabilitation for aiming the early reconstruction of oral function might contribute to the improvement of patients' quality

of life (QOL). The purpose of present study is to investigate factors influencing on the QOL in patients at 6 months after oral cancer surgery using EORTC QLQ-H&N35.

**Methods & Materials:** A questionnaire survey using EORTC QLQ-H&N35 was performed in 40 oral cancer patients (16 maxillary, 16 mandibular and 8 tongue cancers) at 6 months after surgery. Swallowing function was evaluated by the time to swallow 30ml of water. Masticatory efficiency was calculated by the increased surface area after chewing gummy jelly at 30 times. Maximal biting force was measured by Dental Pressscale® (GC, Japan). The influence of gender, age, cancer site and the state of occlusal support on each QOL score was analyzed by Kruskal-Wallis H tests and Mann-Whitney U tests ( $P<0.05$ ). The correlation between the result of functional assessment and each average QOL score was analyzed by Pearson's product-moment coefficient of correlation ( $P<0.05$ ).

**Results:** The score of “sticky saliva” and “gained weight” in the tongue cancer patients was higher than that in the maxillary cancer patients. Age had positive correlation with the score of “swallowing”, “sense”, “dry mouth” and “sticky saliva”. Although none of the result of each functional assessment had correlation with the score of “social eating”, the score of “social contact” had the negative correlation with masticatory efficiency and biting force. The time to drink water had positive correlation with the score of “dry mouth” and “sticky saliva”.

**Conclusion:** From our results, it was suggested that age, cancer site and oral function influenced on the some items of QOL, but there was some estrangement between the results of functional assessment and the QOL score of social eating.

## Table 59

### Biomechanical Study of the Maxilla in Human Skulls

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**Purpose:** This study was to establish and test a biomechanical model using human skulls to analyse the stress distribution in the facial skeleton generated by simulated occlusal and masticatory forces.

**Methods & Materials:** Three dried human cadaver skulls were mounted rigidly to a platform. Elastic chains simulated masticatory muscles between skull and mandible and were loaded with 250g and 500g. A transducer was used to measure bite forces at three different positions in the dental arch. 19 strain gauges were placed on strategic points of the maxilla. Measurements were repeated three times for the two muscle loads and three transducer positions. Results were presented in a descriptive fashion and also studied with a multifactorial statistical design (ANOVA, Statgraphics).

**Results:** Strain measurements obtained from gauges showed differences because of variations of the anatomy and gauge position but these differences had no interaction. At large-scale, similar strain patterns were found in all three skulls independent on the position of the force transducer, however there were local differences which were explained by morphological variations of the skull anatomy. Under the influence of higher muscle loads, the skulls and transducer positions influence in isolation strain measurements.

**Conclusion:** The biomechanical simulation of the maxillofacial complex is very difficult because of the multifaceted morphology of hard and soft tissues and numerous unidentified parameters. However our simplified experimental model allowed the simulation and analysis of mechanical loads in the maxilla. Overall the skulls presented a very similar pattern of stress distribution and strains supporting the three buttress theory of Sicher and Du Brul and can be used as a foundation for future mathematical studies.

## Table 60

### Implant Prosthetic Rehabilitation of Orbital Defects – A Clinical Report of Treatment Outcomes and Complications

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**Purpose:** Craniofacial implants facilitate the use of facial prosthetics and have become an adjunct in the management of orbital defects. The benefits of implant-retained orbital prosthesis significantly enhance patient's acceptance and eliminate the limitations of the conventional adhesive-retained prosthesis. Compared to other facial sites, the outcomes of implants in the orbital region are varied depending on whether the site is radiated. The purpose of this report is to evaluate the treatment outcomes and complications of implant rehabilitation of orbital defects in four patients.

**Methods & Materials:** In this case series, three patients underwent orbital exenteration to remove malignant neoplasm of which two had simultaneous radical maxillectomy. These three patients who had received radiation therapy underwent hyperbaric oxygen treatment before (20 sessions) and after (10 sessions) implant placement. One patient had orbital exenteration due to traumatic injuries to the right orbit. Potential implant sites were evaluated for bone depth and width by means of an implant treatment planning software, the Simplant Pro CMF module. All implant placements were staged with a minimal interval of 6 months between stage I and II. Data on patient demographics, implant location, radiation history, use of hyperbaric oxygen therapy (HBO), prosthetic design, skin reactions and complications around the implants were collected. A standardized questionnaire was used to ascertain patients' satisfaction 6 months after issue of the implant-retained prostheses.

**Results:** The mean follow up time for the implants was 43.6 months (range: 34 to 50.7 months). Of the 11 implants placed in the orbital defects of four patients, 8 were in irradiated bone. Two of the implants in the irradiated bone failed at 11 and 27 months of functional loading. The overall survival rate for implants placed in orbital sites was 81.8% (9/11). Implants in irradiated bone that received HBO therapy had a survival rate of 75% (6/8). All patients and implant sites demonstrated varying degree of skin reactions (Grade 0 to 2) during the study period. When compared to their previous experience with adhesive-retained orbital prostheses, patients were satisfied and preferred implant-retained prostheses.

**Conclusion:** Within the limitations of this survey, a high patient satisfaction was achieved with implant retained orbital prostheses. The ease of use, comfort and appearance of the prostheses seem to have an impact on patients' satisfaction, social and psychological wellbeing. The use of HBO therapy did not seem to improve implant survivals in this group of patients. Long term follow-up with larger patient population is necessary to provide more meaningful data on the clinical outcomes of implant rehabilitation of patients with orbital defects.

## Table 61

### Evaluation of Masticatory Function of Patients Following Resection of Oral Cancer – Segmental Mandibular Resection Cases

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**Purpose:** The aim of this study was to investigate the factors influencing the masticatory function of oral cancer patients following segmental mandibular resection.

**Methods & Materials:** The subjects were 70 patients whose masticatory function could be examined among the patients who had undergone segmental mandibular resection under the diagnosis of oral cancer or osteoradionecrosis at our hospital since 1992. Reconstruction with a vascularized free bone flap was performed for 53 of the 70 patients, and such reconstruction was not performed for the other 17 patients. The masticatory function was evaluated by total biting force and masticatory score, and then statistically analyzed. The total biting force was measured by pressure sensitive sheets, and the masticatory score was measured by Sato et al.'s table for evaluating masticatory ability for 20 foods. The statistical analysis was performed by multiple linear regressions using the total biting force and the masticatory score as dependent variables. A logistic regression analysis was also performed using the top ranking range reaching 50% of the recovery rate of the total biting force and the masticatory score as dependent variables. In both analyses, 10 clinical variables (1:age, 2:gender, 3:duration after surgery, 4:performance or nonperformance of bone reconstruction, 5:residual teeth number of mandible, 6:number of occlusal supports, 7:presence or absence of lower dentures, 8:performance or nonperformance of tongue resection, 9:radiation dosage, and 10:mandibulectomy area) were used as independent variables.

**Results:**

- 1) The variables influencing the postoperative total biting force were: 2,3,5,6, and 7.
- 2) The variables influencing the postoperative masticatory score were: 1,2,3,5, and 8.
- 3) The variables influencing the postoperative total biting force recovery were: 2,4, and 5.
- 4) The variables influencing the postoperative masticatory score recovery were: 3,5,6, and 9.

**Conclusion:** This study identified the factors that can be used to estimate the masticatory function of oral cancer patients following segmental mandibular resection.

## Table 62

### The Retention of the Facial Prosthesis by Segmented Polyurethane Gel; Clinical Case Report

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**Purpose:** Although implant-supported facial prosthesis can achieve the high outcome for esthetic and functional rehabilitation of oral cancer patients, there are a lot of limitations in the application of facial implant such as irradiated bone or economic problems. In the case without facial implant, we have to consider an alternative method for the retention of facial prostheses. This report presents an application of novel adhesive material for the facial prostheses in a maxillectomy patient with a facial defect.

**Methods & Materials:** The patient is eighty-seven years old man, who was affected by the carcinoma of the left maxillary sinus, with a large oronasal communication (f40mm; Aramany class?) and facial defect (f20mm) under the left infraorbital region. Around the facial defect, there are rough dry skins because of the adhesive plaster for retaining facial prostheses which had been made four times over the past ten years. It was supposed that the deterioration of facial prostheses was also accelerated by the usage of adhesive plaster around the marginal area. In the consideration of these problems, we tried to apply a self adhesive sheet of Segmented Polyurethane Gel (gel sheet, GELRODE©, Takiron Co., Japan) on the skin surface of new facial prostheses.

**Results:** The dento-maxillary prostheses and facial prostheses with a gel sheet were applied to the patient. Facial prostheses have been well retained by the gel sheet without any irritation to the skin and the patient has been satisfied with functional and esthetic recovery by the prosthesis. However insufficient marginal seal in the part of infraorbital concave area suggested the need for customizing the shape of a gel sheet considering the anatomy of facial defect.

**Conclusion:** It was suggested that the gel sheet could have the effectiveness as an adhesive material for the facial prosthesis.

## Table 63

### Evaluation of Masticatory Function after Orthognathic Surgery in Mandibular Prognathism

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**Purpose:** The purpose of this study was to evaluate and compare masticatory function subjectively and objectively between patients with mandibular prognathism and normal occlusion patients before and after Bilateral Sagittal Split Ramus Osteotomy (BSSRO) and to determine the outcome's relationship between subjective assessment and objective assessment. Subjective assessment was done with questionnaire.

Mixing ability test and maximum bite force were objective assessment. A low-adhesive color-developing chewing gum and a bite force meter were used for mixing ability test and maximum bite force measurement respectively. All three parameters had improved after orthognathic surgery but no correlation among these parameters were found neither pre nor post operative both in the patients and the controls. At the pre operative numbers of contact point and maximum bite force in the patients were significant difference to the controls whereas the significant differences were not found at the post operative.

**Results:** These results can be concluded that the orthognathic surgery could improve masticatory function to be near to the normal value. The post surgical orthodontic and masticatory training might responsible for the significant differences in the long term study.

## Table 64

### Quality of Life in Hemimandibulectomy Patients in Faculty of Dentistry, Chulalongkorn University: Subjective and Objective Analysis- Part III: Correlation Between Subjective and Objective Analysis of Quality of Life in Hemimandibulectomy Patients with Conventional Prosthesis and Implant Supported Prosthesis

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Quality of life is the most important goal for maxillofacial rehabilitation. The goal of reconstruction and rehabilitation is to encourage these patients to function and live normal life. The assessment for quality of life can be define in to 2 categories; subjective and objective analysis. This study will show the correlation between subjective and objective analysis of hemimandibulectomy patients in Faculty of Dentistry, Chulalongkorn University.

**Materials and Methods:** 20 Patients who received hemimandibulectomy and reconstruction with microvascular or non-vascularized flaps were recruited. 10 patients had conventional prosthesis and the other group of 10 patients had implant supported prosthesis. Objective analysis was assessed by occlusal force meter GM10 (NAGANO, KEIKI) according to part I discussion. Subjective analysis was assessed using University of Washington - Quality of Life Scale (UW-QOL) questionnaire according to part II discussion. Statistic analysis used is paired t-test.

**Result:** Subjective and objective analyses in both groups of patient were correlated. Patients implant supported prosthesis had significantly higher score in questionnaire and higher maximum bite force than conventional prosthesis group.

**Conclusion:** Dental implants improved the quality of life in patients who had hemimandibulectomy. Chewing quality and their satisfaction were found related to type of restorations.