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ISMR Welcome Letter

BIOGRAPHY

Dr. Beumer received his D.D.S. from the University of California, San Francisco. He completed a residency in Oral Medicine at UCSF (1967-1970), a residency in Prosthodontics (1973-1975) at UCLA and was awarded a Masters in Oral Biology from UCSF in 1970. He currently is Professor and Chair, Division of Advanced Prosthodontics, Biomaterials and Hospital Dentistry, UCLA and Director of UCLA’s Residency in Maxillofacial Prosthetics. He is the author of three books, and numerous publications. In 1999 he received an honorary degree in medicine and surgery from the University of Turin. In 2004, he received the Dan Gordon Award from the American College of Prosthodontics. In 2005 he received the Andrew Ackerman Award from the American Academy of Maxillofacial Prosthodontics and the Jerome M. and Dorothy Schweitzer Award from the Greater New York Academy of Prosthodontics.

Welcome to the second joint symposium of the International Congress in Maxillofacial Rehabilitation held by the International Society for Maxillofacial Rehabilitation (ISMR) and the American Academy of Maxillofacial Prosthetics (AAMP). The first joint meeting with our two organizations was held six years ago (November, 2000) on the island of Kauai and was a tremendous success. Therefore, we look forward to this meeting with high expectations.

We had originally made plans to hold this meeting in Miami, Florida. However, circumstances beyond our control brought us to the beautiful island of Maui. Indeed, we were most fortunate to have secured such an excellent facility on short notice following the closure of our previous hotel in Miami, Florida. For this we owe a great debt of gratitude to our meeting planner, Mr. Eben Yancey, RES Inc. Thank you for coming back to Hawaii and we hope you enjoy the meeting.

As we know in recent years the pace of change in Head and Neck Oncology and Maxillofacial Rehabilitation has accelerated. During this meeting we hope to address some of the issues resulting from these changes and are honored and delighted to be together with the leading professionals in the world, active in our field to present the latest information.

We hope you enjoy the meeting and the conference venue. Enjoy your time here on Maui and take the opportunity to network with your colleagues. Come celebrate with us at our Saturday night Luau.

Best Regards,

John Beumer, III
ISMR President
BIOGRAPHY

Dr. Jacob is a Professor of Dental Oncology and Maxillofacial Prosthetics at the MD Anderson Cancer Center. She practices within the hospital setting performing pretreatment assessments and rehabilitation of the head and neck cancer patient receiving surgery; radiation and chemotherapy. Long-term rehabilitation efforts include a team approach with head and neck surgery, plastic surgery and speech pathology. Her major interests are Evidence Based Dentistry education and employment of endosteal implants in maxillofacial prosthodontics. She is president of the AAMP, holds officer positions in the AP and ICP, is a Fellow of the ACP, and Diplomate and examiner of the ABP. Her major interests are Evidence Based Dentistry education and increasing the use of endosteal implants in the cancer patient population.

Welcome to the joint meeting of the AAMP and ISMR. All of you have traveled along way to gather with people of similar practice experiences. Friendships will be renewed and new ones fostered. Our international differences become nonexistent, as we recognize our career desires to treat the maxillofacial patients, create a common bond that shapes how we view the world, and impacts our daily lives beyond what happens in the clinic. This bond is something that clinicians who do not treat the unique maxillofacial prosthetic population, cannot understand. Enjoy your education, your time together, and the beauty of Hawaii.

Best Regards,

Rhonda Jacob
AAMP President
The Department of Dentistry and Maxillofacial Prosthetics at the Cleveland Clinic Foundation; Memorial Sloan Kettering Cancer Center, Department of Surgery – Dental Service; and the University of California at Los Angeles – Maxillofacial Clinic were instrumental with the creation and development of the ISMR.

The First International Congress on Maxillofacial Prosthetics was held in Palm Springs, CA - USA. The leading maxillofacial professionals from around the world delineated on the rehabilitation of the head and neck cancer patient. Four hundred delegates from 36 countries participated. This initial meeting acknowledged that the subspecialty of maxillofacial prosthetics requires multidisciplinary fields of science and health care and proceedings from the First International Congress on Maxillofacial Prosthetics were published. A Second Congress provided educational opportunities in Asia. Held in Seoul, Korea, it attracted 350 enthusiastic participants. The principal organizers of this meeting were the Korean Academy of Prosthodontics and the Korean Academy of Oral and Maxillofacial Surgery, with support from the Japanese Academy of Maxillofacial Prosthetics. Donations were distributed to the Korean Academy of Prosthodontics. Our Third Congress traveled to Europe and was held in Torino, Italy. Our international delegation represented 28 countries investigating the latest in education, research and maxillofacial technology. Donations were presented to the University of Turin, Maxillofacial Department.

The Fourth Congress was a joint meeting with the American Academy of Maxillofacial Prosthetics, held in Kauai, Hawaii. The combination of these two organizations provided a unique and “monumental” meeting. The Fifth Congress was held in Okinawa, Japan and was a joint symposium with the Japanese Academy of Maxillofacial Prosthetics, attracting over 350 international delegates. The Sixth Congress was held in Maastricht, The Netherlands, in cooperation with the Division of Maxillofacial Prosthetics of the Dutch Society of Temporomandibular Disorders and Prosthetic Dentistry. Our Seventh Congress is currently being held here on the island of Maui jointly with the American Academy of Maxillofacial Prosthetics. Plans are under way to hold our Eighth Congress in Thailand (November, 2008).

The Future- International conferences and scholar exchanges promote maxillofacial rehabilitation, providing the science and laboratory technology of maxillofacial rehabilitation to other health care workers. Society meetings are designed to travel worldwide, providing exposure to many Third World countries that are just beginning to develop maxillofacial expertise in cancer therapy, surgical oncology, radiation oncology and medical oncology. To assist in this development, the Society is presently establishing worldwide “Outreach” programs. Local prosthodontists will be trained in the disciplines of maxillofacial techniques so that they may establish their own programs and improve maxillofacial rehabilitation in their respective countries. Through the support of its members and private donations, the Society seeks to promote this scientific field to encompass continued educational programs, research, and patient service. Technology is available and constantly emerging. Disbursement and exchange of maxillofacial prosthetics has benefits for those in all societies. Many third world and developing countries have not been exposed to the field of maxillofacial prosthetics. Exposure through teaching and exchanging scientific knowledge to health care workers ultimately raises the quality of life functions and esthetics for the patients.

Outreach- Teaching programs to third world countries are being developed to bring knowledge, supplies, equipment, training of dentists and laboratory technicians, and the art and science of maxillofacial prosthetics. Previous trips to Vietnam, El Salvador, Nigeria, Mongolia, Bolivia, Thailand and Sierra Leone have introduced maxillofacial prosthetics by identifying, training health care workers and restoring oral function and esthetics to children and adults.

Shriners Children Hospitals provide treatment to children needing plastic reconstructive or restorative surgery as a result of burns, scarring and deformity of the face. The ISMR has provided grants to the Los Angeles California Shriners Children Hospital.

Recently, the ISMR has established a partnership with the UN Millennium Project. After nine months of discussions and negotiations with UN officials and the Columbia School of Dentistry and Harvard School of Dental Medicine, a team representing the ISMR, led by Drs Ian Zlotolow and Kim H. Teoh, will be traveling on an initial oral assessment trip for two weeks to Ethiopia. The UN Millennium Project is directed by Jeffrey Sachs, PhD, a professor of economics from Columbia University (Earth Institute), who was appointed by Kofi Annan of the United Nations to set up programs in deprived regions of the world to eliminate extreme poverty in a 15 year period. The ISMR is proud to be considered a partner in this endeavor and encourages its members and sponsors to participate in this global initiative. We look forward to the future and our potentially rewarding Outreach Programs for this UN project and other populations around the world.
History

The American Academy of Maxillofacial Prosthetics was founded in 1953 by Drs. Aelred C. Fonder, Joseph E. Schaefer, and John R. Thompson. The Academy was originally founded as “The National Association for Somato Prosthetics and Rehabilitation” in Chicago by these three leaders. The corporation consisted of a general association of dentists engaged in a common field of rehabilitation whose purpose was for educational, research, and charitable reasons rather than for pecuniary ones. The name of the organization was officially changed to The American Academy of Maxillofacial Prosthetics at its 1954 meeting.

From its inception in 1953 until 1959, the annual meetings were held in Chicago during the mid-winter meeting of the Chicago Dental Society and the meeting of the American Prosthetic Society. In 1959, it was decided to follow the American Dental Association’s annual meeting location. The first meeting of the Academy was held in conjunction with the ADA meeting in Los Angeles. The Board of Directors later decided to coordinate the Annual Meeting with the American College of Prosthodontists which gave the advantage to our Fellows to attend both meetings.

The Journal of Prosthetic Dentistry was approved as the official publication of the Academy in 1959. Since then, one of the Academy Fellows has represented the Academy on the Editorial Board as an Associate Editor. Education and training of maxillofacial prosthodontists to dentists was a major concern. From 1958 to 1977, two-year teaching programs were offered. From 1977 to 1984, three-year programs were offered and these were accredited by the ADA Commission on Dental Education. On October 19, 1975, the first continuing education course of the Academy was offered. The title of the course was “Management of the Maxillectomy Patient with Orbital Extension”. The Academy had firmly established for itself a leadership role in dentistry and its leaders have demonstrated the ability and the willingness to meet new challenges as they develop.

Research and Awards- In 1959 the Academy jointly sponsored a seminar with the New York University College of Dentistry in New York City. In 1966, a workshop was held on Rehabilitation of Head and Neck Cancer Patients. It was sponsored by the Cancer Control Research, Division of Chronic Diseases. In 1967, the American Board of Prosthodontics accepted Maxillofacial Prosthetics as a component area for competency certification. On February 10-11, 1970, for the first time, maxillofacial candidates have appeared before the Board for certification. Since then, many of our Fellows have taken the certification examination and have become Diplomates of the American Board of Prosthodontics. Currently, eight of our Fellows have become board examiners as well as its President.

In 1970 certificates were given to all previous presidents in Las Vegas. In 1988, the Academy’s Policy Manual was developed and has been updated as needed. In 1983 at the 31st annual meeting in San Diego, it was resolved that effective with the following meeting in 1984, a research competition award would be held by the prosthodontic residents and/or graduate students who had completed training programs within the past three years. From 1994 until 1996, a first and second prize award for research was given. Beginning in 1996, the annual research award was replaced by the annual research/poster award competition.

The Andrew J. Ackerman Memorial Award- This award was established to commemorate the monumental contributions of Dr. Andrew Ackerman of New York City. Dr. Ackerman died in June of 1960 when he was President-Elect of the Academy. The award was established to be bestowed upon a member of the Academy who the Board of Directors considered to have made significant contributions to the advancement of this special area of practice. The first recipient of the award was Dr. Ackerman himself, given posthumously to his wife at the Academy’s Ninth Annual Meeting which was held in Philadelphia in October of 1961. The Ackerman Award is not given annually, but only when the Awards Committee determines that an individual has distinguished oneself at a level that merits special recognition. Other recipients of the Ackerman Award are listed in this book.

Grants- In 1967, the Social and Rehabilitation Services of the U.S. Public Health Service created the “Regional Centers for Maxillofacial Prosthetics” and awarded a grant for prosthetic rehabilitation of maxillofacial patients. In 1974, the National Cancer Institute of the National Institutes of Health Established a grant entitled “Training Program for Maxillofacial Prosthodontists and Maxillofacial Dental Technicians”. This grant was repeated in 1976 and in 1978. Many universities and hospitals which has a reputation in training fellows in maxillofacial prosthetics were recipients of these grants. In the same year, the National Institute of Dental Research gave grants for the “Development of Improved Materials for External Prostheses”. Again, a few renowned dental materials departments and medical centers were recipients of the grants.

The American Cancer Society and state sections of this organization offer support for maxillofacial prosthetic rehabilitation with smaller grants and/or fellowship stipends for training doctors. The federal government supports prosthetic rehabilitation of maxillofacial patients in the military & Veterans Administration hospitals.
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Ectodermal Dysplasia Committee
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Members: Betsy Davis, Paul Sheridan, Jeffery Markt, Larry Brecht

Student Membership Committee
Chair: Joe Toljanic
Members: Lori Ranshoff, Denise Vey Voda, Nelson Lowe, Thomas Schneid
Consultant: Glenn Turner

Luau

The ISMR and AAMP encourages everyone to join us at our private Hawaiian Luau Saturday 6:00pm Molokini Garden Sunset Time: 6:09
This will be a wonderful venue on the Grand Wailea grounds overlooking the Pacific Menu includes: Hawaiian Appetizers, Variety of Salads, Seared Chicken, Baked Mahi-Mahi, Kalua Pig, Steamed Rice, Molokai Sweet Potatoes, Stir Fried Vegetables, Banana Cream Pie, Coconut Cream Cake & Guava Chiffon... Complimentary Mai Tai

Bring the family
On Site Cost: Adults: $90 Children: $45 Dress: Hawaiian Casual

If you have not already done so.... Please register prior to end of day Friday

Acknowledgment of Openings

Recipients: Ackerman Award

Andrew J. Ackerman, D.D.S. 1961
Mervin C. Cleaver, D.D.S. 1962
Arthur H. Bulbulian, D.D.S. 1964
Joe B. Drane, D.D.S. 1966
Totten S. Malson, D.D.S. 1969
William R. Laney, D.M.D. 1971
I. Kenneth Adisman, D.D.S. 1972
Joseph B. Barron, D.M.D. 1974
Herbert Metz, D.D.S. 1976
Varoujan A. Chalian, D.D.S. 1978
Thomas A. Curtis, D.D.S. 1980
Arthur O. Rahn, D.D.S. 1982
Sebastian A. Bruno, D.D.S. 1984
Mohammad Mazaheri, D.D.S. 1989
Ronald P. Desjardins, D.M.D. 1991
Norman G. Schaf, D.D.S. 1994
Richard J. Grisius, D.D.S. 1995
Luis R. Guerra, D.D.S. 1997
Dorsey J. Moore, D.D.S. 1999
Stephen M. Parel, D.D.S. 2000
James P. Lepley, D.D.S. 2001
Cliff W. Van Blarcom, D.D.S 2002
John Beumer III, D.D.S., M.S. 2005
Conference Overview

Thursday, Oct 12th
6pm-7:30pm Welcome Reception Haleakala Ballroom

Friday, Oct 13th Session I- Implants in Max/Face Prosthetics-Craniofacial & Oral Reconstruction
7:00am Continental Breakfasts Exhibits- Haleakala Ballroom
Haleakala 2&3
7:30am-9:30am Spouse/Guest Hospitality Lagoon Overlook
8:00am Opening Addresses Haleakala 2&3
8:15am Keynote Presentations Joseph Toljanic & Tom Salinas Haleakala 2&3
9:00am AM Break Exhibits- Haleakala Ballroom
9:45am Abstract Papers
10:30am Iao Valley and Maui Ocean Center Tour (Elective activity for spouses) Meet in Hotel Lobby
11:00am Abstract Papers
11:45am Conference Luncheon Haleakala Gardens

Session II- Chemoradiation: Treatment and Sequelae
1:30pm Keynote Presentations Mark Chambers & Amy Hessel Haleakala 2&3
2:45pm Abstract Papers
3:45pm PM Break Exhibits- Haleakala Ballroom
4:00pm Keynote Presentation Joseph Huryn Haleakala 2&3
4:30pm Abstract Papers
5:30pm Session Adjourns
6:00pm Poster Set-up Exhibit Ballroom
6:30pm Poster Session and Exhibit Reception Exhibit Ballroom

Saturday, Oct 14th Session III- Clinical Outcomes-Quality of Life
7:00am Continental Breakfasts Exhibits- Haleakala Ballroom
7:30am-9:30am Spouse/Guest Hospitality Lagoon Overlook
8:00am Keynote Presentations Eleni Roumanas & Neal Garrett Haleakala 2&3
9:15am AM Break Exhibits- Haleakala Ballroom
9:30am Abstract Papers
11:00am AM Break Exhibits- Haleakala Ballroom
11:45am Abstract Papers
12:30pm Session Adjourns
12:30pm AAMP Business Luncheon (members only) Humuhumunukunukuapua

2:00-5:00pm CE Workshops (Elective) Two concurrent workshops- select one
#1. Nasoalveolar Molding Lawrence Brecht Pikake Rm.
#2. Restoration of Tongue/Mandible Defects Mark Marunick Ilima Rm.
5:30pm AAMP Installation of Officers Haleakala 2&3
6:00pm ISMR/AAMP Luau Banquet (Elective) Molokini Garden

Sunday, Oct 15th Session IV- Rapid Prototyping / Bone Implant Interfaces Haleakala 2&3
7:00am Continental Breakfasts Haleakala Gardens
7:30am-9:30am Spouse/Guest Hospitality Lagoon Overlook
8:00am Keynote Presentation Ichiro Nishimura Haleakala 2&3
8:30am Abstract Papers
9:45am AM Break Haleakala Gardens
10:00am Keynote Presentation Henk Verdonck Haleakala 2&3
10:30am Historical Lahaina Excursion & Shopping (Elective for spouses) Meet in Hotel Lobby
10:30am Abstract Papers
12:45pm Conference Adjourns
12:45pm ISMR Business Luncheon (members only) Humuhumunukunukuapua

2:00pm-5:00pm CE Workshops (Elective) Two concurrent workshops- select one
#4. Restoration of Maxillary Defects Joseph Huryn Ilima Rm.

Monday, Oct 16th Post Conference Cruise
7:00am Morning Molokini Snorkel (Elective activity for spouses) Individual Transfer Required

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Resort & Meeting Room Map

Grand Wailea Resort Map

Indoor Function Spaces
1. Haleakala Ballroom
2. Hibiscus
3. Plumeria
4. Maile
5. Pikake
6. Ilima
7. Silversword
8. Protea

Outdoor Function Spaces
9. Molokini Garden
10. Chapel Lawn
11. Beach Courtyard
12. Chapel or Lagoon Overlook
13. Chapel Garden
14. Tropical Fruit Garden

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Thursday, Oct 12th
9:00am-5:00pm ISMR & AAMP Board Meetings
6:00pm-7:30pm Welcome Reception

Friday, Oct 13th Session I
Implants in Maxillofacial Prosthetics - Craniofacial & Oral Reconstruction
8:00am Opening Addresses
Abstract # Moderators: Terry Kelly & John Beumer
8:15am 1 Keynote Presentation Joseph Toljanic
8:45am 2 Keynote Presentation Tom Salinas
9:15am Discussion
9:30am 3 AM Break
9:45am 3 Zwetchkenbaum, S. Experience with Rehabilitation of Maxillectomy Defects using Zygomatic Implants
10:00am 4 Reisberg, D. BAHA®-Integrated Auricular Prosthesis Feedback Trial
10:15am 5 Swain, R. Development and Modeling of an Impact Test to Determine the Bone-Implant Interface Stiffness of Percutaneous Implants
10:30am 6 Gehl, G. Immediate Rehabilitation in Craniofacial Implant Prosthetics
10:45am Discussion
11:00am 7 El Fattah, H. Restoration of Mandibular Defects as A Part of Rehabilitation of Oral Cancer Patients
11:15am 8 Srithavaj, T. Rehabilitation of Craniofacial Deformity: Mahidol University Experience
11:30am Discussion
11:45am Conference Luncheon

Session II
Chemoradiation: Treatment and Sequelae
Moderators: Craig Von Dongen & Hisashi Taniguichi
1:30pm 9 Keynote Presentation Mark Chambers
2:00pm 10 Keynote Presentation Amy Hessel
2:30pm Discussion
2:45pm 11 Ackerstaff, A. RADPLAT IA Versus IV Trial: First Year Quality of Life
3:00pm 12 Kerkdijk, D.D. Retrospective Evaluation of Radiationcaries After Chemoradiation
3:15pm 13 Suzuki, M. IMRT for Oropharyngeal Tumors: Dose to Maxilla & Mandible
3:30pm Discussion
3:45pm PM Break
4:00pm 14 Keynote Presentation Joseph Huryn
4:30pm 15 Bertschinger, M. Conservative Treatment in Bisphosphonate Induced Osteonecrosis: An Interdisciplinary Approach
4:45pm 16 Sung, E. Management of Osteonecrosis of the Jaw Secondary to Bisphosphonates
5:00pm 17 Chung, E. Clinical Presentation and Dental Management of Alendronate-Induced Osteonecrosis of the Maxilla
5:15pm Discussion
5:30pm Session Adjourns
6:00pm Poster Set-up
6:30pm Poster Session and Exhibit Reception

Saturday, Oct 14th Session III
Clinical Outcomes-Quality of Life
Moderators: Mo Mazaheri & Ian Zlotolow
8:00am 18 Keynote Presentation Eleni Roumanas
8:30am 19 Keynote Presentation Neal Garrett
9:00am Discussion
9:15am AM Break
9:30am 20 Rieger, J. Quality of Life Associated with Two Randomized Treatments for Prevention of Xerostomia
9:45am 21 Reintsema, H. Rehabilitation of Oral Function in Head-Neck Cancer Patients after Radiotherapy with Implant-retained Dentures: Effects of Hyperbaric Oxygen Therapy
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<td>Hodgetts, W.</td>
<td>Acoustical Assessment of Auricular Prostheses: Is There Anything to Gain?</td>
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<td>Teoh, K.H.</td>
<td>Outcomes of Prosthetic Rehabilitation of the Anophthalmic Socket</td>
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<td>Van Oort, R.</td>
<td>Colour &amp; Colour Formulation Regarding Facial Prosthesis</td>
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<td>van der Laan, G.</td>
<td>Microbial Biofilm Formation on Facial Prostheses</td>
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<td>Ihara, K.</td>
<td>Changes in Cases of Orbital Prosthesis with Epitec TM System</td>
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<td>11:15am</td>
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<td>Davis, B.</td>
<td>Functional Outcomes of Prosthetic and Surgical Reconstruction of Maxillary Defects</td>
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<td>Bohle, G.C.</td>
<td>A Proposed Universal Maxillectomy Classification System</td>
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<td>Habakuk, S.</td>
<td>Faces I Have Known: Prosthetic Rehabilitation and Craniofacial Implants</td>
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<td>Discussion</td>
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<td>Brian Hill</td>
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<td>AAMP Business Luncheon (members only)</td>
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2:00-5:00pm CE Workshops (Elective) Two concurrent workshops- select one

1. Nasoalveolar Molding
   - Lawrenrence Brecht
2. Restoration of Tongue/Mandible Defects
   - Mark Marunick

5:30pm AAMP Installation of Officers

6:00pm ISMR/AAMP Luau Banquet (Elective)

**Sunday, Oct 15th Session IV**

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<td><strong>Keynote Presentation</strong></td>
<td>Ichiro Nishimura</td>
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<td>Wu, B.</td>
<td>NELL-1 Promotes for Calvarial Bone Regeneration</td>
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<td>Ozawa, S.</td>
<td>Stimulation of Mineralization in Osteoblastic Culture by Various Magnetic Fields</td>
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<td>9:00am</td>
<td>33</td>
<td>Ogawa, T.</td>
<td>A Novel Surface Property of Titanium</td>
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<td>Ogawa, T.</td>
<td>A Novel Titanium Surface and Its Impact on Osseointegration</td>
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<td>9:30am</td>
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<td>AM Break</td>
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<td>10:00am</td>
<td>35</td>
<td><strong>Keynote Presentation</strong></td>
<td>Henk Verdonck</td>
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<td>10:30am</td>
<td>36</td>
<td>Poukens, J.</td>
<td>Computer Aided Design and Manufacturing of Cranio-Maxillofacial Implants</td>
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<td>Ciocca, L.</td>
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<td>38</td>
<td>Seelaus, R.</td>
<td>Two and Three Dimensional Digital Technology in Surgical and Prosthetic Planning for Bone-Anchored Auricular Prosthesis: a Comparison of Conventional and Contemporary Treatment Approaches</td>
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<td>Girod, S.C.</td>
<td>Imaging and Intraoperative Guidance in Implant-Based Craniofacial Reconstruction</td>
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<td>Jacob, R.</td>
<td>Implants for Bilateral Maxillectomy Patients: 3-D Modeling of the Reconstructed Fibula</td>
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<td>Skoracki, R.</td>
<td>Incorporating Intraoperative Navigation Technology to Improve Accuracy of Bony Maxillary Reconstructions</td>
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<td>Patel, P.</td>
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<td>Discussion</td>
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<td>Conference Adjourns</td>
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<td>12:45pm</td>
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<td>ISMR Business Luncheon (members only)</td>
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2:00pm-5:00pm CE Workshops (Elective) Two concurrent workshops- select one

3. Rapid Prototyping
   - H. Verdonck / J. Poukens / D. Vandoren
4. Restoration of Maxillary Defects
   - Joseph Huryn

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### Scientific Program Schedule

#### Friday, October 13

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<td>Naitoh, M. Use of Binder Jet Model for Planning of Osseointegrated Implants</td>
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<td>Otomaru, T. Prosthetic Treatment of a Maxillectomy Prepubertal Patient: A Case Report</td>
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<td>Ratner, S. The Biomechanics of Symmetric Surgically Assisted Rapid Maxillary Expansion</td>
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<td>Rea, C. Preprosthetic Conformer to Evaluate Fit and Marginal Extension of a Facial Prosthesis</td>
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<td>Ridwan, A. Sigmund Freud’s Oral Cancer</td>
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<td>Rizzatti, A. Study of QoL and Function in Mandibular Resection Patients: Conventional versus Implantoprosthesis Rehabilitation</td>
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<td>Shigemori, T. A Morphological Evaluation of the Cut Surface of Natural Tooth</td>
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<td>Teruyama, Y. The Comparison of Candida Species in Saliva between Postoperative Malignant Tumor Patients and Benign Tumor Patients</td>
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<td>Thamrongananskul, N. Fabricated Polyurethane for Maxillofacial Prostheses: Properties Evaluation and in Vitro Study</td>
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<td>Ueda, Y. Three-dimensional Database of Ear Shapes for Auricular Prosthesis</td>
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<td>Walton, J. K. Integrating Digital Technologies in the Fabrication of a Nasal Prosthesis</td>
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<td>Williams, B. Load Transfer Characteristics of a Simulated Immediately Loaded Implant</td>
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<td>Wu, H. From a Surgical Stent to an Obturator: a Simplified Way</td>
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<td>Yamaguchi, Y. Fabrication of Facial Implants using Photo-Curable Skull Model and Laser Welding</td>
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*Denotes abstract submitted for Research Poster Competition*
CE Workshops  

Saturday, October 14th

Workshops 1 & 2 are concurrent and require a fee $125 (on site)

If you have not already registered for a workshop, you may do so at the registration desk.
All delegates must register prior to Friday, October 13th - 6:00pm

Workshop 1  

Nasoalveolar Molding  
Instructor:  Lawrence Brecht, DDS, BA

The goal of this workshop will be to provide an in-depth understanding of pre-surgical nasoalveolar molding for infants with cleft lip, alveolus and palate anomalies. The unilateral and bilateral applications currently employed at the Institute of Reconstructive Plastic Surgery at NYU Medical Center will be reviewed. The fabrication of appliances will be discussed as well as the mechanics involved in achieving a non-surgical reduction in the size of the cleft defect and molding of nasal cartilage. Auricular molding will also be presented.

Workshop 2  

Restoration of Tongue/Mandible Defects  
Instructor:  Mark Marunick, DDS, MS

Patients with tongue/mandible defects frequently experience alterations in speech, mastication, swallowing, salivary control and appearance. Advances in surgical reconstruction and prosthodontic techniques have diminished some of these disabilities, but elimination and resolution for full functional rehabilitation has remained elusive for many of these patients.

The principles of oral competency and mastication will be reviewed to elucidate the problems and challenges encountered when restoring patients with these defects with or without reconstruction or failed reconstruction. Knowledge of these principles will guide the development of realistic treatment plans and expectations for functional and cosmetic outcomes.

The application of sound prosthodontic principles in light of these presenting deficits is essential for successful rehabilitation. This course will emphasize these principles for the restoration of the classic edentulous and partially edentulous patients, and for the reconstructed patients.

This workshop will present the latest information:

- Post surgical sequellae
- Surgical considerations
- Functional rehabilitation
- Osseous and soft tissue flaps
- Resection dentures
- Partial dentures
- Implants
Sunday, October 15th

Workshops 3 & 4 are concurrent and require a fee $125 (on site)

If you have not already registered for a workshop, you may do so at the registration desk.
  All delegates must register prior to Friday, October 13th - 6:00pm

Workshop 3

Computer Assisted Maxillofacial Prosthodontics, a Continuing Story
Instructors: Henk Verdonck and Jules Poukens

The goal of the workshop is to inform the delegates about new techniques with regards to data acquisition, computer aided design and computer aided rapid prototyping, manufacturing and their application in head and neck reconstruction. Next to a theoretical introduction it will also be possible for the delegates to work themselves with a frequently used software program.

Laptop Computer advised... But not mandatory

In order to be able to “work with the software” the delegate must bring their own laptop. However, our workshop computer image will be projected on screen for viewing for those who do not bring a laptop. Those bringing laptop computers, please make sure your batteries are fully charged for workshop.

Workshop 4

Restoration of Maxillary Defects
Instructor: Joseph Huryn, DDS, FAAMP

The attendee will learn the indications and methods of prosthetic rehabilitation of the resected maxilla, including surgical, interim and definitive maxillary obturator prostheses. The rational and objectives of surgical obturation, as well as required pre-operative, intra-operative and post-operative steps will be discussed. Planning and execution of subsequent interim and definitive obturator prostheses will be presented.
**Social Electives**

**Friday, October 13th**

**‘Iao Valley and Maui Ocean Center Tour** (10:30AM- 2:30PM)

The lovely, deep valley of ‘Iao Needle, a natural rock pinnacle presiding over the ‘Iao stream and surrounded by the walls of the Pu’u Kukui Crater. ‘Iao Valley is a peaceful lush area with easy hikes, exotic tropical plants and clear natural pools. The ridge-top lookout offers a fantastic view of the valley and Kahului Harbor. Next we visit Kepaniwai Park and Heritage Gardens that pays tribute to the many ethnic groups that immigrated to Maui. Then it’s on to the Maui Ocean Center Aquarium for lunch and a tour of Hawaii’s ocean wonders that include a giant 750,000 gallon aquarium with thousands of awe-inspiring fishes, sharks and corals.

**Cost:** Adults: $99  Child: $80  Includes lunch  
**Dress:** Casual  
**Meet:** Hotel Lobby (10:30am)

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**Saturday, October 14th**

All luau guest must make reservations prior to end of day **Friday, Oct. 13th**

**Hawaiian Luau (6:00PM)**

No trip to the Islands is complete without attending a Hawaiian Luau. Our meeting provides an opportunity for you to join your colleagues at our **private Luau** on the beautiful grounds of the Grand Wailea. Outdoor staging grounds will be decorated with bamboo archways, floral entry, Tiki statues, Giant Ipu and Pahu, Grass huts (providing no-host bars) and evening lighting enhancements.

**Menu includes:** Hawaiian Appetizers, Variety of Salads, Seared Chicken, Baked Mahi-Mahi, Kalua Pig, Steamed Rice, Molokai Sweet Potatoes, Stir Fried Vegetables, Banana Cream Pie, Coconut Cream Cake & Guava Chiffon and complimentary Mai Tai.

**Cost:** Adults: $90     Children: $45  
**Dress:** Hawaiian Casual  
**Location:** Molokini Garden  
**Sunset** is 6:09pm... So make plans to arrive on time to view the sunset.

**Poster Awards** will be presented at banquet luau.

**Cash Bar** will be available for your enjoyment.
Sunday, October 15th

Historical Lahaina Excursion & Shopping (10:30AM-3:00PM)
A self-guided walking tour of Lahaina's past. Discover Maui's historical sites. Your walk includes the historical arrival of the first Polynesians, the unifying of the Hawaiian Kingdom, arrival of the whalers and missionaries. Learn about the history, myths, and cultural significance of the archaeological remains scattered in the island's isolated valleys, mountains and sand dunes. Walk through Maui's rich history with a short tour through modern Lahaina town and the ancient royal capital, Moku'ula, (currently under restoration).

Cost: Person: $65  
Dress: Casual  
Meet: Hotel Lobby (10:30am)

Monday, October 16th

Morning Molokini Snorkel (7:00AM-12:30PM)  

Boat Departs at 7:30am from Maalaea Harbor, Slip #80  
The Four Winds II (photo at right) is a 55 foot glassbottom catamaran. This trip is a family favorite with something for all ages. Molokini is considered one of the best snorkel/dive sites in the world because of the water clarity. Visibility can be up to 150 feet on any given day!

What's Included: Continental Breakfast, BBQ Lunch, plus an open bar of beer, wine and soda. All Snorkel Gear & Instruction, Sport Fishing, Waterslide, Glassbottom Viewing, Two Spacious Decks, Boarding Ladders, Optional SNUBA, Underwater Photo & Video and Free Optical Masks.

Cost: Adults: $90 Children: $53  
Dress: Casual  
Transportation: Transfers to Maalaea Harbor (cruise departure) are not included. Make arrangements for transfer to Maalaea Harbor... 25 minute drive from hotel

Helicopter Tours

Maui, the Valley Isle ... there is no place like it on Earth, and most of the island is remote and completely inaccessible. The only way to really see the island is from a helicopter. The 45 minute Hana / Haleakala tour covers the lunar-like surface of Haleakala Crater, the "7 pools" of Oheo, Hana Town, and the rugged waterfall coastline of the north shore rain forest. The 60 minute Complete Island tour offers Maui's incredible diversity. Exact routes and sights may vary from flight to flight, we recommend morning flight times ... morning is typically the clearest time of the day and clouds are less of a factor. Passenger weight information is required. Passengers weighing 240lbs or more are required to purchase another full price vacant seat for aircraft safety and comfort.

Flights: AM (8-11AM) PM (2-6PM)  

45 minute Hana / Haleakala Adults: $190  
60 minute Complete Island Adults: $243  

Terms & Conditions: Transportation to/from airport not included. No refunds within 48 hours of flight. Flight routes subject to change due to weather. Half hour check-in prior to all flights is required. Comfort Seat charge for passengers weighing 240lbs or more.

LIABILITY CLAUSE: Elective Activities are provided as a courtesy for participants. Any complaint or claim should be made directly to the tour operator. Participants understand that all Elective Activities are subject to change and based on availability. All tour participants by signing the request for Elective Activities thereby releases all employees, officers and directors of RES Seminars, ISMR and AAMP from all liability, demands, or claims for damages to persons or property, or any other losses, including reasonable attorney's fees (collective, "Claims") arising out of or caused by tour operator's actions or negligence in connection with any of the Elective Activities.
Keynote Speakers
CE Instructors
Keynote Speakers

Mark S. Chambers, DMD, MS

Dr. Chambers received his D.M.D. and M.S. degrees in Biological Sciences from the University of Louisville, in Louisville, Kentucky. He completed his training in combined Prosthodontics at the University of Louisville and a fellowship in Maxillofacial Prosthetics and Dental Oncology at The University of Texas M. D. Anderson Cancer Center (MDACC) where he also received an American Cancer Society Clinical Fellowship in Oncology.

Dr. Chambers is currently the Deputy Chief and Fellowship Coordinator in the Section of Oncologic Dentistry and the Director of Clinical Research and an Associate Professor in the Department of Head and Neck Surgery at MDACC. He is a member of numerous local, national, and international organizations, and serves on the AAMP Board of Directors. His current federal- and corporate-sponsored research activities include efficacy trials of pharmacological agents in managing and preventing radiation-induced mucositis, xerostomia, and osteoradionecrosis; drug delivery systems; alternative oral medicine; and maxillofacial biomaterials.

Neal Garrett, PhD

Dr. Garrett received his MA and PhD in Psychology from the University of Southern California. He has been involved in prosthodontic research for over 20 years and is currently Director of the Weintraub Center for Reconstructive Biotechnology and Professor of Advanced Prosthodontics at the UCLA School of Dentistry. He is also Director of the Dental Research laboratory at the Department of Veterans Affairs Greater Los Angeles Area Healthcare System, West Los Angeles. Dr. Garrett is a past president of the Prosthodontic Group of both the American and International Associations for Dental Research. His research interests focus on functional and perceptual outcomes of tooth loss and prosthodontic treatment, which he has published and lectured on both nationally and internationally.
Dr. Hessel is an Assistant Professor in the Department of Head and Neck Surgery at the University of Texas M.D. Anderson Cancer Center. Her training began at the University of Florida Medical School, where she obtained her medical degree. She did her otolaryngology residency at the University of Texas – Houston, and her fellowship training in Head and Neck Surgical Oncology at the UT M.D. Anderson Cancer Center. At the completion of her fellowship, she returned to the University of Texas – Houston where she was an Assistant Professor for the Department of Otolaryngology – Head and Neck Surgery. While her main practice interest was head and neck cancer; at the University of Texas, she had a varied practice of general ENT patients, facial trauma patients, and cancer patients. In the UT Department of Otolaryngology, she was the director of medical student education as well as active participant in resident education.

In 2002, she became a part-time consultant to the Department of Head and Neck Surgery at the UT M.D. Anderson Cancer Center. And, eventually, her practice interests narrowed to the full-time care of HNS cancer patients and she joined the MDACC faculty full-time in 2005. Continuing on with her desire for trainee education, she has become the director of the head and neck surgery fellowship. In addition to her clinical practice and resident / fellow education, her research interests have included the study of long-term outcomes after the treatment of head and neck cancer. She has been focusing on the effect of chemoradiation on the speech and swallowing function.

Dr. Joseph Huryn received his D.D.S. from New York University College of Dentistry in 1976 whereupon he entered the Veterans Administration as a Resident, Staff Dentist and eventually Chief of Dental Service at the Brooklyn, New York, VA Outpatient Clinic. Dr. Huryn left the VA for training in general prosthodontics and maxillofacial prosthetics at Memorial Sloan-Kettering Cancer Center, receiving his certificate in 1986. Upon completion of his training he continued on staff full-time at Memorial Sloan-Kettering Cancer Center, and became Chief of the Dental Service in 2003. Dr. Huryn is an Attending in the Department of Surgery at MSKCC, and Professor of Clinical Surgery in the Department of Surgery at the Weill Medical College of Cornell University. He has published articles and contributed chapters in textbooks in the field of maxillofacial prosthetics. Dr. Huryn is a Fellow of the American Academy of Maxillofacial Prosthetics, Fellow of the Greater New York Academy of Prosthodontics, as well as a member of the New York Head and Neck Society, the International Academy of Oral Oncology, and the International Society for Maxillofacial Rehabilitation.
Keynote Speakers

Ichiro Nishimura, DDS, DMSc, DMD

Dr. Nishimura received his dental training at the Tokyo Dental College (DDS, 1981) and the Harvard School of Dental Medicine (DMD, 1993). His advanced research training at Harvard resulted in the Doctor of Medical Sciences (DMSc) degree in 1986. After a postdoctoral fellowship in cellular and molecular biology under Professor Bjorn Olsen at the Harvard Medical School, Nishimura started tissue regeneration and biotechnology research at Harvard in 1989. He has served as Director of the Harvard-MIT Biomaterials Research Training Program (1993-95) and Director of Predoctoral Research Program at the Harvard School of Dental Medicine (1995-97). He joined UCLA in 1997 and established the Jane and Jerry Weintraub Center for Reconstructive Biotechnology. He is a Professor in the Division of Advanced Prosthodontics, Biomaterials & Hospital Dentistry and the Section of Oral Biology of the UCLA School of Dentistry, and a member of the Advisory Board of the Biomedical Engineering Program, UCLA School of Engineering & Applied Science.

Nishimura served as a reviewing consultant to National Institutes of Health (USA), National Science Foundation (US), Biotechnology & Biological Sciences Research Council (UK) and Christian Doppler Forschungsgesellschaft (Austria). He received scientific/academic awards including Distinguished Faculty Award (Harvard, 93), Turner-Newell Fellowship Award (University of Manchester, UK, 95), Distinguished Service Award (American Association for Dental Research, 99), Appreciation of Services (US Depart. of Health & Human Services, 2000) and Distinguished Scientist Award (International Association for Dental Research, 04). His industry consulting activity covers from biotechnology to applied mathematics. His current research focuses on the biotechnology of tissue engineering and wound healing. He has published in scientific journals such as Journal of Biological Chemistry, Proceeding of National Academy of Science USA, and Journal of Clinical Investigation.

Eleni Roumanas, DDS


Dr. Roumanas joined the faculty at the UCLA School of Dentistry in 1992 as Adjunct Assistant Professor and Director of Maxillofacial Prosthetics at the City of Hope National Medical Center. She is currently Professor in the Division of Advanced Prosthodontics, Biomaterials and Hospital Dentistry, Director of Advanced Prosthodontics and Co-Director of the Maxillofacial Prosthetics Residency Programs. Dr. Roumanas' research focuses primarily on clinical outcomes, determining the efficacy of implant prosthodontics and maxillofacial prosthetics.
Tom Salinas, DDS

Tom Salinas completed dental school at LSU Health Science Center in New Orleans, LA and received advanced training in prosthodontics at LSU as well. He additionally received fellowship training in maxillofacial prosthetics at UT MD Anderson Cancer Center in Houston, TX. He is currently Assistant Professor, Department of Otolaryngology, Section of Maxillofacial Prosthetics and Dental Oncology, The University of Nebraska Medical Center in Omaha, NE.

Tom’s interests are the restoration of dental implants, fixed and removable prosthetic dentistry, and general restorative care. He is well known for his expertise in these areas as he lectures on these topics and maintains editorial review positions in the Journal of Prosthetic Dentistry, Practical Procedures and Aesthetic Dentistry, International Journal of Oral and Maxillofacial Implants and several other dental publications.

Tom is an active member of the American Dental Association, American College of Prosthodontists, and The Academy of Osseointegration.

Joseph Toljanic, DDS

Joseph Toljanic is a board certified prosthodontist. He has been a full-time member of the faculty of the University of Chicago for 18 years and is currently a Professor and the co-Chief of the Section of Dentistry. He maintains a private practice with a focus on Maxillofacial Prosthetics and implant rehabilitation dentistry.

Dr. Toljanic has conducted numerous clinical trials and has published a number of articles in the area of Maxillofacial Prosthetics and implant rehabilitation. He regularly lectures on these topic both nationally and internationally.
Keynote Speakers

Henk Verdonk DDS-MFP

Henk Verdonck is a staff member of the department of Maxillofacial Surgery and Prosthodontics at the University Hospital of Maastricht. He received his training as a maxillofacial prosthodontist at the Daniel de Hoed Cancer Center of the University Hospital Rotterdam.

Besides cleft lip- and trauma - the majority of his patients are head and neck oncology patients. His main interest is the implication of modern technology into the field of maxillofacial prosthodontics.

C.E. Instructors

Workshop 1 Nasoalveolar Molding

Lawrence Brecht, DDS, BA

Lawrence E. Brecht, DDS, is currently Clinical Associate Professor of Prosthodontics and Occlusion in the Division of Prosthodontics and Restorative Dentistry at New York University College of Dentistry. He also serves as the Director of Maxillofacial Prosthetics in the Advanced Education Program in Prosthodontics at NYU where he has taught since 1987. He has a joint appointment as an Assistant Professor of Clinical Surgery (Plastic Surgery) at the Institute of Reconstructive Plastic Surgery of New York University School of Medicine where he is Director of the Center for Craniofacial Prosthetics and serves on the Institute’s Cleft Palate, Craniofacial and Ear Anomalies teams.

Dr. Brecht received his DDS from New York University and his Certificates in both Prosthodontics, as well as Maxillofacial Prosthetics from the New York Veterans Administration Hospital after completing a Fellowship at Brigham and Women’s Hospital and the Harvard School of Dental Medicine. He is a member of the American College of Prosthodontists, The Greater New York Academy of Prosthodontics, American Academy of Maxillofacial Prosthetics, The Academy of Prosthodontics, and the American Cleft Palate/Craniofacial Association. His major research interests include nasoalveolar molding and the extraoral application of osseointegration in both pediatric and adult patients. He has authored numerous book chapters and original articles.

He is the recipient of several funded research grants. He maintains a practice limited to Prosthodontics and Maxillofacial Prosthetics in New York City.
Workshop 2 Restoration of Tongue/ Mandible Defects

Mark Marunick, DDS, MS

Dr. Marunick received his DDS from the University of Michigan in 1975. He then entered the US Public Health Service, completed a General Practice Residency at Staten Island, NY, and served as Chief Dental Officer of a USPHS Dental Clinic on Eglin AFB in Florida for two years. He received his MS in Prosthodontics from the University of Michigan in 1980 and completed a Residency in Maxillofacial Prosthetics at UCLA in 1981 before going into private practice in Toledo, OH. In 1986, he accepted a full-time position in the Department of Otolaryngology, Head and Neck Surgery at Wayne State University School of Medicine where he is an Associate Professor. He is Chief of Dentistry at the Detroit Medical Center and is Director of Maxillofacial Prosthetics at the Barbara Ann Karmanos Comprehensive Cancer Center. He is a Consultant to the John Dingell VA Medical Center in Detroit and to the Henry Ford Health System. He is an Adjunct Clinical Professor in the Department of Biologic and Material Science, Division of Prosthodontics at the University of Michigan where he teaches Maxillofacial Prosthetics to the Prosthodontic Graduate Residents.

Dr. Marunick has been involved in NIH funded research studying rehabilitation of Head and Neck Cancer patients and is a past recipient of the American Cancer Society Clinical Oncology Career Development Award. He is a Fellow of the American Academy of Maxillofacial Prosthetics and of the American College of Prosthodontists, a member of the International Society for Maxillofacial Rehabilitation, Academy of Osseointegration, Michigan Section of the American College of Prosthodontists, and an Associate member of the American Academy of Otolaryngology, Head and Neck Surgery. He is a Diplomate of the American Board of Prosthodontics. He is an Ad hoc reviewer for the Journal of Prosthetic Dentistry.

Dr. Marunick has written numerous articles, book chapters, and has co-authored a textbook on Maxillofacial Prosthetics.
C.E. Instructors

Workshop 3 Rapid Prototyping

Henk Verdonck, DDS-MFP

Henk Verdonck is a staff member of the department of Maxillofacial Surgery and Prosthodontics at the University Hospital of Maastricht. He received his training as a maxillofacial prosthodontist at the Daniel de Hoed Cancer Center of the University Hospital Rotterdam.

Besides cleft lip- and trauma - the majority of his patients are head and neck oncology patients. His main interest is the implication of modern technology into the field of maxillofacial prosthodontics.

Jules Poukens, DMD, MD

Jules Poukens is currently vice-chairman at the department of Cranio-maxillofacial Surgery at the University Hospital Maastricht. He was trained as Cranio-Maxillofacial Surgeon in Belgium (Leuven) and Germany (Freiburg, Black Forrest). After his training, he joined the staff at the University Hospital Maastricht. He was appointed as vice-chairman in 1998.

Dr. Poukens main research interest is on 3D visualization and virtual surgery of the cranio-maxillofacial skeleton, distraction osteogenesis and computer aided planning of implants. His department participates in European Community funded projects on medical rapid prototyping and manufacturing.

Born and raised in Belgium, Jules searched for his roots and now lives with his wife and two daughters in Dilsen, Belgium near the Dutch and German border. Not only professional but also private, he is regarded as a computer addict.

Dieter Vandoren, MSc

Dieter Vandoren holds a position of CMF Software Engineer, MSc in Computer Science and Engineering. Since 2003 he has been leading the software development for Materialise’s state-of-the-art SimPlant CMF software for virtual surgery simulation.
C.E. Instructors

Workshop 4 Restoration of Maxillary Defects
Joseph Huryn, DDS, FAAMP

Dr. Joseph Huryn received his D.D.S. from New York University College of Dentistry in 1976 whereupon he entered the Veterans Administration as a Resident, Staff Dentist and eventually Chief of Dental Service at the Brooklyn, New York, VA Outpatient Clinic. Dr. Huryn left the VA for training in general prosthodontics and maxillofacial prosthetics at Memorial Sloan-Kettering Cancer Center, receiving his certificate in 1986. Upon completion of his training he continued on staff full-time at Memorial Sloan-Kettering Cancer Center, and became Chief of the Dental Service in 2003.

Dr. Huryn is an Attending in the Department of Surgery at MSKCC, and Professor of Clinical Surgery in the Department of Surgery at the Weill Medical College of Cornell University. He has published articles and contributed chapters in textbooks in the field of maxillofacial prosthetics. Dr. Huryn is a Fellow of the American Academy of Maxillofacial Prosthetics, Fellow of the Greater New York Academy of Prosthodontics, as well as a member of the New York Head and Neck Society, the International Academy of Oral Oncology, and the International Society for Maxillofacial Rehabilitation.
Session I
Implants in Maxillofacial Prosthetics
Craniofacial and Oral Reconstruction
Friday, October 13, 2006
Craniofacial Implants in Facial Prosthetic Rehabilitation

Toljanic, J. A.
University of Chicago
Department of Surgery/Section of Dentistry
Chicago, Illinois USA

Since their introduction, percutaneous craniofacial implants have held out the promise of representing the next significant advance in the prosthetic rehabilitation of facial defects. They can provide substantial improvements in retention for a variety of facial prostheses. They can further improve the ease of accurate prosthesis placement while extending the serviceable lifespan of the prostheses. These benefits can enhance patient comfort and confidence in wearing a facial prosthesis resulting in an overall increase in treatment satisfaction. But what is the current body of evidence in regards to the use of craniofacial implants to retain facial prostheses? What do we truly know about treatment outcomes over time versus what represents speculation and inference based on anecdotal experience. What integration survival rates can be reasonably expected over time? Are outcomes site specific? And what impact does irradiation of the bone have on long-term survival.

In this presentation, the currently available body of information regarding craniofacial implants and their use in facial prosthetic rehabilitation will be highlighted. Data obtained from the current literature on craniofacial implants will be assessed and compared to the existing knowledge base of osseointegration outcomes obtained from the use of endosseous dental implants. Finally, this material will be summarized in order to assess our ability to adequately guide our patients in making informed treatment decisions regarding craniofacial implants.

Implant Restoration of Irradiated and Non-Irradiated Osseocutaneous Fibula Grafts of the Mandible

Salinas, T.J.
Mayo Clinic
Rochester, Minnesota USA

This presentation reflects on the UNMC experience in treating patients afflicted with head and neck cancer by using osteomyocutaneous fibula flaps to the mandible and osseointegrated implants since 1994. Over one hundred implants inserted into vascularized fibula and a cohort of one hundred implants inserted into native mandible of the same population is analyzed for their success from 12 to 130 months by life table analysis. Annualized data will give reference to what has been classically published on this subject. Further elaboration on complications will be discussed with special reference to head and neck cancer patients.
Experience with Rehabilitation of Maxillectomy Defects using Zygomatic Implants

Zwetchkenbaum, S.*, Edwards, S., Helman, J.
University of Michigan Medical Center and School of Dentistry
Department of Oral and Maxillofacial Surgery/Hospital Dentistry
Ann Arbor, Michigan USA

The zygomatic implants have been used as an alternative form of implant reconstruction for the severely resorbed maxilla. The zygoma is, in general, relatively spared in most maxillary resections providing good bone stock for implant placement. In hopes of improving our results with prosthetic obturation, especially in terms of a patient’s quality of life, we have begun placing zygomatic implants in our patients’ postmaxillectomy. We have found these to be especially valuable in patients with large palatal defects that extend beyond the midline.

As a further refinement of our technique, we have begun placing the implants at the time of tumor extirpation, regardless of the need for postoperative radiation therapy. We have found this to be beneficial for a variety of reasons. These include faster time to rehabilitation, less difficulty with the unwieldy instrumentation since most patients develop some degree of trismus postoperatively and overall fewer procedures and recovery time. The indications, surgical technique, problems encountered and lessons learned to date will be discussed. Prosthodontic rehabilitation in these and other maxillofacial patients will be reviewed.

Furthermore, a comparison of patients restored with the implant at the time of their resection to those having it placed at some time remote from their primary surgery will be presented.
BAHA®-Integrated Auricular Prosthesis Feedback Trial

Reisberg, D*, Walsh, W., Doler, C., Applebaum, E.
The Craniofacial Center
The University of Illinois Medical Center at Chicago
Department of Otolaryngology-Head and Neck Surgery
Northwestern University
Chicago, Illinois USA

Purpose: To conceal a bone-anchored hearing processor (BAHA®) within an auricular prosthesis to provide a more aesthetic result for patients who use both devices. Fabrication of the BAHA -Integrated Auricular Prosthesis (BAHA-IAP) requires surrounding the BAHA in silicone rubber. However, BAHA users report uncomfortable acoustic feedback when another object contacts their BAHA. This study examines whether a BAHA encased in silicone can function without feedback.

Method and Materials: Three silicone casings were custom fabricated to fit around the BAHA of a patient who wore both an auricular prosthesis and a BAHA. Each casing varied by the amount of contact it had with the BAHA; one silicone casing made full contact, another only partial contact, and the third made no contact. Feedback testing was conducted in an audiometer where each casing was attached over the BAHA and the BAHA’s volume control was adjusted to minimize feedback. The patient and two observers listened for feedback.

Results: With nothing covering the BAHA, the volume control was set at 1.5 to obtain optimal thresholds (less than 15 dB HL). The full-contact casing produced acoustic feedback noted by the patient and 2 observers at all volume control settings. The partial-contact casing produced feedback with any volume control setting greater than 0. The no-contact casing produced feedback with a volume control setting of 1 or greater.

Conclusion: Covering a BAHA with silicone rubber results in significant feedback independent of the amount of contact between the silicone and the BAHA. Decreasing the BAHA’s volume eliminates the feedback in some cases but also results in inadequate amplification by the hearing aid. Acoustic feedback remains a significant obstacle to development of the BAHA-IAP.
Development and Modeling of an Impact Test to Determine the Bone-Implant Interface Stiffness of Percutaneous Implants

Swain, R.*1,2, Faulkner, G.1,2, Raboud, D.1,2, Wolfaardt, J.F.2,3
Mechanical Engineering Department, University of Alberta1/ COMPRU, Caritas Health Group2/Faculty of Medicine and Dentistry, University of Alberta3, Edmonton, Alberta Canada

Purpose: The ongoing need for a clinically effective, non-invasive technique for monitoring implant stability has led to a number of mechanical testing methods. These mechanical techniques provide an indirect measure of the integrity of the bone-implant interface. These measurements have been used to provide indirect information of the changes occurring due to modeling/remodeling at the interface. It is felt that previous research does not provide sufficient information to understand the changes at the bone-implant interface. As a result, a mechanical impact test has been developed to provide increased understanding of the bone-implant interface through assessment of stiffness with a system not requiring attachment to the implant or abutment.

Methods and Materials: An improved impact testing method has been developed and used in a patient study evaluating the implant integrity of Bone Anchored Hearing Aid® (BAHA) implants. Measurements were taken on twelve patients starting from surgical installation and continuing through 1, 2, 3, 6 and 12 month patient visits. A dynamic model based on the impact dynamics is used to estimate an interface stiffness value based on the measured resonant frequency.

Results: The average interface stiffness for the patients at implant placement was 5.0 GPa which increased to 7.9 GPa by 12 months after implant installation. Individual implant interface stiffness values showed a great deal of variation within the first month. One patient had a 82% decrease in the stiffness of the interface in the first month (from 9.1 GPa to 1.7 GPa) while another patient saw an increase in stiffness of 85% (from 3.5 GPa to 6.5 GPa). For comparison, in the human skull the reported modulus of bone ranges from 7.7 to 13.4 GPa.

Conclusion: Longitudinal measurements of the resonant frequency of BAHA® implants result in an estimated average increase of 58% in the bone-implant interface stiffness in the first year. By using the dynamic model developed for the impact event, the mechanical test was able to directly estimate the integrity of the bone-implant interface and was shown to be sensitive to changes in the properties of this interface.
Immediate Rehabilitation in Craniofacial Implant Prosthetics

Gehl, G.
University Hospital
Department Craniofacial Rehabilitation
Zürich, Switzerland

Purpose: After the removal of a tumour in the midface, titanium implants are often used as anchors for facial prostheses. The osseointegration phase for single posts is generally three months, for extra-oral prostheses. This method means a long waiting period before the facial contours can be recounted. can this waiting period be shortened?

Methods and Materials: We have developed a method of reducing the waiting period: immediately following the tumour resection, one side of a 3-D carrier plate (Epitec, Leibinger Stryker) is screwed to the bone. The other side of the plate perforates the skin. Mini-magnets (Steco) are screwed in the carrier plate and used as fixing elements. Next a preshaped prosthesis is fitted to the defect as immediate treatment. The prosthesis in the shape of a facial prothesis is made of Mucopren E (Mucopren, Kettenbach Dental) placed directly on counter magnets.

Results: Initially the prosthesis in the shape of a nose or eye prosthesis is used postoperatively as a surgical plate. No bandage is needed to cover the defect. After one to two months it can prove necessary to make final corrections.

Conclusion: After five years of experience with this short-term, there are no problematic inflammations in the area of the implants. Our concept reduces the waiting period for final implant and adaptation of a facial prosthesis from previously three to six months to about two weeks. The reduction of surgery to a single operation is more gentle on the tissue than the two-operations approach, and is less of a strain on the patients. A reduction in the skin-penetration points of the fixing element to approx. 1 mm in diameter has also proved beneficial for the healing of the wound. In the end the immediate reconstruction of the facial contours represent a significant improvement for our patients in terms of quality of life and in some cases the implant retained reconstruction is possible in one step, immediately after the evisceration of the tumor.
Implants in Maxillofacial Prosthetics
Craniofacial and Oral Reconstruction

Restoration of Mandibular Defects as A Part of Rehabilitation of Oral Cancer Patients

El Fattah, H.
Cairo University
Head of Oral and Maxillofacial Department NCI
Cairo, Egypt

The mandible plays a major role in airway protection and support of the tongue, lower dentition, and the muscles of the floor of the mouth permitting mastication, articulation, deglutition, and respiration. It also defines the contour of the lower third of the face. Interruption of mandibular continuity, therefore, produces both a cosmetic and functional deformity. The resulting dysfunction after loss of part of the mandible varies from minimal to major. Mandibular reconstruction has always been one of the most challenging and demanding of operation in all of reconstructive surgery.

It is unrealistic to discuss functional impairment without reference to the physics and social factors affecting patients with mandibular resection. Distortion in self-image, inability to communicate, and altered firmly and vocational role require the reconstruction of physics systems to handle these new demands. So immediate reconstruction is very essential to overcome problem that will arise and decrease the possibility of facial disfigurement and overcome the psychological effect.

This study was carried out at National Cancer Institute between 1997 and 2005 on 132 patients (seeking rehabilitation after tumor surgery )to evaluate the results of rehabilitating irradiated and non irradiated patients using A/O reconstruction plate. The age of the patients was between 26-63 years. Cases were followed for 1 to 6 years and were classified into 4 groups according to location of reconstruction. Group A: Anterior mandible crossing midline (12 cases). Group B: Body segment of the mandible(14 cases). Group C: Body, ramus and condyle(20 cases ). Group D: Whole mandible except both condyle (6 cases).

The incidence of revision or removal of plate because of untoward complications was used as an objective measure of outcome and was calculated .The other measures are : Postoperative infection, Wound dehiscence and plate exposure, Tempromandibular joint pain or limited mouth opening, Unsatisfactory facial contour, Separation between the screw and the plate .

The study concluded that reconstruction plates satisfy essential requirements of bone surgery in terms of functional stability, universal applicability and that reconstruction can provide a significant reduction of morbidity in patients with osseous defects of the mandible.
Craniofacial abnormalities resulted from congenital and acquired defects required multiple treatment modalities to rehabilitate as per clinical condition. Proper managements depend on severity of previous disease presence.

At our service, treatments can be divided into congenital auricular deformity, acquired auricular deformity, acquired orbital deformity, and mid facial deformity. From 2001-2006, there was 41 patients rehabilitated with 106 extraoral implants. Twenty-eight patients with 64 implants were rehabilitated for auricular deformed condition. Thirteen patients with 42 implants were rehabilitated for orbital deformed condition. One patient was rehabilitated with 4 dental implants and three zygomaticus implants to restore facial and intraoral defect.

Congenital deformity usually has greater success rate using extraoral implant to retain prosthesis than acquired one. Failure for deosseointegrated of implant may due to conjunctive radiation therapy and other surgical complication. Even though, success rate in congenital auricular defect group appeared to be greater, it exhibited mucocutaneous problems around abutments surface. Design and hygiene control is also crucial to maintain good skin condition but other factors need to be further investigated.

This presentation will reveal the present problems, solutions and findings in rehabilitation craniofacial deformities both congenital and acquired defects from our service experience.
Session II
Chemoradiation: Treatment and Sequelae
*Friday, October 13, 2006*
The treatment of patients with advanced squamous cell carcinoma of the head and neck depends on the site and stage of the disease and on the patient’s overall health. Treatment of this entity is a complex and multifactorial process. Thirty years ago, conventional treatment of patients with locally advanced stage III or IV disease was surgery with or without radiation therapy depending on the site of the disease, resectability of the cancer, and the performance status of the patient. However, because of the poor results obtained with conventional therapy of advanced resectable tumors of the larynx, hypopharynx, and oropharynx, systemic chemotherapy was introduced in the mid 1970s as part of a combined-modality approach. Today, organ-preserving strategies with chemoradiation therapy to retain function in speech and swallowing is a hallmark.

The results of recent randomized chemoradiation clinical trials for patients with squamous cell carcinoma of the head and neck have demonstrated significant outcomes, including better local-regional control, a lower incidence of systemic recurrences, and improved disease-free survival. The absolute improvement rate in disease control in patients with locally advanced head and neck disease treated with concurrent chemotherapy and radiation therapy is in the range of 5% to 25%. Although outcomes are improved with combined-modality therapy, an increase in toxicity and symptom burden has been challenging to both the patient and healthcare provider. Mucositis, a significant toxicity of current therapies, develops in almost two thirds of patients treated with chemoradiotherapy, and a considerable proportion of these patients will become dependent on gastrostomy tubal feedings.

Newer chemotherapeutic drugs are being investigated that target greater tumor killing with less toxicity. A recent phase 3 study of cetuximab, a monoclonal antibody targeted against the epidermal growth factor receptor, plus radiation therapy for advanced squamous cell carcinoma of the head and neck revealed improvement in local-regional control, progression-free survival, and overall survival as compared with radiotherapy alone. As well, the addition of cetuximab did not increase the incidence of severe mucositis. This presentation focuses on current treatment paradigms using chemoradiation for advanced head and neck cancer at The University of Texas M. D. Anderson Cancer Center.
Chemoradiation: Long-term Effect on Speech and Swallowing Function

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In the past decade, radiation has been increasingly recognized as an effective way to treat oropharyngeal squamous cell carcinomas. The 5-year local control rates have been shown to be equivalent to surgical resection (ranging from 70-100%) and have less morbidity. For small volume primary disease, 5 year control rates of 83-88% have been reported and in those that did recur, local recurrence was the most common site. Regional and distant metastases almost always occurred after local recurrence. In increasingly higher stage disease, the success rate of local and regional control has been historically much less (37-42%). As with early staged oropharynx cancer, local recurrence was the most common site for recurrence. Because of this, there has been an increasing trend to utilize systemic chemotherapy to improve local control, which could potentially improve survival. The goal of adjuvant chemotherapy is provide intensification or sensitization of radiotherapy and may provide protection against distant disease.

The distinction between advanced stage oropharyngeal disease in regards to primary size and nodal status may be important when evaluating the long term functional outcome of speech and swallowing for the various treatment regimens. It is well-known that combined chemoradiation therapy has adverse effects on swallowing function including gradual fibrosis of the pharyngeal muscles and soft tissues, impairment of pharyngeal contraction, impairment of laryngeal elevation, and hypopharyngeal stenosis. These problems lead to poor base of tongue posterior motion, prolonged pharyngeal transit time, lack of coordination along the pharyngeal peristalsis, difficulty with opening of the cricopharyngeus and problems with closure of the larynx. This can ultimately end up as chronic poor swallowing function and aspiration.

As the use of chemoradiation becomes more frequent, it is not only important to understand its effect on survival, but also its long term effect on speech and swallowing function. The most objective manner in which to study swallowing function would be through formal swallowing testing such as Modified Barium Swallow (MBS) and Functional Endoscopic Evaluation of Swallowing (FESS). However, swallowing function can also be implied with the objective measure of feeding tube placement (PFG) and overall diet during and after treatment.

This presentation is designed to discuss the methods for evaluation of speech and swallowing function before, during, and after the treatment of head and neck cancer. In addition, it will discuss some of the long-term functional results of patients treated with chemoradiation.
Chemoradiation: Treatment and Sequelae

RADPLAT IA Versus IV Trial: First Year Quality of Life

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Purpose: Quality of life (QoL) assessment was integrated into a randomized, multi-institutional study in patients with functionally inoperable, stage IV head and neck squamous cancer treated with either targeted supradose cisplatin chemoradiation (IA) or systemic chemoradiation (IV).

Methods and materials: 207 Patients, 152 male and 55 female, mean age 55 years, were randomly assigned to receive 70 Gy/35 fractions/7 weeks combined with either four courses of intra-arterial (IA) cisplatin (150 mg/m2) and intravenous Na-thiosulfate on days 2, 9, 16 and 23 (N=103) or intravenous (IV) cisplatin (100 mg/m2) on days 1, 22 and 43 (N=104). QoL assessment was performed prior to treatment, and 7 weeks, 3 months, 1, 2 and 5 years after its start, using the EORTC QLQ-C30 and H&N-35 questionnaires and a trial-specific questionnaire. This first analysis concerns 12 months follow-up data.

Results: All participating patients showed a clear deterioration in overall QoL at the end of the 7-week treatment period then a gradual improvement up till 12 months. The greatest difference between the two groups was twice as many patients in the IV group complaining of nausea and vomiting at 7 weeks (p<0.001). At 3 months these complaints / differences almost disappeared. At 12 months (126 evaluable patients) 10 of 59 IA patients (17%) still had tube feeding, compared to 16 of 67 (24%) in the IV group (not statistically significant). The remaining patients returned to a more or less normal oral diet. Voice quality deteriorated by the end of treatment, but then improved over time, slightly exceeding baseline values at 12 months. Of the 62 patients employed before treatment, 42 were able to return to their job within 12 months. Xerostomia was reported by 70 patients (56%), with no statistically significant difference between the IA and IV group.

Conclusion: This preliminary analysis reveals significantly more problems with nausea and vomiting at the end of treatment among patients in the IV group than those in the IA group. Problems with voicing and oral intake, clearly present at the second assessment point in both groups, improved during the 12 months follow-up, often exceeding baseline values.
Retrospective Evaluation of Radiationcaries After Chemoradiation

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Purpose: Chemoradiation has become the standard for treatment of locally advanced head and neck cancer. Effects of this intensified regimen on dentition are not well understood. We performed a retrospective analysis of the dental condition of patients treated in a randomized fashion with intra-arterial (IA) versus intravenous (IV) chemoradiation with or without Intensity Modulating RadioTherapy (IMRT).

Methods and materials: Out of a study population of 162 patients undergoing either intra-arterial or intravenous chemoradiation with or without IMRT, 38 patients were selected for dental evaluation. Criteria for inclusion were availability of an X-Ray prior to treatment and ability of patients to come to the hospital. Radiationcaries was diagnosed clinically. Also, the number of decayed, missing or filled teeth (DMF-T) was radiologically scored before and after chemoradiation. Increase of DMF-T was calculated and corrected for age, sex and time of follow-up since completion of anti-tumor therapy, using a linear regression analysis.

Results: 45% of all patients developed radiationcaries. No differences were found between the increase of DMF-T comparing the different treatment modalities i.e. IA chemoradiation versus IV chemoradiation and lateral radiation fields versus IMRT (p=0.18 resp. p=0.7). Of the patients radiated with lateral fields, 61% developed clinical radiationcaries, whereas in the IMRT-group only 26% had radiationcaries. (p=0.05 Fisher's exact) Fluoride-application, sex and dental status before treatment had no significant influence on radiationcaries in this study.

Conclusion: IMRT seems to have less negative effects on dentition compared to conventional radiotherapy. We couldn’t find any significant differences between IA versus IV chemoradiation.
Purpose: Use of computerized algorithms and imaging technology in IMRT allows sparing of vital structures such as brain, optic nerve, and salivary glands, but may be at the expense of the maxilla and mandible. The purpose of this pilot study was to develop a methodology to evaluate the dose of radiotherapy to specific areas of interest of the maxilla and mandible in patients receiving IMRT for oropharyngeal tumors.

Methods and Materials: 28 patients treated with IMRT bilateral irradiation for oropharyngeal tumors during 2004 at MDACC were examined. The tumors were separated based on their location (right tonsil, n=8; left base of tongue, n=9; left tonsil, n=9; right base of tongue, n=2) and 5 regions of interest in the mandible calculated in an average of six horizontal planes from the inferior border to the cervical margin of the teeth. Also 3 regions of interest in the maxilla were reviewed. A commercially available treatment plan software (Pinnacle3, Phillips Medical Systems, Netherlands) was used to determine the mean dose distribution to the areas of interest. There was no consideration for sparing of the jaws in the treatment algorithms.

Results: The average dose in the mandibular molar area was 47Gy (RANGE: ipsalateral = 49 Gy, and contralateral= 39 Gy) and 34 Gy for the maxillary molars and bicusps. The anterior maxilla received an average of 19Gy, while the mandibular canine and bicusps area received 35Gy, and the anterior mandible received 27Gy. The difference between ipsalateral and contralateral dosage to bone was between 10-20 Gy.

Conclusion: While a greater volume of the maxilla and mandible are irradiated, it is possible that the maximum dose may be less in the posterior mandible, compared to conventional radiotherapy. Despite the fact that the entire body of the mandible is irradiated, the doses may possibly lead to decreased incidence of osteoradionecrosis and a better prognosis if postradiotherapy surgical procedures are necessary. Currently, 150 oropharyngeal radiotherapy patients are being reviewed using this protocol.
Purpose: Bisphosphonates (BP) inhibit osteoclast activity, increase bone density and decrease the risk of skeletal complications. Intravenous BPs have been incorporated into the therapy of patients with osseous metastases of various types. Anecdotal reports of osteonecrosis (ON) in the maxilla and mandible have raised concerns regarding BP toxicity. To further explore this potential drug complication, we performed a retrospective chart review of patients with metastatic breast cancer, multiple myeloma and metastatic prostate cancer who were receiving intravenous BP therapy.

Methods: The medical and dental records of all patients with breast cancer, multiple myeloma or prostate cancer who were treated in the Dental Service of Memorial Sloan-Kettering Cancer Center between 1/1/96 and 1/31/06 were reviewed. Patients who presented with exposed bone or ON of the maxilla or mandible and were treated with intravenous BP were further evaluated for various clinical and pathological characteristics.

Results: 391 patients were identified within the time frame and disease type of interest. 37 patients were found to have ON of the maxilla or mandible. Of these 20 patients had a history of breast cancer with bony metastases, 12 had multiple myeloma and 5 had metastatic prostate cancer. There were 13 men and 24 women, with a median age of 62 years. All of the patients received intravenous BP, with a median duration of 23 months. 23 patients (62%) had been treated with corticosteroids. 18 patients (49%) had a history of tobacco smoking. 23 (62%) patients presented with symptoms. ON was noted in the maxilla in 12, in the mandible in 23, and in both maxilla and mandible in 2 patients. 17 patients (46%) had a history of dental extraction in the region of ON. 15 patients (41%) presented with spontaneous ON. Three patients (8%) had spontaneous ON and in areas related to extraction. Two patients had ONJ related to other oral surgery. Conservative sequestrectomy was performed in 7 patients. 30 patients were managed conservatively with chlorhexidine rinse and/or antibiotics.

Conclusions: The clinically relevant cancer literature on BPs is almost uniformly positive demonstrating a decrease in skeletal complications. Contributing causes of these patients’ ON may include advanced cancer, chemotherapy, other co-morbidities, steroids, and BP. Clinicians caring for patients with advanced cancer should be aware of ON as a possible treatment complication.

Bisphosphonates and Osteonecrosis


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Conservative Treatment in Bisphosphonate Induced Osteochemonecrosis: An Interdisciplinary Approach

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Osteochemonecrosis of the jaws can be a serious and debilitating sequelae of bisphosphonate therapy. Unlike osteoradionecrosis, this kind of osteonecrosis is more often seen in the maxilla, where it can affect the complete midface complex. While there are some reliable treatment options in cases with osteoradionecrosis such as a reanastomised free fibula flap or the hyperbaric oxygen treatment, there is little known about definitive treatment of osteochemonecrosis.

Surgical treatment might often lead to a very extensive resection which has a big impact on the patient’s life. The focus of any therapy in patients with osteochemonecrosis of the jaw should be the improvement of the quality of life. Therefore the approach at the Dental School, University of Zurich is a conservative one, always in mind that the still remaining structures, even if not vital anymore, can provide a certain support of the midface and retention for a possible prosthetic appliance.

On the basis of a case reports we will show the importance of a conservative treatment in bisphosphonate induced osteochemonecrosis.
Management of Osteonecrosis of the Jaw Secondary to Bisphosphonates

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Introduction: Bisphosphonates are synthetic analogues of the naturally occurring inorganic pyrophosphates. They are potent inhibitors of osteoclast activity and are commonly used for the treatment of multiple myeloma, skeletal complications associated with bone metastases from solid tumors such as breast cancer and prostate cancer, and osteoporosis. Recently, use of bisphosphonates has been associated with osteonecrosis of the jaw (ONJ). Most of the reported cases of ONJ were associated with intravenous use of the nitrogen-containing bisphosphonates, Zolendronate and Pamidronate. Several reported cases, however, were related to the oral use of Alendronate (Fosamax) for treatment of osteoporosis. We will present a case of bisphosphonate associated ONJ and our management strategy.

Discussion: There are no randomized controlled trials to support any management protocol for bisphosphonate associated ONJ. However, general consensus is avoidance of invasive surgery of the affected bone and use of preventive and conservative treatment. Dental treatment aimed at eliminating infections and preventing the need for invasive dental procedures in the future should be performed if necessary. While the patients are receiving bisphosphonate therapy, patients should be evaluated for exposed bone in the areas of the oral cavity that are most commonly affected. Invasive surgical procedures are strongly discouraged. If the tooth is nonrestorable because of caries, root canal treatment and amputation of the crown is the better option. In case of osteonecrosis of the jaw, treatment is directed at eliminating or controlling pain and preventing progression of the exposed bone. Rounding off sharp bony projections can be carried out but debridement surgery is not recommended. With secondary infection, long term PO antibiotics and sometimes IV antibiotics might be necessary.

Conclusion: With better understanding of the relationship of bisphosphonate use and the development of osteonecrosis of the jaw, both physicians and dentists should be alert of the condition and its consequences. Working as a team, we should fully inform our patients of the risks and the precautions that need to be taken.
Clinical Presentation and Dental Management of Alendronate-Induced Osteonecrosis of the Maxilla

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Purpose: Aminobisphosphonates, such as pamidronate, zoledronic acid and alendronate have been used to treat patients with multiple myeloma and other metastatic cancers to the bone such as prostrate, breast, lung and renal cell carcinomas. Avascular osteonecrosis of the jaws (ONJ) has been well reported in patients that have received intravenous administration of bisphosphonates, but it has been only in recent years that oral bisphosphonates, such as alendronate, have been associated with ONJ. Oral bisphosphonates are being prescribed more due to their success in slowing the process of osteoporosis. The purpose of this abstract is to report on the clinical presentation and dental management of four patients being treated with alendronate and subsequently developed ONJ in the maxilla following dental extractions.

Discussion: Four female patients, ages ranging from 52 to 88 years, were prescribed alendronate for treatment of osteoporosis. Three patients had dental extractions in the maxilla and one patient had endodontic therapy on the right maxillary first molar following initiation of alendronate therapy. They subsequently developed ONJ in the treatment site areas. These patients had been on alendronate therapy between three to over ten years. Despite conservative treatment consisting of crown amputation of the maxillary right first molar, followed by local irrigation of the affected areas and removal of necrotic bony spicules and rough areas in the extraction site areas, the ONJ has not resolved completely in any of these patients, but none of them have had progression.

Conclusion: Although the incidence of alendronate associated ONJ is low, the consequences are severe, therefore, dental management of these patients should aim to eliminate infections and prevent the need for surgical procedures prior to the initiation of bisphosphonate therapy. Once therapy has been initiated, invasive procedures should be avoided, if possible, to prevent ONJ. If ONJ develops, then conservative management is indicated.
Session III
Clinical Outcomes - Quality of Life
Saturday, October 14, 2006
Clinical Research in Maxillofacial Prosthetics: Where do we go from here?

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Evaluations of functional and perceptual outcomes following head and neck cancer resection surgery and the benefits of prosthetic treatment are limited. Existing studies have utilized relatively small samples which precludes generalized statements regarding treatment effectiveness related to defect size and location, dentition status and sensory motor impairment. In part, this is related to the difficulties with this particular study population. Future studies would benefit from multi-institutional participation. The nature of this collaboration and the opportunities for answering critical questions will be discussed.

Issues in Assessment of Quality of Life and Treatment Satisfaction

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Modern reconstructive surgical procedures and the use of osseointegrated implants have enabled prosthodontists to construct relatively stable prostheses for a variety of orofacial cancer patients. However, the impact of these new treatments on patients’ self-perceptions of facial esthetics and psychosocial wellbeing are difficult to objectively document.

Survivors of head and neck cancer have been found to have similar responses to question of general and mental health status to age and gender matched population norms after adaptation, despite significant functional impairments. Global measure of quality of life may not be sensitive to prosthetic treatment due to the many contributing factors. Results of recent studies on patient reported satisfaction with treatment and function will be discussed, along with alternative approaches to assess the clinical value of treatment.
Quality of Life Associated with Two Randomized Treatments for Prevention of Xerostomia

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Background: Radiation therapy as part of treatment for head and neck cancer often results in xerostomia, which has the potential to lead to radiation caries, periodontitis, chronic oral pain, inability to wear dentures, oral infection, and altered taste, mastication, swallowing, and speech. Because of these side effects, xerostomia has the potential to be a silent destroyer of quality of life for head and neck cancer patients. However, the arrival of potentially efficacious treatments to prevent xerostomia in head and neck cancer patients offers hope for better quality of life outcomes after radiation treatment. The two primary treatments of interest within this study are salivary gland transfer and pilocarpine administration during radiation therapy.

Purpose: The purpose of this study was to determine if there is a difference in quality of life measures associated with speech, mastication and deglutition between individuals with a salivary gland transfer, those receiving pilocarpine during radiation therapy, and a control group receiving no preventative treatment during radiation therapy.

Methods: Fifty patients (15 SGT; 15 pilocarpine; 20 control) treated for oropharyngeal, laryngeal, hypopharyngeal, and nasopharyngeal cancer with either surgery, radiation therapy, chemo-radiation therapy, or some combination thereof were followed prospectively at 3 predetermined assessment visits: 1) pre-treatment; 2) post-radiation therapy; and 3) 1-year post-treatment. At each of these sessions, the European Organisation for Research and Treatment of Cancer quality of life questionnaire for head and neck cancer (EORTC – QLQ-H&N35) was used to assess the quality of life domains that are affected by treatment for head and neck cancer.

Results: Preliminary data analysis for the post-radiation therapy period has revealed statistically-significant differences between the 3 groups in the domains of speech, swallowing and xerostomia on the quality of life scale. Results do not seem to be influenced by site of lesion.
Rehabilitation of Oral Function in Head-Neck Cancer Patients after Radiotherapy with Implant-Retained Dentures: Effects of Hyperbaric Oxygen Therapy

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Purpose: Surgical treatment of malignancies in the oral cavity and subsequent radiotherapy often result in an anatomic and physiological oral condition unfavorable for prosthodontic rehabilitation. The objective of this prospective study was to assess the effect of hyperbaric oxygen therapy on treatment outcome (condition of peri-implant tissues, implant survival, oral functioning and quality of life) of prosthodontic rehabilitation with implant-retained lower dentures in radiated head-neck cancer patients 6 weeks and 1 year after placing the new dentures.

Methods and Materials: The treatment outcome was assessed in a group of 26 head neck cancer patients who were subjected to radiotherapy after tumor surgery. Standardized questionnaires were completed and clinical and radiographic assessments were performed. After randomization, endosseous Brånemark implants were placed in the anterior part of the mandible either under antibiotics prophylaxis (13 patients) or under antibiotics prophylaxis combined with pre and post surgery hyperbaric oxygen (HBO) treatment (13 patients).

Results: In the HBO and non-HBO group 8 implants (implant survival 85.2%) and 3 implants (implant survival 93.9%) were lost, respectively. Peri-implant tissues had a healthy appearance in both groups. Osteoradionecrosis developed in one patient in the HBO group. All patients functioned well with their implant-retained lower dentures. The quality of life related to oral functioning and denture satisfaction were improved to a comparable extent in the HBO and non-HBO group.

Conclusion: Implant-retained lower dentures can improve the quality of life related to oral functioning and denture satisfaction in head-neck cancer patients. Adjuvant hyperbaric oxygen therapy could not be shown to enhance implant survival in radiated mandibular jaw bone.
Acoustical Assessment of Auricular Prostheses: 
Is There Anything to Gain?

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Purpose: Auricular prostheses are designed to restore a natural appearance for individuals who have lost, or are missing part or all of their external ear. However, little is known about whether any acoustical improvements are provided by the prosthesis. In general, we use inputs from both of our ears to estimate the position or direction of sound. To do this, the brain performs a comparison of the inter-aural timing differences (ITD) and inter-aural level differences (ILD) of the incoming signal. A sound arriving from a person's right side will reach the right ear sooner (ITD) and at a greater level (ILD). For sounds arriving directly in front of or behind a person comparison between ears are not possible. The external ear and canal provide an acoustic signature (spectrum) to an incoming sound depending on the incoming azimuth and elevation. The brain uses these different acoustic spectra to aid in front-back and high-low discrimination. The purpose of this study was to investigate the acoustical effects provided by an auricular prosthesis on patients missing their external ears.

Methods and Materials: Eight adults fitted with implant-retained auricular prostheses were recruited for this study. All eight subjects had normal ear function with the exception of a missing auricle. Subjects were seated in an audiometric booth with a tiny probe microphone placed in their ear canal. The microphone was used to measure the real ear spectrum of the incoming pink noise (speech shaped noise) with and without the prosthesis in the following 15 conditions: 5 azimuths (0, 45, 90, 135, 180) and 3 elevations (-35, 0, +35).

Results: As expected, the prosthesis provides no change to the acoustic spectrum in the low frequencies for any azimuth or elevation. In general, for all three elevations (-35, 0, +35) the prosthesis boosts the incoming signal from 1 to 4 Khz when the signal arrives from the front or 45 degrees. From 90 degrees through 180 degrees the prosthesis attenuates the signal in much the same way as for individuals with intact external ears.

Conclusion: In this study, the spectrum of the incoming signal to a patient was mostly affected by the azimuth. Elevation played a smaller role in acoustical changes associated with the auricular prosthesis. Further investigation as to whether these acoustical changes to the incoming spectrum result in improvements in front-back localization is warranted.
Outcomes of Prosthetic Rehabilitation of the Anophthalmic Socket

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Synopsis The maxillofacial prosthodontist may occasionally be involved in managing patients with anophthalmic socket following an enucleation or eviseration procedure. The aim of oculo-prothetic intervention is to produce an ocular prosthesis that provides natural post-operative appearance with symmetry, excellent motility and no socket irritation.

Close collaboration between the oculoplastic surgeon and prosthodontist is essential to achieve the best functional and cosmetic results. The correct diagnosis of the socket problem and an understanding of the principles of socket rehabilitation is of paramount importance for successful management of anophthalmic patients. In this presentation, a review of the prosthetic management and clinical outcomes of patients with anophthalmic and contracted sockets will be highlighted.
The reproduction of skin towards an artificial substitute is tremendously challenging. Skin colour is determined by the spectral properties of incident light, the reflection behaviour of the skin and the interpretation by the observer. The reflection behaviour of biological tissue like the skin is of complex nature. Light penetrates deep and CIE accepted colour metrology fails to deliver useful spectra for colour formulation systems due to edge loss effects (R.v Oort, 1982). By applying a small illuminating beam, favourable in Optical Biomedical Diagnosis, colour determining properties scattering and absorption can be measured more accurately (Groenhuis, 1983).

Purpose: Developing of an accurate in-vivo method to quantify skin colour determining properties applicable in a recipe or colour formulation system for facial prosthesis production.

Methods and materials: By separating the volume reflected light in concentric rings around an incident small beam, layer dependant scattering and absorption arrives (Borsboom, 1988). The plural spectral information eases matching of the prosthesis material. Matching can be achieved by multi variation analysis, using skin spectra and test sets of prosthesis material with known recipe.

Results: Measuring set up, pressure sensitive skin colour data and a set of skin measurements are presented.

Conclusion: By applying small beam illumination, important optical skin and prosthesis properties are quantified and applicable in a colour formulation system, achieving better matching. Interesting particle size, Rayleigh and Mie scattering behaviour of skin and prosthesis materials are observed.

References: P.C.F. Borsboom e.a. - An instrument to measure the color-determining properties of bulk translu-center materials. SPIE 1988; 1012: 206-211, In-Process Optical Measurements. Supported by IAG-Bo5 Grant; Province Groningen/Economic Kompas/EEC-EFRO.
Clinical Outcomes - Quality of Life

Microbial Biofilm Formation on Facial Prostheses

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Purpose: The necessity for short-term remakes of facial prostheses forms a negative burden for both patient and caretaker. Deterioration, delamination and discoloration of silicone materials are factors in the need for remakes. Inflammatory soft tissue reactions both round implants and on the skin contact area are complications in implant retained facial prostheses in 30 to 40% of patients(1). Control of microbial biofilm formation is an essential factor for durable clinical usage of maxillofacial materials (2). Biofilm formation on platinum silicone elastomer might be a key factor in inflammatory soft tissue reactions as well as durability of facial prostheses. Mechanisms of both biofilm formation and composition on facial prostheses are unknown.

Methods and Materials: 25 replaced platinum silicone elastomer facial prostheses of variable wearing-time were investigated with respect to biofilm formation. Surface colonization and deterioration was investigated using scanning electron microscopy. Microbial composition of the biofilms was investigated using standard microbiological culturing techniques. The results were compared with a 2 year old, stored platinum silicone elastomer prostheses that had never been used.

Results: Extensive surface colonization was observed for all replaced silicone elastomer facial prostheses. Both bacteria and fungi were detected; more specifically, Stapylococcus epidermidis and S. schleifen were the predominant bacterial species and Candida albicans, C. parapsilosis and C. tropicalis were the predominant fungal species isolated. Surface deterioration and discoloration of the silicone materials correlated with microbial surface colonisation.

Changes in Cases of Orbital Prosthesis with Epitec TM System

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Purpose: Purpose of this study is to discuss how the problems in facial prosthetic treatment with Epitec system may be resolved, to report changes that this treatment mode underwent and the effect of this system in comparison with long-term success rates of facial implants developed from dental implants in other institutions.

Materials and methods: We studied progress of 11 cases we treated from January 1997 to December 2005 by orbital prostheses that were retained with the EpitecTM system. Researched specifics were: terms from tumor resection to placement of Epitec plate, with/without radiation therapy, terms from radiation therapy to placement of Epitec plate, size and number of placed Epitec plates, size and number of failed Epitec plates and survival terms of the plate.

Results: In the initial period of this treatment mode, we treated four cases with EpitecTM system, small carrier plates recommended by Prof. Farmand, the creator of EpitecTM system. In the second period, larger carrier plates were used in two cases. In the third period, some carrier plates were finely bent on the patient’s stereo-lithography skull model and connected by laser welding. We thus obtained a carrier plate large enough for the defect that afforded a maximum bone contact. The carrier plates made on the stereo-lithography as a surgical simulation were sterilized and used in the operation. Some of the small Epitec plates used in the first period showed instability due to insufficient primary fixation. But primary fixation of Epitec plates improved as the plate size was enlarged in the second and third periods; installed plates remained stable for a long term even in cases in which high doses of irradiation were applied. Success rate in all Epitec plates was 80.9% excluding case 2, in which the plates were removed due to tumor metastasis. Of the respective treatment periods, period one showed 70%, period two 100% and period three 85.7%. Success rate in the irradiation group was 77.8% against 100% in the non-irradiation group. These results were comparable to the success rates reported in facial implants.

Conclusions: In conclusion, the EpitecTM system has proved to provide effective materials for the retention of orbital prostheses.
Functional Outcomes of Prosthetic and Surgical Reconstruction of Maxillary Defects

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Purpose: Patients with maxillary defects have problems with speaking, swallowing, and chewing. Although prosthetic obturation seeks to seal the nasal cavity from the oral cavity, failure to completely seal off the two cavities often result in problems with leakage of food and liquids through the nose and hypernasal speech. The purpose of this study was to compare functional outcomes of speech, swallowing, mastication, and quality of life of prosthetic obturation and surgical reconstruction of maxillary defects.

Methods and Materials: A cross-sectional survey of Hollings Cancer Center/Medical University of South Carolina based patients with maxillary cancers reconstructed either prosthetically or surgically for the past ten years were retrospectively reviewed. Functional outcome measures included the M.D. Anderson Dysphagia Inventory, the SWAL-QOL, the speech intelligibility test, the Obturator Functioning Scale, the Patient-Generated Subjective Global Assessment, masticatory efficiency, and facial photographs. Patients were randomly selected for each treatment group. The study was limited to five patients with prosthetic reconstructions compared to five patients with surgical reconstructions.

Results: The results of the survey revealed significant differences between the two groups with respect to functional outcomes. Overall advantages, disadvantages, complications, and outcomes will be presented.

Conclusions: Both prosthetic and surgical reconstruction should be considered at the treatment planning stage with maxillary defects. This study highlights the advantages and limitations of each modality with respect to functional outcomes in a small number of patients. Functional outcomes of speech, swallowing, and chewing should be the “standard” by which we measure rehabilitation. A larger longitudinal study is required to truly measure rehabilitation of maxillary defects.
A Proposed Universal Maxillectomy Classification System

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Purpose: Multiple publications have discussed proposed systems to classify maxillectomy defects from both the surgical and prosthodontic viewpoint. Classification systems enable colleagues to describe treatment that was rendered to the patient accurately and begins preparing them for the rehabilitation process ahead. The purpose of this study is to review known maxillectomy classification systems and propose a universal classification system validated by a 21 year experience.

Materials/Methods: Medical and Dental records from 1984-present were reviewed for all patients who underwent a maxillectomy, craniofacial resection, soft palate resection, or delivery of a surgical obturator. Patients were excluded if there was not a surgical defect involving the hard palate. The data base query resulted in a total of 850 patients and the charts were made available for data collection. Prior to data collection IRB approval was obtained allowing the use of data from the charts to be used for the study. The information collected from the charts was hospital medical record number, gender, operating surgeon, operating dental surgeon, date of procedure, histological diagnosis, anatomical site of primary, size of lesion as described by “T” stage, and extent of maxillectomy. A schematic diagram of the oral cavity was used and the defect was drawn for each patient. Using established prosthodontic oriented classifications patients were grouped for statistical analysis.

Results: Using the established prosthodontic classifications an overwhelming majority were Aramany Class II and Okay Class 1b. The second majority was Aramany Class I/V1 which corresponds to Okay Class II. Finally, this was followed by Aramany Class III and Okay Class 1a.

Conclusions: The well known prosthodontic classification systems developed by Aramany and Okay are based on the clinical experience of 123 patients in 6 years and 47 patients in two years respectively. Using retrospective data from 850 patients who have undergone a maxillectomy and the previously developed classification systems, a conglomerated, defined, evidence based proposal is made to the governing bodies of the American Academy of Maxillofacial Prosthetics and the International Society for Maxillofacial Rehabilitation for consideration of developing and adopting a universal classification system to describe patients.
Faces I Have Known: Prosthetic Rehabilitation and Craniofacial Implants

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The purpose of this presentation is to provide the audience with clinical and laboratory insights and perspectives regarding the use of osseointegrated implants to retain facial prostheses. Emphasis will be placed on the successful management of patients with congenital and acquired defects through the use of bone anchored auricular, orbital and nasal prostheses using the team approach. Topics that will be addressed include: facial appearance, steps in the treatment plan and a retrospective evaluation of the quality of patients' lives and their families.
Session IV
Rapid Prototyping / Bone Implant Interfaces
Sunday, October 15, 2006
Nanotechnology and Implant Dentistry

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Titanium-based dental implant systems have shown great clinical promises for a selected group of patients; however, there is a large unmet need of improvements to establish osseointegration in maxillofacial bones. The implant surface provides the environmental interface to the host cells. Since Ross Harrison described the cell’s preferential association to the micro-structured substrate in 1912, the concept of “contact guidance” has been repeatedly demonstrated. Micro-topographic features of substrate surface, such as grooves, fissures, ridges and tubes, have shown controlling the alignment and growth of cells. However, different cell types exhibited uniform reactions to the texture dimensions of 1 – 10 microns, indicating that the further improvement of osseointegration may not be achieved by different micro-topography designs.

In recent years, a new array of technologies has been developed allowing fabrication and testing of materials carrying nano-scale topography. The nano-topography has shown unexpectedly significant influences to cell behaviors, although the mechanism is still unknown.

This presentation describes the latest research and development for the new generation of dental implants incorporating nanotechnology concepts.
Introduction: Nel-like, type 1 molecule (Nell-1) is a secretory molecule involved in bone formation and regeneration. Nell-1 was first discovered as being over-expressed during premature cranial suture closure in human craniosynostosis and signals downstream of Cbfa1 to induce osteoblast differentiation and bone formation. The current research investigates Nell-1 signaling and utilizes biodegradable PLGA scaffolds to deliver Nell-1 to accelerate bone regeneration within rat calvarial defects.

Methods: To examine Nell-1 gene regulation, MC3T3-E1 cells were infected with an adenovirus overexpressing rat Nell-1 (AdNell-1) driven by a CMV promoter at 20 pfu/cell. Cells were then maintained for 48 hours before switched to osteogenic differentiation medium. RNA was harvested on day 0, 3, and 6. Finally, poly(lactic-co-glycolic acid) (PLGA) scaffolds were loaded with 200 ng of recombinant Nell and BMP proteins (rNell-1 or rhBMP-2) and implanted into 3 mm full-thickness calvarial defects in Sprague-Dawley rats. Rats were microCT imaged at 2 and 4 weeks to examine bone regeneration.

Results: Investigation into molecular signaling of Nell-1-induced osteogenesis revealed that Nell-1 stimulation reduced the expression of early osteogenic regulators (OSX and ALP), but induced the expression of intermediate and late markers (OPN and OCN). Grafting Nell-1 coated PLGA scaffolds into rat calvarial defects revealed the osteogenic potential of Nell-1 to induce bone regeneration equivalent to BMP-2.

Conclusions: Calvarial defect healing is augmented with growth factor implantation. Nell-1 and BMP-2 are both known to induce bone formation in vivo; however, the transition from animal studies into clinical studies has been only mildly successful with BMP-2. The ability of Nell-1 to accelerate bone formation may relate to the decrease in the number of proliferative cells within the defect, suggesting that Nell-1 influenced cells out of a proliferative phase and into a differentiated phase. Insights into Nell-1 regulated osteogenesis coupled with its ability to induce bone regeneration reveal a potential therapeutic role and an alternative to the currently accepted techniques for bone regeneration.
Stimulation of Mineralization in Osteoblastic Culture by Various Magnetic Fields

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Purpose: Shortening the healing period is one of the patient’s demanding for the implant treatment. Applications of changing magnetic fields on medical treatment have been reported such as stimulation of tissue repair of bone fracture. In stimulation of bone healing around the implant, magnetic exposure could be employed, however, little is known about threshold of electromagnetic effect and its biological mechanism. A purpose of this study was to evaluate a promotional effect of static magnetic field and an extremely low frequency magnetic field on bone formation in vitro.

Methods: Static magnetic field (250mT, Neodymium disc magnet) and time varying magnetic field (electromagnetic power unit) were applied on MC3T3-E1 osteoblastic cell culture. In changing the magnetic field, 400mT maximum intensities and frequency of 0.8 Hz were applied to the culture. Cell proliferation was assessed by using a colorimetric proliferation assay (WST-8) determining the hormazan content in the samples by measuring the absorbance at 450 nm. Effect for mineralization was evaluated by measuring amounts of mineralized nodule formation.

Results: After 4 weeks of the culture, nodule formation was significantly increased in the stimulation of both static and dynamic magnetic filed. The results of the proliferation assay revealed that one to twenty four hours exposure of changing strong magnetic fields increased its proliferation, however decreased in the exposure of the static magnetic field.

Conclusion: Based on these results, effects of electromagnetic fields were confirmed by increase of mineralization in vitro. The stimulation of osteoblastic cell proliferation might be responsible for the promotional effect in the changing magnetic field, but not in the static magnetic field.
A Novel Surface Property of Titanium

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Restorative treatment of missing teeth using titanium dental implants have considerable oral health impact, by which masticatory function, nutritional status, speech and quality of life are improved, when compared to conventional removable denture prostheses. In the US, 10% of the adult population, and one-third of adults over 65 years of age, are fully edentulous and wear removable complete dentures. Successful implant anchorage is dependent upon the magnitude of bone directly contacting the titanium surface without soft/connective tissue intervention, which is referred to bone-titanium integration or osseointegration.

Despite the growing demands for titanium implants, their limited application and protracted healing time after implantation present immediate challenges. To address these issues, more understanding of the mechanism of osseointegration is essential. This presentation will introduce our exploration of a newly-found surface property of titanium that significantly affects its osseointegration capacity.

A Novel Titanium Surface and Its Impact on Osseointegration

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Missing teeth, fully edentulous jaws, maxillofacial defects, osteoporotic femoral neck fractures, and degenerative changes of hip and knee joints are quite common, serious problems. Although the use of endosseous titanium implants as an anchor is essential for restorative and reconstructive treatment of such conditions, it implicates unsolved concerns of medical, societal and monetary issues. Immediate challenges in implant therapy are to accomplish faster establishment and long-term predictability of implant anchorage in bone.

Our long-term goal is to develop endosseous implants with an overwhelming capability of accelerating and enhancing bone-implant integration over the existing implants. This presentation will introduce a novel titanium surface and its potential to induce distinct bone morphogenesis for improved osseointegration.
Computer Assisted Maxillofacial Prosthodontics, a Continuing Story

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New techniques of visualization, virtual design and rapid prototyping will be discussed. There is an accelerating development in visualization techniques, designing software and manufacturing techniques. The application varies from intra oral (obturators, surgical guides) to extraoral (facial prostheses, laryngectomie canules, breast prostheses).

Computer Aided Design and Manufacturing of Cranio-Maxillofacial Implants

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Introduction Demand for more and better esthetics and function in cranio-maxillofacial area obliges the medical community to include new and exiting technologies. Computer aided design and manufacturing of prosthesis and medical implants enables customized and individualized medical treatment, treatment that was a few years ago not possible. The purpose of our study was to enable custom-fit treatment of defects in the cranio-maxillofacial area (defects of skull and- or face) by using CAD-CAM manufactured implants.

Material and Method Twenty one patients had defects in cranio-maxillofacial area: 15 patients with a skull defect, 3 patients with a deformity defect in the orbital area and 3 patients with a mandibular defect. All patient underwent a CT scan. The data of the CT scan were converted with Mimics (Materialise), further processing was done by using Pro-Engineer (Pro-Engineer) or Freeform (Sensible Technologies) in order to produce a virtual implant in a three-dimensional environment. These data were sent to different rapid manufacturing machines (CNC milling, selective laser sintering, electron beam melting, hydroforming) in order to get computer manufactured titanium implants.

Results All implants were easy to apply and fitted very well. The mean operation duration was lowered with 1 ½ hours in each operation when compared to conventional treatment.

Conclusion Computer aided design and manufacturing of medical implants will become more and more important in medical treatment. In near future this will be the treatment of choice. Cost reduction and refinement of the logistics will surely have an positive effect on the distribution of this technology.
CAD-CAM Ear Composite Model and Virtual Construction of the Mold

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Department of Oral Science Prosthodontic Section Bologna, Italy
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Purpose: To present a technique of creating a model by laser scanning the stone cast of the healthy ear and integrating it with the model of the defective side. A 3-D integrated digital image of the unaffected ear is copied and then mirrored in the laser-scanned model of the defective side. The negative volume of the ear is used to fabricate the mold by means of a rapid prototyping 3D printer.

Material and methods: Using a pin system around the healthy ear cast, eight laser measurements of the surface from random new angles allow for the detection of all undercuts. The same system is used for the defective side, but its surface is directly laser-scanned onto the skin of the patient, and the pin system applied on it. The software blends the different surfaces of the healthy ear and the defective side into one composite virtual 3D model. The negative volume of the ear is finally utilized to construct the three part virtual mold, with an integrated connection system that allows the technician to precisely recompose the entire volume into a tightly sealed mold for polymerizing the silicone.

Results: Results from this study are: 1. The virtual 3D integration of the defective side surface (base) with the mirrored ear digital model (external); 2. The impression of the defective side is no longer necessary; only the position of the implants must be recorded in order to develop the bar for the retention of the prosthesis. 3. The procedure allows us to elaborate the position of the ear straight onto the screen, eliminating the diagnostic wax-up; 4. The construction of the stone mold is no longer necessary, because of the rapid prototyping of the negative volume in a three part virtual mold.

Conclusion: This paper describes a technique to make maxillo-facial prostheses using CAD-CAM technology and a rapid prototyping machine. It is also a viable protocol to eliminate the use of impression materials for facial prostheses, the use of diagnostic wax up and the use of a stone mold.
Two and Three Dimensional Digital Technology in Surgical and Prosthetic Planning for Bone-Anchored Prosthesis: a Comparison of Conventional and Contemporary Treatment Approaches

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Digital imaging and modeling technologies have seen increased usage in the surgical planning and design of bone-anchored extra-oral prosthesis. Investigation into these technologies reveals that a broad scope of technologies is available to the clinician for surgical planning, design and fabrication of prostheses. Digital photography and radiography, CAD/CAM, three-dimensional modeling, rapid prototyping and haptic devices are among the technologies available to clinicians for enhanced treatment planning.

Two patients requiring implant-retained auricular prostheses were treated using two and three-dimensional digital technologies for implant positioning, prosthesis design and prototype fabrication. Conventional and contemporary digital techniques were utilized in the surgical treatment planning and fabrication of prostheses.

A comparison of treatment planning approaches utilizing various technologies, with particular interest in time, cost, accessibility, accuracy, usage of clinical resources, patient contact and treatment outcomes will be presented.
Imaging and Intraoperative Guidance in Implant-Based Craniofacial Reconstruction

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Purpose: In craniofacial defects and syndromes modern reconstructive techniques have overcome many of the traditional problems and, wherever possible, surgical reconstruction with autologous tissue is the treatment of choice. However, in some cases primary reconstruction may not be desirable or feasible for different reasons. With the introduction of extra-oral osseointegrated implants, which allow direct prosthetic anchorage of the prosthesis to the underlying bone, many limitations for maxillofacial prostheses have been overcome.

Methods and Materials: The major problem of extra-oral implants is the limited availability of bone in the facial skeleton, e.g., in the temporal bone for the fixation of an auricle, or at the supraorbital rim for an eye prosthesis. Assessment of the bone that is available for implantation is therefore most important in preoperative planning. Computed tomography (CT) allows the visualization of the precise anatomical extent of craniofacial tissue defects, and, in the case of CT, also that the structure and thickness of the bone available for implant placement. With the introduction of intraoperative guidance it has become possible to transfer the preoperative plan into OR.

Results: The aim of using a surgical navigation system is to position endosteal implants in exact agreement with the preoperative plan. For general orientation in the operating field, transparent volume renderings are generated that displays both the bone surface and the planned implants. The position of the drill tip is projected into frontal and lateral renderings in real time during the preparation of the implant bed. Thus a highly accurate placement can be achieved in placement of extra-oral implants. The procedure will be explained using clinical examples.

Conclusion: Restoration of craniofacial defects with a prosthesis anchored by extra-oral osseointegrated implants is a complex and difficult task that requires the close collaboration of surgeon, prosthodontist, anaplastologist and radiologist. In complex cases the use of a surgical navigation system can help to transfer the preoperative plan into the OR and ensure high precision in the placement of the implants.
Implants for Bilateral Maxillectomy Patients: 
3-D Modeling of the Reconstructed Fibula

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Purpose: To describe the prosthetic implant rehabilitation of patients with bilateral maxillectomies and complete palate resections, reconstructed with fibual osseocutaneous free flaps and contrast these rehabilitations to historical rehabilitations without boney reconstruction or implant restoration.

Methods and Materials: A series of 5 patients with bilateral maxillectomies including complete hard palate resection, were treated with fibula flap reconstructions. 3-D models of the fibula bone and fabrication of surgical guides were used for Astratech implant placement. Three patients also had total soft palate resections.

Results: Three patients had maxillary implant restorations while two had serious concurrent illness precluding continuing with implant therapy. 5 to 8 implants were placed in the fibula bone. 3-D anatomic models were made to fabricate surgical guides for implant placement. Concurrent to implant placement, the bone plate hardware was removed. Soft-tissue in growth of the fibula marrow space was seen on two patients, causing a non-union in one patient and a need for bone regeneration techniques in the second patient. Implants were placed outside the area of complications. Secondary tissue procedures are also needed and use of internal platform implant systems is helpful in uncovering implants and placing abutments through the mobile skin paddle.

Conclusions: These patients are oral cripples without closing the defect between the oral cavity and maxillary sinuses and nasal cavities. Implants are required to support prosthesis due to tissue contours and need to support pharyngeal obturators.
Incorporating Intraoperative Navigation Technology to Improve Accuracy of Bony Maxillary Reconstructions

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Purpose: To describe reconstruction of bilateral maxillectomy patients with complete hard palate defects using a fibula osseocutaneous flap and various technologies to determine the fibula contours and position.

Methods and Materials: A series of 5 patients with bilateral maxillectomies including complete hard palate resection were reconstructed with fibula flap reconstructions, using skin paddles through an intraoral and lip splitting incisions. The etiologies were palatal tumors, infection, and osteoradionecrosis. Use of 3-D models, intraoperative navigation, and preoperative templates varied among the patients as the technology and experience of the surgical team advanced.

Results: The fibula required 5 boney sections and spanned between zygomatic arches, or pterygoid plates if present. The skin paddle replaced the missing hard palate. The fibula was shaped to support the nasal columella and placed directly over the mandibular dentition for better implant alignment. Three patients also had soft palate resections, that were left for prosthetic restoration. Preoperative templates and 3-D models are required to determine flap contours and relationship of the flap to the mandible.

Conclusions: The fibula is ideal for reconstruction of the hard palate and inferior maxilla, when external skin and the nose remains. It can be contoured using 3-D models and positioned using intraoperative navigation.
Solving Structural Problems of the Craniofacial Skeleton

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Purpose: In contrast to adults, children with craniofacial skeletal conditions present with unique reconstructive needs. As with adults, many present with bony defects that require restoration of the skeletal form in three-dimensions. However, such restoration must accommodate not only the regional requirements from the viewpoint of biomechanics but also must adapt to growth and development of an immature skeletal framework. In recent years biomaterials have been used with increasing frequency in facial reconstruction to replace autogenous bone for both adults and children. Several reasons for their popularity include the elimination of donor site morbidity and cost effectiveness in reducing operating time and hospitalization. This paper will focus on our experience with prosthetic complications of cranial vault reconstruction and a discussion of the context of the use of such alloplastic materials when solving structural problems of the craniofacial skeleton.

Methods and Materials: We will review our experience with 16 cases of failure of various prosthetic materials to restore the cranial vault in children. Of these, 6 had alloplastic reconstruction for residual deformity from congenital condition and 10 for post-traumatic reconstruction. Failure ranged from 3 months to 7 years after implant reconstruction. A finite element model will be used to illustrate a better understanding of the interface and load transfers that can lead to failure with varying material properties.

Results and Conclusion: In identifying the ideal biomaterial for reconstruction of the craniofacial skeleton, several criteria should be met. The biomaterial should be biocompatible with the surrounding tissues without elucidating a foreign body or inflammatory response; easily shaped and molded to fit the deformity; able to maintain volume long term following implantation; osteoactive, inducing replacement of the biomaterial by bone at a rate equal to the biomaterial resorption; and readily available. Essentially biomaterials should match with surrounding hard tissues in mechanical properties such as elastic modulus. However, because of the differing requirements of the reconstruction from restoring the continuity of the defect to altering the biologic boundary no single material can fulfill the varied requirements. The choice of the material whether alloplastic or autogenous must be tailored to the reconstructive requirements.
Poster Presentations
6:30pm-8:00pm
Friday, October 13, 2006
Purpose: Mini-dental implant (MDI) system presents the least invasive and most economical approach to achieve function in these mandibular reconstructed mandibles after ameloblastic tumor patients.

Methods and Materials: Mini implants were used in two reconstructed mandibles of a female and male patients presented with ameloblastic tumors to enhance the retention of the mandibular prosthesis.

Results: Two year results showed improved function.

Conclusion: The short-term use of mini dental implants to retain removable prosthesis in fibula grafted reconstructed mandibles has been shown to be successful and promising method to enhance the denture acceptance by surgically reconstructed mandible.
A Case of Osseointegrated Implants with Bone Graft for the Treatment of the Injured Maxilla


1 The First Department of Prosthodontics, 2 Department of Oral and Maxillofacial Radiology, 3 Department of Orthodontics, 4 The First Department of Oral and Maxillofacial Surgery School of Dentistry, Aichi-Gakuin University Nagoya City, Japan

In the case of multiple teeth loss by the injury, subsequent bone loss made it difficult for the implant treatment. We report a case that autogenous bone graft from tibia was carried out for bone augmentation and the implant placement. The case was restored by a removable denture using the magnetic attachments. Patient was 20 years old male. There was no special medical history. He was encountered a traffic accident when seating back seat of the motorcycle on Oct. 1999. Due to heavy smash of his face, extraction of six teeth including right premolar canine, and three incisal teeth in maxilla was carried out. It was fixed by the interim denture on Nov. 1999, and waited for the wounded area healing. After that orthodontic therapy was started for correction of crowding and improvement on the labioclination of lower incisal tooth on the right side in April 2000. After orthodontic therapy completed (Nov 2001), he had medical examination in respect of the implant treatment. The diagnostic template was fabricated in which imitated the final superstructure confirmed the bone quantity of the implant placement region.

The computed tomography and image analysis showed labial bone quantity shortage. Therefore, he underwent the bone augmentation from his tibia that covered by a titanium mesh in Aug. 2002. The titanium mesh was removed in Jan. 2003, and then five Branemark implants (Nobel Biocare, Sweden) were placed in Feb. 2003. The implants were uncovered by the secondary operation in Aug. 2003. Considering aesthetics, ease of cleaning, and the crown/root ratio, etc., the selection of the superstructure was made to be a removable denture using the magnetic attachments (Magfit EX600 :Aichi Steel Works Co.).

According to the ordinary method, RPD was fabricated through the impression making, bite taking, try-in, in which a cingulum rest on lateral incisal and a reciprocal palatal arm on right molar were designed. The magnetic assemblies were fixed directly in the oral cavity.
Odontogenic Ghost Cell Carcinoma: Report of a Case and Review of the Literature

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Purpose The calcifying odontogenic cyst (COC) was first recognized by Gorlin et al in 1962 and described by the World Health Organization in 1971, as a cystic lesion that shows an epithelial lining with a well-defined basal layer of columnar cells, an overlying layer that may resemble the stellate reticulum, and masses of ghost cells. The term odontogenic ghost cell carcinoma (OGCC) was used later to defined this rare entity. In the literature, OGCC is very rare. The present article describes a case of OGCC of the maxilla in a 29-year-old man and discusses the treatment and prognosis of the cases previously reported.

Methods and Materials and results: case report A 29-year-old man was referred to our clinic because of a swelling of the left cheek extending from the infraorbital region to the upper lip. His medical history was non contributory. A first biopsy performed concluding to a Pindborg tumor. Intraoral examination showed a fluctuant swelling of the left maxilla extending from the upper left canine to the posterior portion of the left maxillary alveolar ridge. The mass had been present for at least several months and had been accompanied by pain. Computerized tomography and MRI demonstrated an expansive process, involving the left maxillary respecting the buccal and lateral bony sinus walls, intraosseous soft tissue lesion with multiple calcified clusters. Under general anaesthesia, left maxillectomy was performed. An obturator prosthesis has been used to restore the functions of mastication, deglutition, and speech and to achieve normal facial appearance. This surgical obturator is a base plate type appliance which is constructed from the pre-operative impression cast and inserted at the time of resection of the maxilla in the operating room. Next changed 2 weeks later for a temporary obturator. No radiation therapy was used.

Conclusion: We discuss the histologic features, the treatment and the prognosis of this rare entity.
In creating esthetic facial prostheses, treatment planning is of utmost importance, particularly in proper implant placement and angulation. Multiple components must be hidden so that the best esthetic result can be obtained. Digital photography provides a means to capture an image and have it readily available in a matter of seconds. This poster presentation will demonstrate how the use of digital photography and simple transparencies can provide a quick visual aid, which is easily distributed to the members of the prosthetic team. This technique can be used to properly position implants, implant bars and suprastructures. It can also be used to set globes for orbital prostheses and check sculpting, which lessens the chair time for the patient.

Using transparencies has proved to be a valuable tool in the MUSC Maxillofacial Prosthodontic Clinic. Most importantly, it has a positive impact on the outcome of the facial prosthesis, which greatly benefits patients.
Table 5
Clinical Outcomes - Quality of Life

Masticatory Performance and Facial Appearance Outcomes of Maxillary Defects

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Purpose: The purpose of this study was to compare masticatory efficiency and facial appearance of prosthetic obturation and surgical reconstruction of maxillary defects after tumor resection.

Methods and Materials: Ten patients from the Medical University of South Carolina/Hollings Cancer Center patient population who were status post resection of maxillary tumors were randomly selected to participate in this study. Five of the patients had been treated with surgical reconstruction and five had been treated with prosthetic obturation. The patients plus five controls were administered a masticatory efficiency test. Five random judges graded the ten patients on a facial appearance scale. Other factors such as age, radiation, chemotherapy, maximum opening, defect classification, surgical complications and dentate/edentulous status were also recorded.

Results: A one-way analysis of variance was used. The Tukey’s test was used to perform the pairwise comparisons of the control and the two treatment groups. A significance level of 5% was chosen for all analyses. Masticatory efficiency in the control group was significantly better than both the prosthetic group and the surgical group with a p-value (<0.05). There was also a statistically significant difference in masticatory efficiency between the prosthetic group and the surgical group. For analyzing the data with respect to facial appearance, a nonparametric Wilcoxon rank-sum test was used. There was a significant difference in facial appearance between the surgical and prosthetic groups with the surgical group having more severe facial disfigurement (p-value <0.05).

Conclusions: Treatment planning of maxillary defects should include both prosthetic and surgical reconstruction. This study highlights the advantages and limitations of each modality with respect to masticatory efficiency and facial appearance in a small number of patients.
Table 6
Clinical Outcomes - Quality of Life

Quality of Life, Speech, and Swallowing Outcomes of Maxillary Defects

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Purpose: This study compares the functional outcomes of speech intelligibility, swallowing, and quality of life issues following either surgical reconstruction or prosthetic obturation of maxillary defects.

Methods and Materials: Ten patients who were status post resection of maxillary tumors from the Medical University of South Carolina/Hollings Cancer Center patient population were randomly selected to participate in this study. Five of the patients had been treated with surgical reconstruction and five had been treated with prosthetic obturation. Swallowing was assessed using the SWAL-QOL Survey and the M.D. Anderson Dysphagia Inventory. Quality of life was evaluated using the Scored Patient-Generated Subjective Global Assessment and the Short Form 6. The Assessment of Intelligibility of Dysartric Speech was used to examine speech intelligibility.

Results: The results of this study revealed differences between the two groups with respect to speech, swallowing, and quality of life issues.

Conclusions: Both prosthetic and surgical reconstruction should be considered in treatment planning of maxillary defects. This study highlights the advantages and limitations of each modality with respect to functional outcomes of speech, swallowing, and quality of life in a small number of patients.
Table 7
Rapid Prototyping / Bone Implant Interfaces

Use of Rapid Prototyping Technologies in Prosthetic Auricular Fabrication

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Medical imaging and rapid prototyping are viable tools which can be utilized in the process of creating an auricular prosthesis. Successful implementation is a direct result of close collaboration between medical and engineering personnel. The use of medical imaging and rapid prototyping has the potential to reduce the cost and time in the fabrication of an auricular wax pattern and could result in a more accurate morphologic result.

This poster presentation describes the use of medical imaging and rapid prototyping used in the fabrication of an auricular wax pattern and its adaption to the clinical defect. The use of this technology results in a more symmetrical wax pattern and a time savings of 68% compared to sculpting in the traditional manner.
Study of Quality of Life in Rehabilitated Post Maxillectomy Patients

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Purpose: The purpose of medicine is to prevent death, diminish pain and contribute to improvements of quality of life of people who are ill or disabled. Quality of Life (QOL) in disease, both for the patient and his family and community. This aspect however is given little explicit attention. Aim of the study is to evaluate quality of life in post maxillectomy group of out patients.

Materials & Methods: The subject selected for this study were postmaxillectomy patients visiting outpatient clinic, at Tata Memorial Hospital a premiere cancer institute in India. All these patients were randomly selected as voluntary participants for this study during their follow up visit. The sample consisted of 30 patients who have undergone maxillectomy for oral cancer and were using a prosthesis. The World Health Organization Quality of Life-Brief (WHOQOL-BRIEF) Field Trial Version was used to assess quality of life.

Result & Conclusion: Out of the four WHOQOL Domains of physical health, Psychological, Social Relationships and Environment the QOL scores were higher in Domain1 of Physical Health. Increase in the post maxillectomy period, that is as the number of years after maxillectomy increased Quality Of Life improved, especially in Domain of Psychological, though it was not found to be statistically significant.
Table 9
Research Competition
Clinical Outcomes - Quality of Life

Proteomic Analysis of Oral Fluids

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Purpose: The burgeoning field of proteomics has opened new doors for the study of oral diseases and links between oral and systemic diseases. It has been postulated that important information regarding oral and systemic health and disease can be found in saliva and GCF. This project will identify major protein constituents of saliva and GCF in order to learn the similarities and dissimilarities in the protein profiles of these fluids collected from clinically healthy intra-oral sites in systemically healthy subjects.

Methods and Materials: Saliva and GCF samples were collected from one adult volunteer who demonstrated good systemic and oral health, was fully dentate, a non-smoker, and had no recent history of periodontal surgery or dental prophylaxis. Saliva was collected via expectoration into 50ml polypropylene tubes. The 50ml tubes were centrifuged at 6,000g to pellet insoluble debris. Clarified saliva was transferred to 1.0ml microcentrifuge l aliquots. Each saliva sample generated 6 aliquots which were stored at -20 degrees C. 6-8 periodontally healthy teeth were selected for GCF collection. A PerioPaper filter strip was inserted into the sulcus to a depth of 2-3mm and held in place for 1-2 minutes. The strip was then removed and placed in a sterile 1.5ml Eppendorf plastic tube and frozen at -20 degrees C. Sample proteins were separated by standard 2D gel electrophoresis. 2D-spots which were significantly different between samples were isolated, digested and subjected to MALDI-TOF mass spectroscopy to identify the candidate proteins. Descriptive statistics were employed to identify major dissimilar protein constituents of each fluid.

Results: Significantly different protein profiles were observed when comparing saliva and GCF using proteomic analysis.

Conclusion: The information obtained as a result of this study is completely original in nature. There are no published reports comparing the protein profiles of saliva and GCF. Learning what constitutes “healthy” saliva and “healthy” GCF in order to understand what aspects of systemic biology these fluids represent is of great scientific and clinical importance.
Surgical and Prosthetic Reconstruction of Adolescent with Ameloblastoma

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Purpose: To reconstruct an adolescent diagnosed with an ameloblastoma of the posterior right mandible. Services included resection of the tumor with immediate reconstruction with a cadaver mandible and autogenous bone graft. The placement of four endosseous implants and a skin graft to support a fixed prosthesis. This restoration was fabricated to compensate should further mandibular growth occur.

Methods and Materials: An 11 year old male diagnosed with an ameloblastoma of the right posterior mandible underwent surgical resection of the tumor and immediate reconstruction. A cadaver mandible, employed as a biologic reconstruction tray, filled with autogenous particulate bone marrow was used for the surgical reconstruction. Four endosseous implants were subsequently placed to support and retain a prosthesis. An autogenous skin graft was placed prior to exposing the implants. The final prosthesis was fabricated to compensate for any future three-dimensional mandibular growth, which might effect the functional occlusion, phonetics, and esthetics. Future modifications to the prosthesis can be performed with minimal expense and inconvenience to the patient.

Results: Proper function, occlusion, phonetics, and esthetics were established by the surgical and prosthetic reconstruction of this patient. A unique ceramo-metal prosthesis was designed. A superstructure design was utilized with the anterior tooth being a cement-on processed acrylic crown. This design allows for easy intra-oral modifications needed should further three-dimensional growth occur. Once skeletal growth has ceased a final restoration can be easily fabricated for the patient.

Conclusion: The patient was successfully restored with a fully functional prosthesis and minimal surgical scaring and deformity.
Presurgical 3D Planning of Implant Placement for Implant-Supported Orbital Prostheses

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The advent of skin-penetrating implants for support of craniofacial prostheses has revolutionised the method of rehabilitation of patients with facial defects.

When placed in an optimum position, implants will enhance the retention of the prosthesis and allow better aesthetics to be achieved, thus improving patient satisfaction and confidence. Implant placement in the orbital region using traditional methods without preoperative 3 dimensional (3D) planning can prove to be challenging for the following reasons (1) the remaining span of bone available for implant insertion can be very variable due to different extent of tumour resection (2) the depth of bone available for implant insertion can be minimal and often unpredictable due to uneven contour and the presence of adjacent sinuses (3) the angulation of the implants is very critical as this can affect the aesthetics of the prosthesis. The use of 3D planning allows preoperative determination of the position of implants based on the available bone volume. The angulation of the implants can also be planned so that the aesthetics of the prosthesis is not compromised. The planning can be done in conjunction with the prosthodontist/prosthetist to his satisfaction.

Following the planning phase, customized surgical stents may be fabricated to transfer the information to the operating table. This improves the ease of implant surgery and reduces surgical time. This paper discusses 3 cases of orbital implant placement with the help of pre-surgical 3D implant planning using the Simplant CMF module (version 10). The first patient lost his orbit due to chemical burns, while the other 2 had orbital resection for malignant tumours. The latter 2 patients had previous radiotherapy and were treated with hyperbaric oxygen prior to implant surgery.
The Difference of Speech Ability Recovery between Maxillectomy and Mandibulectomy

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Purpose: Resection of the maxillofacial region causes functional disorders such as speech, mastication and swallowing. Especially speech ability is strikingly impaired. Therefore the rehabilitation of speech ability is one of the most important aims of maxillofacial prosthetic treatment. Now it is clear that the speech ability of maxillectomy patient is improved securely with the maxillofacial prosthesis. And before prosthetic treatment, the doctor can inform the patient that improving the speech ability is anticipated. On the other hand, it is not clear that the speech ability of mandibulectomy patients get well certainly after prosthetic treatment. The aim of this study was to proof if the speech ability of mandibulectomy patient is improved like that of patient after treatment using the monosyllable speech intelligibility test, which is one of the most widespread methods of speech evaluation in Japan.

Methods and materials: Twenty maxillectomy patients and twenty mandibulectomy patients were enrolled in this study. 100 monosyllables Speech Intelligibility Test was applied in a conventional way. Speech Intelligibility score was calculated as the mean percentage of correct responses from three of the five listeners after the maximum and minimum score had been excluded. The scores of patients with and without prostheses were compared by case. The mean and the standard deviation were calculated each.

Results: The mean score of maxillectomy patients was significantly increased and the standard deviation of that significantly decreased after treatment. In the meantime the mean score of mandibulectomy patients was not increased significantly and the standard deviation of that was significantly increased.

Conclusions: These results indicate that the speech ability of maxillectomy patients can be improved to a certain extent with prosthetic treatment, but the speech ability of mandibulectomy patients can not always be improved enough. It might be due to the size of glottal defect, the decrease of glottal movement by prostheses, the stabilization of mandibular position and the number of remaining teeth.
Development of a Light-weight Facial Impression Technique

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Purpose: Accuracy of the facial impression which is required for fabricating facial prosthesis depends on several factors, such as volume of impression materials and weight of the tray, position of subject, and operator's skill. We have reported a method of evaluating three dimensional discrepancy between laser captured face and facial mold in 53rd AAMP Annual Meeting. It is suggested that inaccuracy of the facial impression might be partially due to weight of impression materials and patient's posture. Therefore, we have developed a new light-weight tray for facial impression. The tray is made of casting tape, which has been used for a plaster cast in the field of orthopedics.

The aim of this study was to evaluate the accuracy of this new facial impression technique in relation to patient's posture. Materials and Methods The casting tape was used for making an individual tray, in which conformer was placed on the face in order to make a space for impression materials. Facial impressions were made on four volunteers with alginate and the tray on up-right and reclined position. Laser surface scanning of the face were also performed on the same day in up-right position by 3-D digitizer (VIVID 910, Konicamnolta, Japan) The amount of discrepancy between the two measurements were calculated by 3D rugle 4 (Medicengeneering Japan) after the data matching. The matching was performed in order to obtain minimum distances between the two configuration data on all facial points.

Result and Discussion: By using the casting tape tray, weights of the facial impression was dramatically decreased. Moreover there was little discrepancy between the laser scanned face and face mold fabricated by this impression technique. In terms of effect of the posture, the up-right positioned impression was more accurate than the reclined. In conclusion, the casting tape method was useful because it was easy to make light-weight individual tray and to make facial impression on up-right position.

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Mechanical Characterization of a Flexible Nylon Denture Base Resin for Obturator

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Purpose: A newer nylon-based denture resin reported has properties of light weight and high flexibility. It is suggested that this material may be utilized for prosthetic purposes as a non-metal retaining clasp for larger prosthodontic restorations such as maxillofacial obturator. There are few detailed reports about the physical properties of this material. The purpose of this study was to determine the mechanical properties of a nylon resin material.

Methods and Materials: The bending characteristics of the following resins were examined: nylon resin system (Lucitone FRS, Dentsply: henceforth LT); heat cure polymeric resin Quick Acron (GC: henceforth QA); Luxon (GC: henceforth LX); PMMA injection (SR Ivocap Plus High Impact, Ivoclar-Vivadent Inc.: henceforth IV); polycarbonate resin (Bio Carbo Resin, High Dental Japan: henceforth BC). Ten specimens of each material of dimensions 40×4×2 mm were stored in distilled water at 37° for 24 hrs. A three-point flexural test was performed with a universal testing machine (EZ-test, SHIMAZU, Japan) at a cross head speed of 1 mm/min and span length of 20 mm. The moduli of elasticity and maximum bending stresses were calculated from the resulting load-deflection curves. All data were examined by one-factor ANOVA (with Scheffe's F = 0.01 multiple comparison).

Results: The mean elastic moduli varied from 1.38±0.07 GPa for LT to 2.59±0.09 GPa for QA. The remaining resins were intermediate. The nylon resin LT modulus was statistically significantly the lowest. For the maximum bending stress, LX was statistically significantly the highest with a mean value of 98.6±2.1 MPa. Specimens of LT did not fracture, but bent excessively.

Conclusions: The high flexibility of the nylon resin, as demonstrated by its low modulus, indicates its potential use for non-metal retaining clasp with an obturator.
Table 15
Research Competition
Clinical Outcomes - Quality of Life

Factors Influencing Masticatory Performance in Mandibulectomy and Glossectomy Patients

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Purpose: Mandibulectomy and glossectomy patients often suffer masticatory disorder because of various surgical and postoperative factors. The purpose of this research is to investigate the factors influencing masticatory performance in mandibulectomy and glossectomy patients.

Methods and Materials: Masticatory performance was measured by using gummy jelly before surgery, at 1 and 12 months after surgery in 18 mandible, tongue and oral floor tumor patients. Factors influencing masticatory performance at each postsurgical stage were analyzed by multiple linear regressions.

Results: The masticatory performance at 1 month after surgery was lower than that before surgery, but that at 12 months after surgery recovered at the same level before surgery. Chemotherapy and masticatory performance before surgery were chosen as significant predictive factors at 1 month after surgery. The primary tumor location, radiation, and bite force before surgery were chosen as those at 12 months after surgery.

Conclusion: These results suggested the significance of periodic evaluation of those factors for strategic rehabilitation of masticatory ability in mandible, tongue and oral floor tumor patients.
Rehabilitation and Treatment Evaluation in Aramany Class VI Patients

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Purpose: The large surgical resection of malignant tumor in anterior part of maxilla effect in masticatory dysfunction, speech disability and unfavorable appearance. After surgery, bilateral anterior maxillectomy, patient will be classified as Aramany Class VI that is rare and challenging case in prosthetic rehabilitation. There are few reports that study and describe about the treatment of these patients. This study was the experience of rehabilitation in three cases with Aramany Class VI patients, studied in term of esthetics and function by evaluated the patient mastication and speech.

Case Report: Three male patients with maxillary squamous cell carcinoma underwent radical resection of the anterior maxilla. (All patients were the Aramany Class VI patients.)

<table>
<thead>
<tr>
<th>Age</th>
<th>Gender</th>
<th>Ra</th>
<th>Chem</th>
<th>NRT</th>
<th>RT Upper/ Lower</th>
</tr>
</thead>
<tbody>
<tr>
<td>49</td>
<td>male</td>
<td>+</td>
<td>+</td>
<td>3</td>
<td>RPD / NT</td>
</tr>
<tr>
<td>59</td>
<td>male</td>
<td>-</td>
<td>+</td>
<td>6</td>
<td>RPD / NT</td>
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<tr>
<td>70</td>
<td>male</td>
<td>+</td>
<td>+</td>
<td>2</td>
<td>RPD / NT</td>
</tr>
</tbody>
</table>

(Ra: Radiation, Chem: Chemotherapy, NRT: Number of remaining teeth, RT: Restoration type, RPD: Removable partial denture, NT: Natural teeth)

After the upper removable partial dentures were applied, masticatory performances were evaluated with Mixing Ability Index, and speech abilities were evaluated with Speech Intelligibility and digital acoustic analysis of five vowels. Although the masticatory efficiency was decreased in according with the small amount in remaining teeth, the speech ability of all patients were improved into the level that they could communicate.

Discussion: Prosthetic treatment and rehabilitation in Aramany Class VI patients are very difficult in esthetics and function. In this study, the efficiency of mastication was decreased in according with small amount of remaining teeth. Some additional treatments, occlusal therapy for example, should be considered for the purpose of improving the patients’ quality of life.
Definitive Obturators with Extensive and Close Contact to Defects

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Purpose: Conventional elastic impression material is used for the final impression of acquired defects in the maxilla. The undesirable undercuts recorded in the cast should be blocked out when making the obturators. In addition, the obturators should be chair-side adjusted for fitting. Most patients were satisfied with the obturators, however, they were having difficulties when using straws for liquid intake. Taking the impression using only impression compound would minimize this problem through improving sealing of the defect.

Method: Impression compound (GC, Japan) was used to take final impressions for defects located in the maxilla. After delivering the definitive obturators, six patients were asked to fill out a questionnaire about patient’s satisfaction and efficiency of the obturators. The questionnaire included VAS test (visual analog scale) and water suck-up test using a straw (Swallowing test).

Results: The VAS test showed that the extension into the defect and close contact of obturators were better than regular obturators. In addition, swallowing test showed that the modified obturators provided better swallowing forces than those of regular obturators. Conclusion: Obturators for acquired defects of the maxillae are basically covering prostheses to re-establish the oral-nasal partition. The estimate of extension into the defect depends on the requirements of retention, stability, and support. If these properties can be obtained from the remaining maxillary structures, it is not necessary to extend into the defects. Therefore, it is usually recommended to extend over the scar band.

In this study, a firm sealing of the defect improved the swallowing function. Therefore, taking the final impression using only impression compound is recommended, since it provides an extensive and closer contact to the defect, which in turn will enhance the sealing of the obturator.
Biomechanical Analysis of a New Craniofacial Implant Design - Influence of Implant Geometry on Strains in the Surrounding Bone. A Finite-Element Analysis

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By using mathematical models, our aim was to compare systematically the bone strains of one commercially available craniofacial implant with two new implant designs.

Material and Methods: Finite-element models were created of cranial bone with a single endosseous implant embedded in high and low-density cancellous bone. Oblique, vertical and horizontal loading was applied. Cortical and cancellous bone were modeled as transversely isotropic and linearly elastic. Perfect bonding was assumed at all interfaces. We determine the main effects of the conventional implant design variables on maximum shear strains in the cranial bone. We compare this result with two new designs of one piece craniofacial implants.

Results: The three implant designs produced similar strain levels when vertical loads were applied. When horizontal load was applied, variations among the designs were greater. The strains of one new design were three times lower than the conventional implant.

The variations found were related to the design of the neck of the new one piece implant which improves the implant bone-anchorage.

Conclusion: Conventional Implant design appears to be the goal standard in craniofacial osseointegration, however, it would be possible to reduce the amount of the strain on the surrounding bone by improving the implant bone-anchorage. This new design could give important advantages to the clinicians, reducing the time of treatment and also the cost and complexity of the procedures.
Design and Clinical Application of a New Scanner-Surgical Template for Placement of Implants in Ear-Bone Anchored Prosthesis

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Proper location of the implants is critical for fabricating ear prosthesis with ideal shape and contour. However, its location not always matches the areas with the best bone, in quality and quantity.

This article describes the process of making and using a scanner-surgical template based on facial landmarks useful as a lap support and mechanical guide for inserting the implant.

Metal rings are placed over a master cast where the optimal position of the implants are planned, to serve as a guide. Also a lap supporting cylinder is located. A vacuum-formed plastic matrix is made of the original cast. The matrix is trimmed leaving the supporting cylinder and the metal rings covered. The plane that goes from the lower border of Tragus to the corner of patients eye is marked in the template as the facial landmark.

The patient with the template is referred to the scanner. The template is placed according to the facial landmarks and fixed with an adhesive band. Then a cross-sectional image is selected where the two metal ring markers are visible to observe the proposed implant position with the available bone and location of vital structures.

At the surgical step the lap is supported by the template which is also positioned according to the facial landmarks. At the same time, the metal rings are used as mechanical guides for the initial drilling to prepare the implant placement.

Through this procedure, the proposed implant location can be aligned with the intended protheses and, most importantly, the underlying bone topography.
One-Stage Orbital Implant Reconstruction - 9 Years Case Report

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It has been suggested that one-stage (non-submerged) intra oral implants are as successful as two-stage (submerged) dental implants. A report where skin-penetrating abutments at the mastoid process were connected at the time of implant installation showed no difference in the outcome between this therapy and the conventional two stage procedure. Some surgeons suggest that one stage technique in auricular reconstruction is associated with fewer skin reactions and has advantages in reducing both the rehabilitation period and the cost of the procedure. However, the one stage procedure have been reported by using submerged implants with immediately connected abutments. There are no experiences with non-submerged implant designs (One piece implant) and in sites other than the mastoid.

In this case, 3 ITI one-stage implants (Straumann, Switzerland) were placed at the orbital process, post tumor resection and radiotherapy.

At the 9 years control, the magnetic abutments (Steco, Germany) were removed in order to clean and the very healthy peri-implant skin was observed.

These information could give us relevant information in order to improve craniofacial implant designs and craniofacial implant therapy reducing both the rehabilitation period and the cost of the procedure.

Assessment of Functional Rehabilitation of Maxillofacial Patients

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Purpose: In the field of maxillofacial prosthetics, the pivotal function of which is to enhance the functional rehabilitation of patients, substantial attention has been paid on how to assess the functional rehabilitation in question, as seen in the literature. However, there is a little information on criteria to assess the function.

Material and Methods: All papers which appeared in Journal of Maxillofacial Prosthetics (1996-2005) were reviewed on the viewpoint of assessment of functional rehabilitation after prosthetic treatment. Twenty-five papers were chosen.

Results: We defined twenty-five papers addressing the change of oral function of maxillofacial patients before and after prosthetic treatment. These papers evaluated the masticatory function, speech function and swallowing function of maxillofacial patients before and after prosthetic treatment. The masticatory function was most often assessed by means of a questionnaire (16 papers), biteforce (7), jaw movement analysis (2), EMG (3) and masticatory efficiency test (5). Speech function was assessed by means of monosyllable (11 papers) and speech intelligibility test (12), acoustic analysis (1), nasal fiberscopy (5), blowing test (5), nasometer (5) and palatogram (1). Swallowing function was assessed by means of a water drinking test (6 papers) and videofluorography (4).

Conclusion: A large number of assessment of oral function have been reported. We suggest the standardized assessment with high reliability and validity should be developed for maxillofacial patients to improve their quality of life.
Mandibular Reconstruction with Vascularized Fibula Flap and Osseointegrated Implants

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Purpose: The most commonly used donor site for reconstruction of mandibular continuity defects is currently vascularized fibula-flap. The placement of osseointegrated implants in the vascularized fibula-flap facilitates functional dental rehabilitation. This report describes two mandibular discontinuity defects treated with fibula-flap and implant-supported prosthesis.

Methods and Materials: Patient-1/ a 62 year-old white male with a history of head/neck cancer of unknown primary. Patient underwent radiation therapy as the treatment of choice. He developed osteoradionecrosis of the anterior/bilateral posterior mandible and underwent total mandibulectomy and mandibular reconstruction with vascularized fibula-flap. Seven dental implants were placed in the reconstructed mandible. Due to altered mandibular arch shape, reduced prosthetic space, and the difficulty getting access to the most distal implants, the mandibular prosthesis was only supported with five implants. The efforts were made to explain the biomechanical disadvantages of having a long cantilever arm, straight alignment of supporting implants, and minimal anterior-posterior spread to the patient. However, due to esthetic concerns, the cantilever arm was extended beyond the acceptable biomechanical guidelines on the left side. Patient-2/ a 62 year-old african-american female with history of squamous-cell carcinoma of floor of the mouth. She underwent left partial mandibulectomy followed by concomitant chemo/radiation therapy. Mandibular continuity was restored with the vascularized fibula-flap on the left side. Four implants were placed in the reconstructed mandible and patient received a complete maxillary denture and implant supported mandibular prosthesis.

Results: On clinical follow-ups, patient-1 presented with episodes of loosening/fracture of the retaining screws on the left side of prosthesis. The prosthesis was then retrofitted to the most distal implant on the left side. Currently there is no evidence of any prosthetic complication or recurrent disease in the clinical follow-ups. Patient-2 shows no evidence of recurrent disease or prosthetic/implant complications.

Conclusions: The patients in our clinical report currently show no sign of any complication with fibula vascularized flaps. Even though patient 2 showed episodes of prosthetic screw loosening/fracture, there is currently no sign of any implant/prosthetic complications. Patients are on 3-month follow-up schedule.
Novel Segmental Overlay to the PMMA Cranial Implant

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An ideal cranial implant should provide protection to the brain, be biocompatible and provide support for an esthetically acceptable appearance. A well fitting alloplastic cranial implant can be fabricated pre-operatively with information corrected from computer tomography (CT) and using a 3D model generated by rapid prototyping technology. However, in many cases a depression at the fronto-temporal region often results after the cranioplasty procedure. Suspected possible causes of this “temporal hollowing” include atrophy of the temporalis muscle, displacement or atrophy of superficial temporal fat pad, or inferior displacement of the temporalis muscle detached from bone/cranial implant.

This poster will present some previous surgical solutions to temporal hollowing and the fabrication of a novel segmental overlay option to the PMMA Cranial implant.
Sensory Outcomes, Function and Quality of Life Following Tongue Reconstruction

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Purpose: The objectives of this study are to determine how sensation of the tongue after surgical resection and reconstruction with an innervated radial forearm free flap is related to function and quality of life, and to determine if patients differ from age- and gender-matched controls.

Methods and Materials: Eight patients with squamous cell carcinoma, who underwent hemiglossectomy and reconstruction of the oral tongue with an innervated radial forearm free flap for treatment of oral cancer, participated in this study. Eight age- and gender-matched volunteers acted as control subjects. Subjects were tested on tasks evaluating the effectiveness of mastication, speech intelligibility, quality of life and sensation on the four quadrants of the tongue. The results were compared between the patient and control groups. In addition, relationships between sensation, mastication, speech intelligibility and quality of life were explored in the patient group.

Results: Preliminary results indicate that patients’ sensory ability (i.e., two-point discrimination, touch and temperature) on the reconstructed side of the tongue differs from the non-reconstructed side and from the control data. However, there were no differences between patients and controls on sensations that use the whole mouth for discernment (i.e., taste and texture). Results also indicate that patients and controls were similar in masticatory ability in that they did not differ in the number of food particles that came to rest on a series of 6 sieves, but did differ in the number of finest particles that came to rest on the plate underneath the sieves. While only the ability to sense texture and form in the patient group was related to bolus reduction, the number of opposing natural tooth pairs may be a more influential factor in bolus reduction. Sensory ability did not influence speech intelligibility outcomes. Within the patient population, several significant relationships were found between quality of life and the other factors that were measured (i.e., sensation, mastication, speech). These relationships will be highlighted in the poster presentation.

Conclusions: This study demonstrates several intricate relationships between sensation of the tongue after reconstruction with an innervated radial forearm free flap and masticatory ability and quality of life outcomes.
Microbial Adhesion to Prosthetic Materials used to Restore Maxillary Defects

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Purpose: To identify microorganisms that adhere to obturators, and measure their adhesion to a range of materials that can be used to make interim and definitive obturators.

Methods and Materials: Swabs of obturators, adjacent tissue and teeth were taken from 10 patients who had undergone maxillectomies. Microorganisms from swabs were plated onto blood, mitis salivarius, and YEPD agar. Representative bacterial colonies from the mitis salivarius agar plates were characterised by Random Amplification of Polymorphic DNA, Polymerase Chain Reaction (RAPD PCR) using an arbitrarily chosen oligonucleotide primer (OPA-02 5’-TGCCGAGCTG-3’). Bacterial isolates were identified by DNA sequencing of 16S rRNA genes. Adhesion of 3H-thymidine labelled bacteria to eight different denture prosthetic materials was measured. Adhesion of a Candida albicans strain (radiolabeled with 35S-methionine), obtained from an obturator swab, to the same materials was also determined. The influence of saliva on adhesion of the microorganisms was investigated.

Results: Microbial analysis indicated that obturators from all patients were colonised with yeast. Candida species from microbial swabs of the obturators were identified using CHROMagar. Obturators from all but one patient were colonised with C. albicans and three had other Candida species present. Characterisation of bacterial isolates using RAPD PCR showed at least 12 types of bacteria; two bacterial strains that were specific to the obturator were identified as Staphylococcus epidermidis and Streptococcus pneumoniae by DNA sequencing. The radioactivity-based adhesion assays found that for all materials tested, a higher proportion of S. epidermidis cells added to assays adhered than S. pneumoniae cells and saliva reduced the adhesion of both radiolabeled bacteria to all materials. In contrast, saliva promoted the adhesion of C. albicans to all materials tested.

Conclusion: Saliva alters the adhesion of microorganisms to denture materials and the adhesion of S. epidermidis, S. pneumoniae and C. albicans to provisional denture materials is higher than to definitive materials. This microbial adhesion may increase the risk of microbial infection in an immunocompromised patient and reduce the lifespan of an obturator, particularly an interim-obturator.
Effects of adhesion of Candida Albicans on Physical Properties of Soft Denture Liners

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Purpose: The purpose of this study was to examine the effect of adhesion of Candida albicans (C. albicans) on shore hardness of acrylic soft denture liners. We tried to evaluate the time to renew the liners for deterioration.

Methods and Materials: Two acrylic soft denture liners, Visco-gel (DENTSPLY, GERMANY) and COE-SOFT (GC, AMERICA), were used in this study. The tested group was incubated in artificial saliva at 37 for up to 4 weeks with 3H-thymidine labeled of C. albicans cells. The radioactivity of the adhered cells on samples was counted with scintillation counter and converted to colony forming unit (CFU). The shore hardness of the tested materials was measured by using the samples incubated with non-labeled C. albicans in the same conditions. The effects of adhesion of C. albicans on the shore hardness of materials were examined with a durometer (Teclock, Japan).

Results: The number of C. albicans was increased gradually during the all incubation period. CFU on Visco-gel was higher than that on COE-SOFT of all the samples. Significant difference was found between both materials at the day 7 and 14 after incubations (p < 0.05). CFU on both materials has increased remarkably at the day 28 after incubation. The shore hardness of Visco-gel incubated with C. albicans was higher than that of all the control samples at every experimental day. Significant difference in the shore hardness of two groups was found at the day 21 after incubation (p < 0.05).

Conclusions: The transition of the shore hardness was different in Visco-gel and COE-SOFT, and hardness of the C. albicans group increased more than the control group in both materials at the day 28 after incubation. CFU on Visco-gel was more superior to COE-SOFT at every experimental day. Therefore, it is considered that the existence of C. albicans affect to the shore hardness of soft denture liners. The results suggested that soft denture liners have to renew until 4 weeks.
Clinical Application of Magnetic Attachment for Maxillofacial Prosthesis

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Purpose: We applied magnetic attachment as a retentive structure and connector between a removable partial denture and an obtulator, and an obtulator and a facial prosthesis.

Methods and Materials: A 73-year-old male patient had an operation on a squamous cell carcinoma of the right maxillary gingival over 2 years ago. Numerous surgical excisions resulted in a defect in the region of the right upper palate. He also had a skin defect on the right cheek due to a postoperative infection with MRSA. Although he had worn a removable partial denture and facial prosthesis, he had been complaining of mastication, articulation, and esthetic problems. After removing all crowns of his upper jaw, seven inner crowns with keeper of magnetic attachment were fixed to the abutment teeth with an adhesive resin cement. Magnetic assemblies were fixed into the outer crowns with the same cement. Metal welding was done between the outer crowns and metal frame. The hollow obturator was made for weight reduction with a heat-curing acrylic resin and a soft lining material. Four pairs of magnetic attachments were applied to connect the partial denture and the obturator. The hollow facial prosthesis was made with medical silicone material and two pairs of magnetic attachments were also applied to connect the facial prosthesis and the obturator.

Results: Although the new maxillofacial prosthesis was heavier than the old one, the VAS score of the patient’s satisfaction was 100. It was thought that the attractive force of the magnetic attachments made good retention and stability of the prosthesis. The new facial prosthesis was small and its adhesion was strong enough for the magnetic attachments without adhesive material for his skin.

Conclusion: The evaluation of mastication and articulation was done before and after wearing the new prosthesis and his complaining improved.
Actuality of Voice Rehabilitation with Prosthesis After Maxillectomy


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Purpose: Prosthetic rehabilitation after maxillectomy for carcinoma is a conventional technic to restore aesthetic, chewing, swallowing and phonetic functions. Many studies have evaluated the speech ability and the quality of voice but most of them are subjective studies based on an analysis by a listener judgment. The aim of our study was to evaluate the voice of the same patient before and after surgery with the prosthesis using an acoustic computerized analysis and a speech analysis by listeners for speech intelligibility.

Methods and Materials: 10 patients were recorded pre and post surgery with and without their prosthesis in a quiet room using a Digital Audio Tape-recorder Sony PD (Sony 60ES, SoftADS, Japan) and a Lem EMU 4535 (Lem communication, Igny, France) microphone placed at 20 cm from the mouth. Speech samples included maximum sustaining of the vowels /a/, reading aloud and monosyllabic word list (plosives and fricatives) and reading a standard french text of 170 words. Frequency features were analyzed with the Computerized Speech Lab (CSL, Kay Elemetrics, Lincoln Park, NJ), the software Adobe Audition and the freeware Praat (www.praat.org) for the perceptive evaluation by the listeners. The acoustic analysis used the Multidimensional Voice Program (MDVP) (Kay Elemetrics, Lincoln Park, NJ). The durational measures recorded were the maximum phonation and the speech rate. The frequency features automatically recorded were the average fundamental frequency in hertz, the fundamental frequency, the standard deviation, the jitter, the shimmer in percent, and the noise to harmonic ratio in percent.

Results: The maximum phonation time before and after surgery is not significantly different ($t = 0.55$). The intelligibility of the fricatives is not deteriorated; the velar plosives are more deteriorated than the labial plosives. The fundamental frequency ($t=0.36$), the jitter ($t=0.69$), the shimmer ($t=0.76$), the formants, the NHR ($t=0.42$), the TMP ($t=0.55$) are stable.

Conclusion: The stability of the vocal features between the pre and post-operative stages is in favour of ours prostheses for the quality of life of the patients.
Introduction: The technique for dental implant has shown remarkable progress. However, the establishment of the implant treatment is not yet in the case with the large bone defect due to such as a cancer, injury and congenital diseases. We experienced the restoration with the implant treatment including the bone graft for a cleft lip and palate patient. Patient and clinical strategy The patient is a 54 years old, male. He had undergone the palatoplasty due to cleft lip and palate. He had the missing teeth from a first incisor on the right side to a second premolar on the opposite side. Since he strongly wished that the region is restored by the fixed prosthesis, although the removable partial denture was fabricated a couple of years ago, we made the plan to augment the ideal residual ridge by the bone graft from a tibia as a first step, and then to place implant fixtures to restore the missing teeth based on first examination including the CT and X rays. After eight months from bone graft, it was confirmed for the bone augmentation on the region by CT examination again. After the surgical treatment, we fabricated the fixed prosthesis on the four implants.

Results and Conclusion At first, we examined the esthetic and its function by the provisional restoration, and also durability of the implants and abutments. Then final restoration was inserted made of PMF. We keep to observing them for the prognosis, so far it was obtained the remarkable functional rehabilitation through the questionnaire and measuring the occlusal force for the ability of mastication.
Purpose: A full-scale model produced using CT data was made following the binder jet method and applied for presurgical diagnosis, surgical simulation, and the production of surgical templates for dental implant treatment. The accuracy of the full-scale model was influenced by setting the binary threshold value. In this study, the accuracy of the full-scale model made with plaster powder was measured by shifting the binary threshold values. Then, we reported one case in which the binder jet model was applied for the planning of osseointegrated implants.

Materials and Methods: A step phantom was made from bone-equivalent material. When it was placed in water, CT was performed. Three-dimensional images were reconstructed using three dimensional visualization software. When it was set at four different threshold values, full-scale models were produced using the binder jet method with plaster powder. Each side of the full-scale models was directly measured using a digital caliper and the resulting values were compared with those of the step phantom.

Results: The mean difference was approximately 0.1 mm in the axial plane when the setting was 0.75 for the threshold. In total, the mean difference was approximately 0.2 mm when the setting was 0.50 for the threshold. Case report: A 50-years-old patient, who with a large ameloblastoma of the mandible underwent segmental mandibulectomy and reconstruction with a rib approximately 13 years previously, was planned to undergo occlusal reconstruction using osseointegrated implants. CT scan was performed, and then a full-scale model was made from the three-dimensional data. Using the model, the optimal sites for osseointegrated implants were determined in the remaining mandible and transplanted rib. Two osseointegrated implants were inserted and an implant-supported prosthesis using magnet attachments was set.

Conclusion: The accuracy of the full-scale model with plaster powder was high when the setting was 0.5 for the threshold in the directions of axial plane and table movement. It was also useful for determining the optimal sites for osseointegrated implants.
Table 31  
Clinical Outcomes - Quality of Life

Prosthetic Rehabilitation of a Combined Maxillectomy and Lateral Mandibular Discontinuity Defect using Progressive Anterior Guidance in an Edentulous Patient

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Purpose: Restoration of a right maxillectomy, partial mandibulectomy in a 64 yr old edentulous male patient with a maxillary obturator and a mandibular resection prosthesis in progressive anterior guidance occlusion.

Methods and Materials: After being diagnosed with Squamous Cell Carcinoma in the oral cavity, a 64 yr old male patient underwent radiation therapy and surgical resection of his right maxilla and mandible. The patient was treated with external beam radiation therapy, therefore making the placement of endosseous implants unfavorable. The surgical resection consisted of the removal of the right retromolar trigone, right subtotal parotidectomy and right radical neck dissection, in addition to the right maxillectomy and partial mandibulectomy. The loss of the right condyle established a right lateral discontinuity defect. A maxillary obturator was fabricated with a functional platform on the side contralateral to the defect. To enhance stability of both protheses, a shortened dental arch was used along with progressive anterior guidance for both the maxillary and mandibular tooth arrangements.

Results: The obturator and complete mandibular denture/resection prosthesis provided adequate phonetics, aesthetics, soft tissue support, function and occlusion. The functional platform allowed for stability, mastication, and a repeatable range of occlusal contact. The progressive anterior guidance provided the patient with a stable occlusal scheme, which allowed ease of disocclusion for a patient with compromised muscular activity, as well as enhanced aesthetics.

Conclusion: Progressive anterior guidance is a viable alternative to consider as a selection of an occlusal scheme for the restoration of an edentulous patient with a lateral discontinuity defect restored with a maxillary obturator and a mandibular rehabilitation prosthesis.
Electromyography and Kinesiography in Maxillo-Facial-Cervical Diseases: Repeatability and Operators Calibration

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Purpose: Most of craniofacial diseases cause, directly or through side effects of the treatment, deep functional alterations to the orofacial musculatures. The ideal treatment of these diseases requires a multidisciplinary approach. Alteration of the maxillofacial musculatures affects the general health of the patient and reduces his ability to return to a normal social life. Functional damage is a direct consequence of the ablative surgery for head and neck cancer or consequence of chemo-radiation treatment. Maxillofacial prosthodontist, as a part of the oncological team, has to actively participate during the treatment in order to improve the final rehabilitation. Functional recovery of the muscular orofacial apparatus can be studied by electromyography and kinesiography. The aim of this research, that is a first step of larger study, is to evaluate the repeatability of these techniques and to train and calibrate the different operators.

Materials and Methods: Electromyography repeatability has already proved in the International literature. To prove the Kinesiography repeatability the plots of opening, closure protrusion and laterality of 3 healthy subjects and 3 mandibular resection patients have been analyzed. After a period of training in order to became confident with both techniques, the calibration of 3 operators has been statistically evaluated.

Results: The kinesiographic opening, closure and protrusion plots resulted repeatable while the laterality plot resulted not repeatable. The operators training period resulted short with a satisfactory calibration.

Conclusions: Electromyography and Kinesiography are suitable techniques to investigate a functional damage of orofacial musculature because repeatable with easy training and calibration of the operators.
Influence of Craniofacial Form on Masticatory Performance with Implant-Assisted Overdentures

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Purpose: The purpose of this study was to compare the effect of craniofacial form and masticatory function of conventional and implant–assisted mandibular dentures in edentulous patients. Specific craniofacial measures were made using a digital imaging and measurement evaluation program.

Methods and Materials: A randomized controlled clinical trial was undertaken to compare treatment success rates, functional and perceptual outcomes, and cost of care with mandibular complete dentures (CD) and implant overdentures (IOD) in average denture wearers. Subjects were evaluated at entry and then received new dentures with either mandibular conventional or implant overdentures. Pre- and post-insertion cephalometric radiographs were taken and evaluated for 25 CD subjects and 44 IOD subjects. Masticatory performance was measured 6-months after treatment completion for each group. The radiographs were evaluated using Dolphin software. Specified landmark points were selected for identification by two clinicians for determination of facial form (brachyfacial, mesofacial, and dolichofacial) and skeletal class (I, II, III). Masticatory performance was evaluated with standardized tests on the preferred chewing side (PS) with two test foods (peanuts and carrots). Additionally, tests of swallowing threshold performance (SWT) were made with the same foods. Comparison of mean masticatory performance scores for PS and SWT performances were evaluated with multivariate analysis of variance (MANOVA) for treatment (CD/IOD) and facial form (brachyfacial, mesofacial and dolichofacial), with separate analysis for treatment and skeletal class (I, II, and III).

Results: PS performance with peanuts was highest in the CD group for subjects with mesofacial form (45.1+13.0) compared to those with brachyfacial (36.4+11.1) or dolichofacial (34.5+13.0) form. For the IOD group, subjects with a brachyfacial form had the highest mean PS performance with peanuts (42.1+15.6), compared to those with mesofacial (38.8+14.5) and dolichofacial (35.9+16.7) forms. No statistically significant differences were seen for the main effects of treatment type or facial form, or for interaction effect (p>0.05). MANOVA results for skeletal class indicated a main effect, with performance in Class I subjects being greater than for Class II subjects (p=0.047), and a marginal interaction (p=0.081) between treatment and skeletal class.

Conclusions: Subjects treated with a brachyfacial form had higher masticatory performance if they were treated with and IOD in the mandible compared to an CD. Subjects with a mesofacial form performed better if treated with a CD compared to an IOD. Performance was poorest in subjects with a dolichofacial form.
A Clinical Study of Dental Implants Placed in Bone Graft

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Purpose: After resection of the mandibular tumor, prosthetic reconstruction for mandibular discontinuity case is challenging than the continuity case. However, one of the continuity cases of extensive tissue loss isn’t easy to match between the maxillary and mandibular alveolar bone positions. That means the disharmony of occlusion. The augmentation procedure of the free iliac crest graft isn’t only concerned with surgical reconstruction. It is also necessary that careful treatment is planned for prosthetic reconstruction. This case report describes the importance of free iliac crest grafts positions and meetings where the prosthodontist and oralsurgeon discuss a treatment plan.

Patient and Methods: A 30 year old woman was diagnosed as having an ameloblastoma in the left alveolar bone of the mandible. A marginal mandibulectomy of the ameloblastoma was performed. Subsequently the patient’s chief complaint was with the reconstruction of the masticatory function and esthetics. We diagnosed that free iliac crest graft and implant treatment was necessary. We made a diagnostic wax-up and surgical template for matching between the maxillary and mandibular alveolar bone positions. The surgical template was used to position a free iliac crest in the operating room.

Results: Prosthetic treatment has been finished. We have been able to achieve a good occlusal balance. The patient is satisfied with her masticatory function, esthetics and is therefore content with the results.

Conclusion: The mandibular bone position from maxilla in marginal mandibulectomy cases is often located in a buccal position. Therefore, it was important to match between the maxillary and mandibular alveolar bone positions and for the prosthodontist and oralsurgeon to discuss the treatment plan for the reconstruction of good masticatory function and esthetics.
**Table 35**
Clinical Outcomes - Quality of Life

**Prosthetic Treatment of a Maxillectomy Prepubertal Patient:**
A Case Report

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Purpose: After hard palate resection in adults, microvascular reconstruction and prosthetic rehabilitation is undergone. In case of prepubertal patients, prosthetic rehabilitation is sometimes selected because there is the expectation of further significant somatic growth, while the prosthesis can be periodically modified. The objectives of prosthetic rehabilitation in young children with missing teeth are to provide the improvements of esthetic, phonetic and masticatory function, to prevent psychologic trauma, and to avoid development of abnormal oral habits. This is reported about prosthetic rehabilitation for a maxillectomy prepubertal patient due to mesenchymal chondrosarcoma.

Case Report: An 8-year old Japanese boy was referred to the hospital of Tokyo Medical and Dental University for examination, evaluation, treatment. He had a mass in his right maxilla. A diagnostic incisional biopsy of the mass was performed. At first, microscopic examination and immunohistochemical studies confirmed the diagnosis of Ewing sarcoma. After chemotherapy and surgical resection, the diagnosis was mesenchymal chondrosarcoma. Post-surgical rehabilitation of the patient was discussed among head and neck surgeons, pediatrician and maxillofacial prosthodontists, it was planned to follow by prosthetic rehabilitation with an obturator. Before the surgery, he was presented to the Department of Maxillofacial Prosthetics of the Tokyo Medical and Dental University for fabricating a surgical obturator. The alginate impression of preoperative maxillary was made and the surgical obturator was applied after the surgery. After that, an interim obturator was fabricated twice because the defect mucosa became smooth and smaller. The obturator was sometimes adjusted and relined with soft lining material (Coe-soft; GC America). After 1.5-year of treatment, the patient uses the third obturator that is ready for changing his dentition.

Discussion: No clinical disorders were observed neither in the tissue nor the obturator prosthesis with 1.5-year prognosis. But the eruption direction of the right maxilla premolar tooth(15) can not be predicted. The case was discussed with orthodontists, it was determined that the tooth needs to be observed until left maxilla deciduous teeth is extracted. After that, orthodontists will move the 15 tooth to good position for fabricating the prosthesis if it is necessary. Prosthetic rehabilitation is to provide improvements of phonetic and masticatory function. From now on, phonetic and masticatory evaluation will be undergone, the results will be refered for him and another prepubertal patient. His obturator prosthesis should be adjusted or refabricated again due to his growth.
Maxillofacial Prosthetic Management for Edentulous Patient with Microstomia: A Clinical Report

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Microstomia is defined as an abnormally small oral orifice. It may be caused by scleroderma, burns, radiotherapy, cleft lips, maxillofacial trauma, or surgical treatment of orofacial neoplasm.

Clinical report: A 63-year-old man was referred for treatment to the Maxillofacial Prosthetic Clinic at the University of Alabama at Birmingham. Patient presented very small oral opening, resulting from skin graft reconstruction, after removal of squamous cell carcinoma in the lower lip. With effort the patient could manipulate a mandibular denture into his mouth, but could not insert the maxillary denture. This clinical report describes the techniques used for impressions and fabrication of a collapsible maxillary removable complete denture with a custom made palatal hinge, as well as the techniques to fabricate the hinge for the record base, the collapsible record base, the final hinge made out of gold and wrought wire, the use of Hannes Anchor attachment to keep the prosthesis in place after unfolded in the mouth. The patient was instructed to insert and remove the prostheses at the delivery appointment. Instructions were given to the patient to perform meticulous oral hygiene and follow up appointment every three months.

Conclusion: It is very difficult to treat patients with severe reduction of the oral aperture. In this case report the techniques for impressions and fabrication of a collapsible maxillary removable complete denture with a custom made palatal hinge for a patient with microstomia have been described. Patient has been wearing the complete dentures successfully without any adhesive.
Three Vowels for Standard Words in Nasometer Test

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Purpose: Nasometer has been used for evaluate patients with velopharyngeal function impairment to improve their speaking efficiency. With Nasometer, patients were asked to read several passages containing at least 30 words or more to get the average “Nasalance score”. For the purpose to find some monosyllable words for Maxillofacial prosthetics patients whom are difficult to speak such long passages, the vowels which is the voice sound were selected. By the result of our former study, some vowels from Thai and Japanese language were chosen to evaluate, whether they can be used as standard testing words in Nasometer test or not.

Methods and Materials: Two Groups, 20 Japanese and 20 International (10 nations) normal adults without any Maxillofacial defect, ages 24-44 years, were asking to read 7 vowels (/a/, /i/, /u/, /e/, /o/, um, /aj/), 6 times for each sound. The “Nasalance Score” was recorded and calculated during reading by Nasometer II model 6400 (Kay international). The Coefficient of Variation (CV) was used to evaluate the “Nasalance Score” of each vowel that below 0.33. Comparing the results of these two groups with independent t-test.

Results: Only three vowels /a/, um, /aj/ of both groups had CV of “Nasalance Score” below 0.33. Japanese group 0.269, 0.228, 0.329 and International group 0.316, 0.18, 0.33 respectively. When compared the mean Nasalance of each vowel, /a/, um, /aj/, by pairing the same vowels, there is significant difference in all pairs of vowels of these two groups (p<0.05)

Conclusion: By using Nasometer test, three monosyllable vowels, /a/, um, /aj/ also can be used as the standard test words for ordinary people, as same as the results from our former study in Thai people. These three vowels can be the primary detection for improper velopharyngeal function in obturator or Maxillofacial Prosthetics appliance wearing patients. But there is significant difference in mean of sample groups, it seem to be better that each language have to find their own mean Nasalance scores in each vowel to be the standard value. As this was a primary study, further clinical studies are required to clarify the efficiency of these 3 vowels.
The Biomechanics of Symmetric Surgically Assisted Rapid Maxillary Expansion

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Purpose: Maxillary distraction has been utilized to facilitate orthodontic treatment of dental-skeletal mismatch. Surgically assisted rapid maxillary expansion (SARME) has been recommended for non-growing patients with transverse maxillary deficiencies greater than 6 mm. The purpose of this investigation was to biomechanically assess the symmetric and asymmetric effects of SARME.

Methods and Materials: A three-dimensional model of a human adult skull was fabricated using different birefringent materials to simulate bone and teeth. A Hyrax appliance was customized to fit the assembled model and was luted to the first premolars and molars. The appliance was activated eight one-quarter turns. Model was immersed in a tank of mineral oil to minimize surface refraction and thereby facilitate photoelastic observation. Resulting stresses at all articulations were recorded photographically in the field of a circular polariscope. The following sequential osteotomies were performed: midpalatal suture release, lateral maxillary sinus walls, pterygoid plates, medial sinus walls, ascending palatine bone, and septal disarticulation. Photoelastic observations were repeated after each osteotomy.

Results: The distribution of forces following activation of the Hyrax showed maxillary expansion before and after osteotomies. Midpalatal osteotomy facilitated maxillary expansion. Failure to release the pterygoid plates from the maxillary tuberosity is a major contributor to skeletal resistance. Asymmetric expansion is observed when the septum is not disarticulated. No appreciable changes in force distribution were observed after medial sinus wall osteotomies.

Conclusions: The results indicate that, following standard surgical protocol for SARME, adequate maxillary expansion may be achieved. Release of the pterygoid-maxillary and midpalatal sutures facilitated this expansion. The primary osseous anatomic entity which may contribute to asymmetric expansion appears to be the septo-palatal junction.
Table 39
Implants in Maxillofacial Prosthetics
Craniofacial and Oral Reconstruction

Preprosthetic Conformer to Evaluate Fit and Marginal Extension of a Facial Prosthesis

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Purpose: This presentation will describe the use of a clear silicone rubber conformer to evaluate retention, stability, and margin extension of a facial prosthesis before the prosthesis is actually fabricated.

Method and materials: Three patients with facial defects had a facial moulage and master cast fabricated in preparation for a facial prosthesis. Each had a tissue conformer cast in clear medical grade silicone rubber that mimicked the fit, shape, and extension of the planned prosthesis. The retention, stability, and marginal extension of each conformer was evaluated and adjusted to establish the optimal fit and marginal extension of the prosthesis.

Results: In each case, the conformer was used to determine the ideal marginal extension of the prosthesis by identifying areas of soft tissue movement where the cast needed to be adjusted to allow for a close marginal fit. Areas and degrees of soft tissue undercuts were tested and determined to improve prosthesis retention and stability.

Conclusion: A soft tissue conformer may be used to evaluate the final fit and marginal extension of a facial prosthesis before the prosthesis is fabricated. This technique saves time and determines the ideal fit for the prosthesis. The technique is equally useful for an adhesive-retained or implant-retained prosthesis.
Sigmund Freud, aged 66 and smoking up to 20 cigars a day, had squamous cell carcinoma on his right soft palate. From 1923 until 1939 he had 33 operations. Treatment under local anaesthetics consisted of a resection of the right palate and a coronoidectomy. The maxillectomy cavity was lined with a split skin graft supported by gutta percha on the surgical obturator.

In the course of his disease seven obturators were provided. Despite surgery and radiotherapy, a recurrence of the cancer was diagnosed in 1936. His terrible pain was relieved with orthoform, a relative of cocaine. The skin over the right zygoma became gangrenous and eventually there was a perforation between the oral cavity and the skin. Freud kept on smoking until the end. He was given 2 times 200 mg of morphine. He slipped into a coma and died on the 23rd September 1939, aged 83 years.
Table 41
Clinical Outcomes - Quality of Life

Study of QoL and Function in Mandibular Resection Patients: Conventional versus Implantoprosthetic Rehabilitation

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Purpose: Survival statistics alone may no longer be valid when used as evidence of effective outcomes. Nowadays health care providers have to deal with functional and psycho-social aspects. Multidisciplinary approach is the way to treat head and neck cancer patients in order to gain a satisfactory recovery comparable to the pre-surgical condition. The aim of this preliminary study is to evaluate the quality of life and the functionality of mandibular resection patients comparing the conventional prosthetic restoration with implantoprosthetic rehabilitation.

Methods and materials: Patient enrolled in this study underwent ablative surgery for oral cancer involving the mandible, the floor of the mouth and the lateral border of the tongue. Residual defects were lateral mandibular discontinuity defect and mandibular reconstruction with three different plastic surgery: primary closure, miocutaneous flap and microvascularized free flap. The pilot study enrolled 30 patients: 15 restored with conventional removable prosthesis and 15 restored with implant assisted prosthesis. Four questionnaires were administered: the EORTC QLQ-C30 (European Organisation for Research and Treatment of Cancer Quality of Life Questionnaire), Dysarthria inventory (Yorkston inventory modified by Schindler), Dysphonia inventory (Schindler), Andersson dysphagia inventory. A masticatory performance test, according to Olthoff LW, was performed on 10 patients (5 from each group, randomly chosen).

Results and conclusion: The preliminary results of the study underline the positive influence of the implants of the aspects investigated (psychological and functional)
A Morphological Evaluation of the Cut Surface of Natural Tooth

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Purpose: Rest seat or guiding plane preparation is an essential part of the prosthetic preparation for partial denture treatments. These preparations are confined within the outer enamel surfaces and are left exposed after completion. The oral exposure of these preparation areas have not been ultrastructurally examined, and the decay risk in relation to the ultrastructural changes may be evaluated. A completed preliminary investigation has demonstrated cuticle film deposition on the surfaces of prepared enamel. @piece attached on the acrylic palate and maintained within the oral cavity for a period of time. The cuticle film was evaluated on the prepared cut enamel surface. (second enamel cuticle/minute granulated powder crystal) The purpose of this examination is to evaluate characteristics of the new deposit cuticle film following preparation using ultrastructural SEM, TEM and electron diffraction microscopy.

Method & Materials In this study Planned extraction third molars were selected as a base and substrate for evaluation of cuticle films depositions to imitate more appropriate clinical condition. Patients were selected and appropriate institutional documentation and authorization was obtained. Intraoral guiding plane tooth preparations were prepared using rotary instrumentation. The preparation were then left for a fixed period time(3,6 months), and subsequently extracted. Specimens were then sent for SEM and TEM examination including electron diffracted test.

Result & Discussion Both on the 3 month and 6 month deposition materials were observed. Enamel crystal degradation was not recognized despite of biofilm accumulation on prepared enamel surfaces. Granulated powder crystal was observed on the 6 month samples only. Electron diffraction evaluation demonstrated that the granulated powder crystals were ring shaped, similar to original enamel polycrystal structure. Further evaluation of the observed granulated powder crystal (6 month findings) is recommended to examine possible remineralization in the influence of saliva.
The Screening System on Aspiration with the Voice Evaluation Technique

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Purpose: In aged people and glossectomy or mandibulectomy patients, swallowing ability is usually compromised. Among the swallowing disorders, the aspiration is acute problem. Thus the aspiration causes aspiration pneumonia. For the evaluation of the aspiration, the video fluorography and the questionnaire is commonly used. However, the Video fluorography has serious problems about the radiation exposure and the aspiration during swallowing the contrast medium when examine patients. Some investigators use the questionnaire to verify the dysphagia and aspiration, the Fujimoto’s dysphagia screening questionnaire for instance, but it needs a period of time and it is confusing and hard not only for the aged patients but also for exhausted postoperative patients and especially hard for the dementia patients. Because of close relationship in larynx structure between pharyngeal swallowing function and the speech function, solving these problems, we have the hypothesis that it will be possible to do the aspiration screening with the voice evaluation technique. The purpose of this investigation is to establish a screening method on the aspiration problem with the voice evaluation technique.

Methods and Materials: Twenty three patients with mandibulectomy and glossectomy, fifteen males (age 57 to 84) and eight females (age 61 to 81), were participated in this study. Aspiration evaluation The Fujimoto’s Dysphagia Screening Questionnaire sheet was used for the aspiration evaluation. Voice disorder evaluation All the patients were ordered to utter /a/ sound for 3 seconds in a sound treated room. The utterance was recorded to Elementric Computer Speech Lab system (model 4300) and analyzed using Multi Dimensional Voice Program software, Noise to Harmonic Ratio were adopted in this study. This result of research group had already reported at the congress of American Academy of Maxillofacial Prosthetics at Los Angels in 2005. Statistical analysis Spearman’s correlation coefficient was used to investigate the relationship between the result of the voice disorder evaluation system and the dysphagia screening questionnaire.

Result: The Spearman’s correlation coefficient showed 0.58 and P value was 0.0028. Conclusion: There is a possibility that the aspiration screening can be carried out with the voice evaluation technique. It is easy to do and does not have risk in examination.

Conclusion: We conclude that the screening system on aspiration with the voice evaluation technique is clinically useful.
The Comparison of Candida Species in Saliva between Postoperative Malignant and Benign Tumor Patients

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Purpose: Inflammation is a necessary process by which the body rejects microbial invaders. Unfortunately, in some circumstances, inflammation persists without attaining its foremost objective. Inflammatory cells chronically inundate an organ system and, in some process, damage normal host cells. Virtually all clinicians recognize the link between chronic inflammation and cancer. Whether the underlying process be colitis, chronic skin ulceration, hepatitis, pancreatitis, cystitis, or gastritis, the long-term outcome is frequently malignancy. Although this association is well accepted, it is poorly understood. Oral candidiasis presents clinically in many forms, and its first stage shows inflammation in what is called gingivostomatitis. Oral candidiasis results from yeast overgrowth and penetration of the oral tissue when the host’s physical and immunological defenses have been undermined. It has been reported that Candida albicans is a promoter of oral mucosal neoplasia, because Candida albicans is a necessary cause for oral candidiasis. The purpose of this study was to investigate the differences of colonization of oral candida between malignant tumor and benign tumor patients.

Methods and Materials: The Subjects in this study were twenty postoperative oral malignant tumor patients and twenty oral benign tumor patients. All subjects were treated with maxillofacial prosthetics. Saliva from patients were incubated on CHROMagar$Candida medium. The determination of medically important Candida species were done by observations on colony color.

Results: The amounts of Candida species in saliva of postoperative oral malignant tumor patients were significantly larger than those of oral benign tumor patients. The ratio of isolation for Candida species of postoperative oral malignant tumor patients were significantly higher than those of oral benign tumor patients, and there is statistical significance in all species (Candida albicans, Candida tropicalis, Candida glabrata, Candida krusei, and Candida parapsilosis).

Conclusion: There is a possibility that such observation of colonization of oral Candida will be able to use as a screening technique for the oral tumor patients’ prevention of recurrence. This method is very simple and does not have any risk in examination. We have considered that this screening method is clinically valuable.
Fabricated Polyurethane for Maxillofacial Prostheses: Properties Evaluation and in Vitro Study

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Purpose: To fabricate the polyurethane sheet from liquid form for marginal improvement of the maxillofacial prostheses

Methods and Materials: The polyurethane sheet was fabricated by pouring the liquid polyurethane in the gypsum mold. It was kept in hot air oven at 70 oC for 48 hours for complete curing. Investigation of the polyurethane sheet properties was divided into 2 parts. The first part was to measure the tensile strength, tear resistance and peel resistance between polyurethane sheet and triacethoxy siloxane by using 3 coupling agents in the condition with or without heat treatment according to ASTM D 638-01, 1938-92 and 1876-93, respectively. The second part was to test the cytotoxicity of polyurethane sheet according to the ISO 10993-5. In this study triacethoxy siloxane was use as the control group.

Results: The result from the first part evaluated by Lloyd universal testing machine showed that the tensile strength (2.39±0.19 MPa) and tear resistance (33.88±2.19 N/mm) of polyurethane sheet were significantly higher than the tensile strength (0.51±0.03 MPa) and tear resistance (0.77±0.11 N/mm) of triacethoxy siloxane sheet (p<0.05), respectively. For the peel resistance measurement, there was no bonding between polyurethane sheet and triacethoxy siloxane in the group treated with S-2260, A-4040 coupling agent in both with or without heat treatment. The group treated with 1205 coupling agent showed the strong bonding that produced cohesive failure in triacethoxy siloxane material in both condition of heat treatment. The second part, in vitro study, the human gingival fibroblast demonstrated well proliferation and well attachment around and on the surface of polyurethane and triacethoxy siloxane materials.

Conclusion: Polyurethane sheet fabricated from the liquid form showed the excellent mechanical properties in both tensile strength and tear resistance. These properties are the ideal requirement for the marginal strength of facial prostheses. The 1205 coupling agent can be used in maxillofacial prostheses to improve the bonding ability between polyurethane sheet and triacethoxy siloxane. Both polyurethane and triacethoxy siloxane showed cellular biocompatibility. Therefore, it would be worth to modified liquid polyurethane for lining beneath the silicone prostheses.
Three-dimensional Database of Ear Shapes for Auricular Prosthesis

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Purpose: We have been studying the manufacturing methods of auricular prostheses applying 3D-CT data and Rapid Prototyping devices. The shape of the ear differs from person to person. Adjustment of size or a certain amount of transformation in the shape of the prototype auricular prosthesis is possible with a 3D-CAD system, but the shape is easier to design given access to several examples of original data. Consequently, from currently accumulated cervical 3D-CT data we selected cases in which the auricular shape was completely included, and extracted the surface shape of the auricle to create a 3D-shape database.

Methods and Materials: The cervical 3D-CT data used was from over 70 cases that included the complete auricular shape, selected from over 130 scans in storage, taken to examine for maxillofacial deformity, tumors, wounds, and so on. The CT data is one slice consisting of a 512X512 pixel matrix. Initially each slice was 2 mm thick, but in recent years the output has become 0.5 mm. From this, an area of 150X150 pixels, focusing on the auricle and the external auditory meatus, was extracted and, because of the rough resolution, enlarged to 300X300 pixels by three-dimensional Bi-Cubic interpolation, and the number of the slices quadrupled. This data was then binarized to three –96, -128, and –160 CT value thresholds, from which the surface shapes were extracted and database created.

Results: It can be considered that the data from different threshold values is effective in shape variation. However, because the similarity of shapes, classification and arrangement has yet to be confirmed, it is still difficult to select a shape from the database for individual cases. Because of this, the making of a sample model of each shape, using a Rapid Prototyping device, and matching the shade at the time of the crown prosthesis production, may be considered as the best solution.

Conclusion: In future, we hope to proceed with shape classification and arrangement, while producing samples of typical shapes.
Integrating Digital Technologies in the Fabrication of a Nasal Prosthesis

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Purpose: A forty-three year old Caucasian female presented for prosthetic treatment following ablative surgery (rhinectomy) and radiation therapy for squamous cell carcinoma of the nasal cavity. Acute radiation effects involving the mucosal lining of the nasal cavity impeded attempts at facial moulage. The patient’s remote location also hindered her access to care. The purpose of this presentation is to describe the integration of computed tomography (CT), laser surface digitization, computer-assisted design, and rapid prototyping to design, fabricate, and deliver a nasal prosthesis.

Materials and Methods: Topographic data of the facial defect site were acquired via CT scan. A pre-rhinectomy cast of the patient’s face was laser-scanned to acquire three-dimensional data upon which a prosthetic nose would be based. Computer-assisted manipulation of these data was performed to virtually position the nose and to design a mold for the nasal prosthesis. Stereolithography was used to construct a model of the facial defect as well as a mold for the prosthesis. The mold was used to fabricate a wax prosthetic pattern. The wax pattern was positioned and refined on the stereolithographic model prior to investment within a conventional gypsum mold. The prosthesis was processed using a platinum silicone elastomer with base shade determined at the initial visit. The prosthesis was externally tinted using digital images as a reference for color and characterization. The patient was recalled and the nasal prosthesis was delivered.

Results: A nasal prosthesis with acceptable contours and color match was fabricated. Prosthetic margins were comparable to those obtained through conventional methods. Data acquisition, design/fabrication, and delivery were accomplished within two clinical appointments.

Conclusion: Digital imaging, computer-assisted design, and rapid prototyping are emerging technologies being used in the design and fabrication of facial prostheses. The advantages of their use include: (1) greater patient comfort through the elimination of traditional impression techniques, and (2) greater patient convenience through the elimination of procedures requiring multiple patient visits. Both of these advantages were made apparent in this case report.
Load Transfer Characteristics of a Simulated Immediately Loaded Implant

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Purpose: Immediate functional loading of dental implants is a relatively new approach. The stresses developed during immediate loading of an implant have not been elucidated. The purpose of this study was to determine the effects of varying degrees of simulated implant osseointegration on load transfer.

Materials and Methods: Composite photoelastic models using two different resins to simulate trabecular bone and 1mm thick layer of cortical bone. A 4x10mm threaded implant (3i) was embedded into each model. Four different degrees of implant osseointegration were modeled as percent contact with simulated trabecular bone: immediate loading 10-15%, one month post insertion 50-60%, four to six months post insertion 75-80%, and complete integration 100%. The contact simulation was obtained by blocking out various amounts of threads using light cure composite. Axial and angled loads were applied on an abutment (10mm height) attached to the implant. The stresses developed within the supporting structures were observed and recorded photographically in the field of a circular polariscope.

Results: There were some similar general load transfer characteristics with all simulated degrees of integration. Under axial loading, increased symmetrical stress was observed that was highest at the apex within the trabecular simulant. This stress was higher for the immediately loaded condition and least for the fully integrated condition. Under angled loading, the highest stresses occurred along the length of the implant on the side away from load application. Again, the highest stress was seen with the immediately loaded condition and the least for the fully integrated condition. Angled stresses observed were greater than the axial loads tested. For all loadings there tended to be higher stresses generated within the cortical plate with the immediate loading model.

Conclusion: The higher stresses observed with the immediately loaded (least integrated) implant reinforces the necessity of assuring that such implants be inserted in good quality bone. Further, the higher stresses developed under angled loading suggest that occlusal design should minimize non-axial forces. Initially, occlusal loads should be controlled to minimize stress production on partially integrated implants.
From a Surgical Stent to an Obturator: A Simplified Way

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The presurgical communication of the patient, surgeon and prosthodontist is key to a successful prothetic rehabilitation for a maxillofacial defect. The well designed surgical stent provides surgical packing and immediate obturation for the defect area. It also can be converted into an interim obturator to improve patient’s speech and deglutition for few months before the final prosthesis made. An easy and accurate impression technique for the definitive obturator is described in this presentation.

Fabrication of Facial Implants using Photo-Curable Skull Model and Laser Welding

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Purpose: The method of using implants to retain a facial prosthesis affords far better retention than do glass or adhesive materials. Patient satisfaction rates with implant-supported facial prosthesis are also high. We usually use Epitec system as an implant for facial prosthesis. It is not easy however to ensure close fit between the carrier plate and bone during implant installation. To facilitate the process, we have devised a method to make the carrier plate adaptable to bone on a photo-curable skull model. Prior to surgery, a lattice carrier plate may be cut at opportune places and welded by laser beam so that it closely fits the skull model. In this study, technical details of our procedure will be described.

Material and methods: From a photo-curable skull model based on patient’s CT data were further created a craniofacial bone model and a soft tissue surface model. Epitec carrier plates were bent on the craniofacial bone model before a carrier plate frame covering a wide bone surface area was fabricated by laser welding. The carrier plate was then fixed on the craniofacial bone model. The soft tissue surface model was repositioned on the bone model to ascertain close fit between abutment positions and skin.

Results: The carrier plate fabricated on the skull model was placed with the patient’s orbital bone after sterilization. A facial prosthesis was then fabricated as per common manner after surgery.

Conclusion: Processing of carrier plates by use of a photo-curable skull model and laser welding has proved to be effective in reducing operation time while enhancing adaptation with bone surface. This method had a good effect on retention of a facial prosthesis.
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