2017 CONFERENCE PROGRAM

4th Joint Meeting of the

ISMR-AAMP

San Francisco, California USA

October 28-31, 2017

14th Meeting of the

ISMR

International Society for Maxillofacial Rehabilitation
ismr-org.com

64th Annual Meeting of the

American Academy of Maxillofacial Prosthetics
maxillofacialprosthetics.org

Corporate Silver Patron: QUINTESSENCE PUBLISHING

14th Meeting
of the ISMR

64th Annual Meeting
of the AAMP

Welcome Colleagues to the 4th Joint Meeting of the

International Society for Maxillofacial Rehabilitation
and the
American Academy of Maxillofacial Prosthetics

October 28-31, 2017
Palace Hotel
San Francisco, California USA

2017 Meeting Title

Research and Patient Care

BRIDGING THE GAP

Meeting Planner **RES SEMINARS**
4425 Cass St. Suite A San Diego, CA 92109
T: 858.272.1018 F: 858.272.7687
res@res-inc.com www.res-inc.com

TABLE OF CONTENTS

Meeting Planner **RES SEMINARS**
4425 Cass St. Suite A San Diego, CA 92109
T: 858.272.1018 F: 858.272.7687
res@res-inc.com www.res-inc.com

ISMR History

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

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

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

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

The ISMR advances interdisciplinary maxillofacial rehabilitation throughout the world.
"Advancing Head & Neck – Maxillofacial Rehabilitation Together"

www.ismr-org.com

ISMR International Society for Maxillofacial Rehabilitation

ISMR Officers & Board of Councilors

President
Dr. Dale Howes

Vice President
Dr. Daniel O'Connell

Secretary
Dr. Claudio Brenner

Treasurer
Dr. Peter Gerngross

Immediate Past President
Dr. Harry Reintsema

ISMR Board of Councilors
Dr. Robert Taft
Dr. Dennis Rohner
Dr. Alvin Wee
Dr. Joseph Huryn
Dr. Martin Osswald
Dr. Jana Rieger
Dr. B. Srinivasan

ISMR PAST PRESIDENTS

John Beumer III, D.D.S., M.S.....	1994 Palm Springs, CA
Salvatore Esposito, D.M.D.....	1994 Palm Springs, CA
Kwang Nam Kim, D.D.S., M.D., PhD	1996 Seoul, KR
Giulio Preti, D.D.S., M.D., PhD.....	1998 Torino, IT
Ian Zlotolow, D.M.D.....	2000 Kauai, HI
Ian Zlotolow, D.M.D.....	2002 Okinawa, JP
John Beumer III, D.D.S., M.S.....	2004 Maastricht, NL
John Beumer III, D.D.S., M.S.....	2006 Maui, HI
David J. Reisberg, D.D.S.....	2008 Bangkok, TH
David J. Reisberg, D.D.S.....	2010 Sestri Levante, IT
Johan Wolfaardt, B.D.S., PhD.....	2012 Baltimore, MD
Harry Reintsema, D.D.S., PhD.....	2013 Santa Ana Pueblo, NM
Harry Reintsema, D.D.S., PhD.....	2014 Xi'an, CN
Harry Reintsema, D.D.S., PhD.....	2015 Groningen, NL
Dale Howes, B.D.S., MDent.....	2016 Belgrade, Serbia

We thank all past ISMR Presidents for their dedication and service

AAMP 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 Academy was officially incorporated in Cook County (Illinois) and received its charter on January 29, 1953. 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 actual founding of the Academy was preceded by many organizational meetings during 1951 and 1952. The "founding group" of 25 dentists met in the "Windy City" and established a constitution, ratified by-laws with set standards, and requirements for active membership. Since then, the Constitution and By-laws have been revised as needed.

The "founding fathers" elected the Academys first officers on February 24, 1953. They were: Dr. Aelred Fonder, President; Dr. R. E. Stenford, Vice President; Dr. Henry Carney, Secretary; and Dr. A. J. Ackerman, Treasurer. The name of the organization was officially changed to The American Academy of Maxillofacial Prosthetics at its annual meeting in 1954.

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 the Pick Congress Hotel. In 1959, it was decided to follow the American Dental Associations annual meeting location and time and in 1960, the first meeting of the Academy was held in conjunction with the ADA meeting in Los Angeles. After experiencing difficulties with the ADA Housing Bureau, the Board of Directors decided to coordinate the Annual Meeting with the American College of Prosthodontists which gave the advantage to our Fellows to attend both meetings. Our first meeting with the College was in October of 1973 in San Antonio, Texas.

The first banquet of the Academy was held at the Pick Congress Hotel on February 1, 1957. Since then, our annual President's banquet has been on the second day of our Scientific Program. 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. The Academy's seal or emblem was presented and approved in 1959. Certificates of membership bearing the seal have been issued to all members since then. In 1973, the "Membership" certificates were changed to "Fellowship" certificates.

Education and training of maxillofacial prosthodontics 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 held at the Playboy Club in Lake Geneva, Wisconsin. The title of the course was "Management of the Maxillectomy Patient with Orbital Extension". The 22nd course is scheduled for November 5th (1997) in Orlando.

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.

We are an association of prosthodontists who are engaged in the art and science of maxillofacial prosthetics. Our mission is to accumulate and disseminate knowledge and experience; and, to promote and maintain research programs involving methods, techniques and devices used in maxillofacial prosthetics.

The Academy is devoted to the study and practice of methods used to habilitate esthetics and function of patients with acquired, congenital and developmental defects of the head and neck; and of methods used to maintain the oral health of patients exposed to cancer-cidal doses of radiation or cytotoxic drugs.

www.maxillofacialprosthetics.org

AAMP Officers & Board of Directors

President
Dr. Peter J. Gerngross

Vice President
Dr. David J. Reisberg

President Elect
Dr. Jeffery C. Markt

Vice President Elect
Dr. Arun Sharma

Immediate Past President
Dr. Gerald T. Grant

Executive Secretary / Treasurer
Dr. Thomas J. Salinas

Recording Secretary
Dr. Alvin G. Wee

AAMP Board of Councilors
Term Ending in 2017: Dr. William R. Wilson & Dr. James Kelly
Term Ending in 2018: Dr. Harold Kolodney & Dr. Stephen Wagner
Term Ending in 2019: Dr. Joseph DiFazio & Dr. Theresa Hofstede

AAMP RECIPIENTS OF THE 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
Victor J. Niiranen, D.D.S.	1968
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
John E. Robinson, Jr., D.D.S.	1981
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. Schaaf, D.D.S.	1994
Richard J. Grisius, D.D.S.	1995
Luis R. Guerra, D.D.S.	1997
Gordon E. King, D.D.S.	1998
*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
Carl J. Anders, D.D.S.	2003
John Beumer III, D.D.S., M.S.	2005
Salvatore J. Esposito, D.M.D.	2007
Thomas R. Cowper, D.D.S.	2008
Jonathan P. Wiens, D.D.S.	2009
Rhonda F. Jacob, D.D.S., M.S., F.A.C.P.	2013
Johan Wolfaardt, BDS, MDent, PhD.	2014
Mark T. Marunick, D.D.S, M.S.	2015
Robert M. Taft, D.D.S.	2016

AAMP PAST PRESIDENTS

*Aeldred C. Fonder, D.D.S.	1953 Chicago, IL
*Robert E. Stewart, D.D.S.	1954 Chicago, IL
*Thomas E. Knox, D.D.S.	1955 Chicago, IL
*Arthur H. Bulbulian, D.D.S.	1956 Chicago, IL
*Arthur H. Bulbulian, D.D.S.	1957 Chicago, IL
*Mervin C. Cleaver, D.D.S.	1958 Dallas, TX
*Joseph B. Barron, D.D.S.	1959 Chicago, IL
*Joseph B. Barron, D.D.S.	1960 Los Angeles, CA
*Benjamin B. Hoffman, D.D.S.	1961 Philadelphia, PA
*Edward J. Fredrickson, D.D.S.	1962 Miami Beach, FL
*Kenneth I. Adisman, D.D.S.	1963 Atlantic City, NJ
*Joe B. Drane, D.D.S.	1964 San Francisco, CA
*Louis J. Boucher, D.D.S.	1965 Las Vegas, NV
*Victor J. Niiranen, D.D.S.	1966 Dallas, TX
*Victor J. Niiranen, D.D.S.	1967 Washington, DC
*Ralph S. Lloyd, D.D.S.	1968 Miami, FL
*Herbert H. Metz, D.D.S.	1969 New York, NY
*Morton S. Rosen, D.D.S.	1970 Las Vegas, NV
*John E. Robinson, D.D.S.	1971 Cherry Hill, NJ
*Thomas A. Curtis, D.D.S.	1972 Las Vegas, NV
*Sebastian A. Bruno, D.D.S.	1973 San Antonio, TX
Varoujan A. Chalian, D.D.S.	1974 Williamsburg, VA
William R. Laney, D.M.D.	1975 Lake Geneva, WS
*James B. Lepley, D.D.S.	1976 San Diego, CA
*Augustus J. Valauri, D.D.S.	1977 Orlando, FL
Arthur O. Rahn, D.D.S.	1978 Las Vegas, NV
*Dorsey J. Moore, D.D.S.	1979 New Orleans, LA
James S. Brudvik, D.D.S.	1980 San Antonio, TX
*Seymour Birnbach, D.D.S.	1981 St. Louis, MO
James W. Schweiger, D.D.S.	1982 Monterey, CA
Norman G. Schaaf, D.D.S.	1983 San Diego, CA
*Verdi F. Carsten, D.D.S.	1984 Nashville, TN
*David N. Firtell, D.D.S.	1985 Seattle, WA
Ronald P. Desjardins, D.M.D.	1986 Williamsburg, VA
Mohammad Mazaheri, D.D.S.	1987 San Diego, CA
Richard J. Grisius, D.D.S.	1988 Baltimore, MD

*Charles C. Swoope, D.D.S.....	1989 Tucson, AZ
Stephen M. Parel, D.D.S.....	1990 Charleston, SC
*Luis R. Guerra, D.D.S.....	1991 Reno, NV
Donald L. Mitchell, D.D.S.....	1992 Tampa, FL
Clifford W. VanBlarcom, D.D.S.....	1993 Palm Springs, CA
Gordon E. King, D.D.S.....	1994 New Orleans, LA
Gregory R. Parr, D.D.S.	1995 Washington, DC
James E. Ryan, D.D.S.....	1996 Kansas City, MO
*Carl J. Andres, D.D.S.....	1997 Orlando, FL
Salvatore J. Esposito, D.M.D.....	1998 Victoria, BC
Timothy R. Saunders, D.D.S.....	1999 Philadelphia, PA
Jonathan P. Wiens, D.D.S.....	2000 Kauai, HI
Alan J. Hickey, D.M.D.....	2001 New Orleans, LA
*Robert E. Gillis Jr., D.M.D, M.S.D.	2002 Orlando, FL
*Thomas R. Cowper, D.D.S.....	2003 Scottsdale, AZ
Mark T. Marunick, D.D.S, M.S.....	2004 Ottawa, Canada
Thomas J. Vergo Jr., D.D.S.....	2005 Los Angeles, CA
Rhonda F. Jacob., D.D.S., M.S.....	2006 Maui, HI
Jeffrey E. Rubenstein, D.M.D, MS..	2007 Scottsdale, AZ
Terry M. Kelly, D.M.D.....	2008 Nashville, TN
*Glenn E. Turner, D.M.D., M.S.D..	2009 San Diego, CA
Steven E. Eckert, D.D.S., M.S.....	2010 Orlando, FL
Robert M. Taft, D. D. S.....	2011 Scottsdale, AZ
Steven P. Haug, D.D.S.....	2012 Baltimore, MD
Lawrence E. Brecht, D.D.S.....	2013 Santa Ana Pueblo, NM
Betsy K. Davis, DMD, MS.....	2014 New Orleans, LA
Mark S. Chambers, DMD, MS.....	2015 Orlando, FL
Gerald T. Grant, DMD, MS, FACP..	2016 San Diego, CA

**Denotes Deceased*

We thank all past AAMP Presidents for their dedication and service

IN MEMORY OF
GLENN E. TURNER, DMD, MSD

Glenn E. Turner, DMD, MSD, former Director of Maxillofacial Prosthetics University of Florida College of Dentistry, passed away on June 11, 2017 after a 10-year long battle with Parkinson's Disease. He was 72 years of age.

Dr. Turner was President of the American Academy of Maxillofacial Prosthetics in 2009, and had served as a member of the AAMP board of directors for many years. He was a Diplomate of the American Board of Prosthodontics, a fellow of the American College of Dentists, International College of Dentists and the American College of Prosthodontics. He was past president of the Florida Prosthodontic Association.

He was also a retired Colonel in the US Army with wartime service in Viet Nam and Desert Storm.

The Officers and Board of Directors honor Dr. Turner’s memory and service to the organization and Dentistry. He will be sorely missed by his friends and colleagues.

Educational Grant Support

Journal of Prosthetic Dentistry
Editorial Council Office: The Senter Group
303 W. Madison Street, Suite 2650
Chicago, IL 60606
T: 312-981-6793
F: 312-981-6787
www.thejpd.com

Additional Support

Circle C Ranch
7432 Honea Egypt Rd
Montgomery, TX 77316
T: 713-822-3624
F: 281-462-9628
www.circlecranch.us.com

AE Neuman-WMW Foundation

CORPORATE SILVER PATRON

Quintessence Publishing Co., Inc
4350 Chandler Drive
Hanover Park, IL 60133
T: 630-736-3600
F: 630-736-3633
service@quintbook.com
www.quintpub.com

INDUSTRY PRESENTATION PATRON

Forward Science
10401 Greenbough, Suite 100
Stafford, TX 77477
T: 855-696-7254
F: 855-329-6725
info@forwardscience.com
www.forwardscience.com

INDUSTRY WORKSHOP/PRESENTATION PATRON

Cochlear Americas
13059 E Peakview Ave
Centennial, CO 80111
T: 303-790-9010
F: 303-792-9025
Concierge@Cochlear.com
www.cochlear.com

Factor II, Inc
P.O. Box 1339
Lakeside, AZ 85929
T: 928-537-8387
F: 928-537-0893
sales@factor2.com
www.factor2.com

Panthera Dental
2035 rue duHaut-Bord
Québec City, QC Canada G1N 4R7
T: 418-527-0388
Toll Free: 855-233-0388
info@pantheradental.com
www.pantheradental.com

Shofu Dental Corporation
1225 Stone Drive
San Marcos, CA 92078
T: 760-736-3277
F: 760-736-3276
customer-service@shofu.com
www.shofu.com

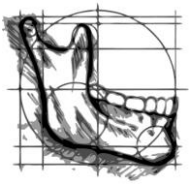
Technovent
Unit 5 York Park
Bridgend Industrial Estate
Briedgend, South Wales, UK CF31 3TB
T: +44-0-1656-768566 F: +44-0-1656-650780
info@technovent.com www.technovent.com

EXHIBITORS

3D Systems
5381 South Alkire Circle
Littleton, CO 80127
T: 844-643-1001
720-643-1001
denver.healthcare@3dsystems.com
www.3dsystems.com

Ameriface
PO Box 751112
Las Vegas, NV 89136
T: 702-769-9264
F: 702-341-5351
info@ameriface.org
www.ameriface.org

COOK Medical
750 Daniels Way
Bloomington, IN 47402
T: 812-339-2235
F: 800-554-8335
customersupport@cookmedical.com
www.cookmedical.com



CranioRehab.com
2600 W 29th Ave., Suite 102
Denver, CO 80211
T: 800-206-8381
Support@CranioRehab.com
www.craniorehab.com

DENTSPLY Sirona CAD/CAM
4835 Sirona Drive
Charlotte, NC 28273
T: 800-877-0020
contact@dentsplysirona.com
www.dentsplysirona.com

DENTSPLY Sirona Implants
590 Lincoln St
Waltham, MA 02451
T: 800-877-0020
contact@dentsplysirona.com
www.dentsplysirona.com

EXHIBITORS CONTINUED

EUSA Pharma
100 Horizon Center Blvd
Hamilton, NJ 08691
T: 302-397-5854
F: 302-298-0816
customerservice-usa@eusapharma.com
www.eusapharma.com

Face2Face Healing
580 S. Aiken Ave., Suite 310
Pittsburgh, PA 15232
T: 844-323-4325
info@face2facehealing.org
www.face2facehealing.org

KLS Martin Group
PO Box 16369
Jacksonville, FL 32245
T: 904-641-7746
F: 904-641-7378
Brittany.henshaw@klsmartin.com
www.klsmartin.com

Nobel Biocare
22715 Savi Ranch Parkway
Yorba Linda, CA 92887
T: 714-282-4800
F: 714-998-9236
info.usa@nobelbiocare.com
www.nobelbiocare.com

PLANMECA USA
100 N. Gary Avenue, Suite A
Roselle, IL 60172
T: 630-529-2300
F: 630-529-1929
sales@planmecausa.com
www.PlanmecaUSA.com

Southern Implants
1 Albert Road
Irene, Centurion, RSA
T: +27-12-667-1046
F: +27-12-667-1029
infor@southernimplants.com
www.southernimplants.com

EXHIBITORS CONTINUED

steco-system-technik GmbH & Co. KG
Kollaustr. 6
22529 Hamburg, Germany
T: +49-40-55 77 81 0
F: +49-40-55 77 81 99
info@steco.de www.steco.de

Straumann
60 Minuteman Road
Andover, MA 01810
T: 978-747-2500
F: 978-747-2490
info.usa@straumann.com
www.straumann.us

Ultralight Optics Inc
3505 Cadillac Ave., Building H
Costa Mesa, CA 92626
T: 323-316-4514
F: 714-436-5003
customerservice@ultralightoptics.com
www.ultralightoptics.com

Whip Mix Corporation
361 Farmington Ave
Louisville, KY 40209
Toll Free: 800-626-5651
F: 502-634-4512
whipmix@whipmix.com
www.whipmix.com

Zimmer Biomet
1520 Tradeport Drive
Jacksonville, FL 32218
T: 904-741-4400
F: 904-741-4500
www.zimmerbiomet.com

2017 PRESENTER DISCLOSURES

ADA C·E·R·P® | Continuing Education Recognition Program

Disclosures of Significant Relationships with Relevant Commercial Companies/Organizations

As required by the Continuing Education Recognition Program (CERP) under the auspices of the American Dental Association and in accordance with the American College of Prosthodontists policy, every effort has been made to encourage presenters to disclose any commercial relationships or personal benefit, which may be associated with their abstracts. This disclosure in no way implies that the information presented is biased or of lesser quality. Attendees of this meeting should be aware of these factors in interpreting the program contents and evaluating recommendations. Moreover, views of faculty do not necessarily reflect the opinions of the American Academy of Maxillofacial Prosthetics or the International Society for Maxillofacial Rehabilitation.

This continuing education activity has been planned and implemented in accordance with the standards of the ADA Continuing Education Recognition Program (ADA CERP) through joint efforts between the American Academy of Maxillofacial Prosthetics and the International Society for Maxillofacial Rehabilitation.

The following presenters submitted disclosure statements that confirm that their presentation is biased:

Farwell, D. Gregory: (Grants/Research Support) Intuitive Surgical
(Honorarium) AO-ASIF
Salinas, Thomas J.: (Employee)Mayo Clinic Foundation

The following presenters have disclosed they have no commercial relationships:

Algazi, Alain
Arias, Eduardo
Bedrossian, Edmond
Bernier, Gaston
Burnell, Lisa
Butterworth, Chris
Buurman, Doke
Chuka, Richelle
Clark, Jessica
Conrad, Dustin
Csorba, Steven
de Groot, Reilly J.
Goel, Prachi
Hamour, Amr
Hopkins, Alexander
Idris, Sherif
Jakus, Adam
Koli, Dheeraj Kumar
Lai, Stephen Y.
Mao, Jeremy
McHutchion, Lindsay
Mehta, Manali
Mendez, Adrian
Mulholland, Graeme
Murphy, Hugh
Murray, Scott
Nguyen, Caroline
O'Connell, Dan
Oliver, Jeremie
Patel, Pravin
Rosenberg, Janine
Sabbagh, Rula
Seelaus, Rosemary
Seikaly, Hadi
Shah, Ramille
Soares, Ana
Somerman, Martha J.
Sommerfield, Connor
Sonis, Stephen T.
Starmer, Heather M.
Van den Heevan, Jacobus
VeyVoda, Denise
Wolfaardt, Johan
Wu, Shuyi
Xingzhou, Qu

2017 PRESIDENTS' WELCOME LETTER

Dear Colleagues,

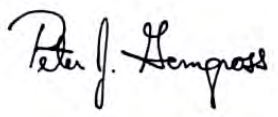
Welcome to the 4th Joint Meeting of the International Society for Maxillofacial Rehabilitation (ISMR) and the American Academy of Maxillofacial Prosthetics (AAMP). These societies have had a long and fruitful symbiotic association with like-minded professionals who have dedicated their lives to the improved patient centered outcomes with multidisciplinary management of head and neck tumors and trauma.

It is with this symbiosis that our program chairs, Drs. Dan O'Connell and David Reisberg, have crafted a program under the theme of "Research and Patient Care – Bridging the Gap", assembling a renowned group of specialists in multi-disciplinary care to present a range of topics from treatment strategies in oncology and advances in facial reconstruction, to the art of prosthetic fabrication.

The program includes 3-days of educational sessions (October 29-31), hands-on workshops and poster presentations with room to enjoy the social program and the exciting city of San Francisco. In addition, a pre-meeting workshop along with two presentations from our industry partners will be offered to our attendees (October 28).

Once again, we welcome you to our 4th Joint Meeting. We suggest that you take time to review this year's program and be prepared to participate in the sessions to better enrich your experiences over these next few days. As leading organizations in maxillofacial prosthodontics and oral oncology, both the ISMR and the AAMP are excited to offer its members and colleagues this education program in cutting-edge continuing education. We are thrilled you are here!

Dale Howes
President, ISMR



Peter J. Gerngross
President, AAMP

2017 Conference Program Chairs' Welcome Letter

Dear Colleagues,

Welcome to San Francisco and thank you for participating in the 4th Joint Meeting of our two great organizations. You represent the many different facets of health care that are needed to provide the most comprehensive care to our complex maxillofacial patient population. The bond that joins us all is the desire to constantly evolve, improve and to provide the best possible evidence-based care to our patients. Toward this end, our program includes widely varying topics related to congenital and acquired maxillofacial conditions, head and neck oncologic treatments and rehabilitation; from basic science research to the most current protocols and procedures in clinical care.

You will hear from keynote speakers of worldwide acclaim discussing the latest in cleft research, "growing" bone, laryngeal transplantation, the economics of head and neck cancer care, patient- centered tools for measuring treatment outcomes, measuring treatment response to radiation, the emerging role of immunotherapy in head and neck cancer care, the role of zygomatic implants in complex maxillofacial rehabilitation, functional outcome-driven head and neck research, and facial prosthetics and anaplastology. In addition, you will have the unique opportunity of sharing the experiences and perspectives of a head and neck cancer survivor.

The scientific short papers and poster presentations will highlight the ingenuity and talents of your colleagues around the world and give you the opportunity to speak directly with presenters about their clinical and research presentations. The hands-on workshops being offered throughout the meeting will enhance your existing knowledge and skills or allow you to gain new ones.

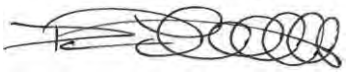
We also want to recognize and thank all of the exhibitors who are joining us this year. Without their generous support, quality scientific gatherings such as this one would not be possible. We encourage you to visit them in the exhibitor hall and learn of the many books, products and equipment they provide to help us to improve the

quality of life for our patients.

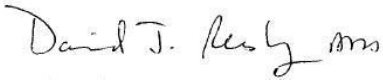
One of the best parts of any meetings is the collegiality; whether renewing existing friendships or kindling new ones. We have planned two very special elective social events to help you do just that. Please join us on Sunday for a very special "cable car" tour of this beautiful City by the Bay and a unique dining experience at a food truck park. Then on Monday, we gather for our Presidential Banquet to be wined and dined as we create an evening of fun and memories.

Once again, thank you for joining us. We recognize the time, effort, and sacrifices made by many of you in order to attend. In planning the meeting and program, our goal has been to create a memorable experience while "Bridging the Gap" in our shared passion for providing the best possible patient care.

Welcome to San Francisco!



Dan O'Connell
Program Co-Chair, ISMR



David Reisberg
Program Co-Chair, AAMP

14th Meeting
of the ISMR

64th Annual Meeting
of the AAMP

Friday, October 27th

08:30 - 16:00 **ISMR Board of Councilors Meeting**
Board of Councilors Members only
Location: Mendocino

Saturday, October 28th

07:00 - 16:00 **AAMP Officers & Board of Directors Meeting**
Oficers and Board Members only
Location: California Parlor

08:30 - 15:00 **Workshop #1:** *Advanced Jaw Reconstruction during Head & Neck Oncologic Surgery with Hands-On Afternoon Session* (elective)
Location: Marina

15:30 - 16:30 **Shofu Industry Session Presentation:** *No metal, NO problem, New Metal Free Materials* with Robert E. Vasile- For All
Location: Mendocino

16:30 - 17:30 **Forward Science Industry Session Presentation:** *Sex, Drugs & Oral Cancer™ & Mitigating Discomfort During Oral Cancer Treatment* with Brian Pikkula- For All
Location: Mendocino

17:30 - 20:00 **Poster Session & Exhibit Reception**- For All
Location: Gold Ballroom

Sunday, October 29th

07:00 - 08:00 **Continental Breakfast** (Exhibit Review)
Location: Gold Ballroom

07:00 - 10:00 **Hospitality Breakfast for Registered Guests**
Location: Sonoma Room

08:00 - 08:15 **Welcome Address**
Location: Grand Ballroom

08:15 - 12:00 **General Session**
Location: Grand Ballroom

12:00 - 13:30 **Lunch with Exhibitors**
Location: Gold Ballroom

12:00 - 13:30 **AAMP Business Luncheon**
AAMP Members only
Location: Ralston Ballroom

13:35 - 15:05 **General Session**
Location: Grand Ballroom

15:30 - 20:30 **ISMR & AAMP Social Outing:**
San Francisco City Tour &
SPARK Social Food Truck Park (elective)
Meet in the lobby of Palace Hotel

Monday, October 30th

07:00 - 08:00 **Continental Breakfast** (Exhibit Review)
Location: Gold Ballroom

07:00 - 10:00 **Hospitality Breakfast for Registered Guests**
Location: Sonoma Room

07:00 - 08:00 **AAMP New Members Breakfast**
AAMP New Members only
Location: Presidio

08:00 - 12:30 **General Session**
Location: Grand Ballroom

12:30 - 14:00 **Lunch on Own**

14:00 - 17:00 **General Session**
Location: Grand Ballroom

15:00 - 17:00 **Workshop #2:** *Cochlear Workshop- VistaFix Training Course* (elective)
Location: Marina

19:00 - 20:00 **Happy Hour Reception with Exhibitors**- For All > Silent Auction Closes
Location: Gold Ballroom

20:00 - 22:30 **ISMR & AAMP Presidential Banquet** (elective)
Location: Grand Ballroom

Tuesday, October 31st

07:00 - 08:00 **Continental Breakfast** (Exhibit Review)
Location: Gold Ballroom

07:00 - 10:00 **Hospitality Breakfast for Registered Guests**
Location: Sonoma Room

08:00 - 12:00 **General Session**
Location: Grand Ballroom

13:30 - 16:00 **Workshop #3:** *Factor II / Technovent Beginner Level Workshop- Silicone Elastomer Understanding* (elective)
Location: Sea Cliff

Workshop #4: *Factor II / Technovent Advanced Level Workshop- Materials, Manipulation, Matching & Magnets* (elective)
Location: Pacific Heights

Workshop #5: *Nobel Biocare Workshop- Zygoma Concept: Surgical Hands-On Session* (elective)
Location: Presidio

Saturday, October 28th

07:00 - 16:00	**AAMP Officers & Board of Directors Meeting** *Officers and Board Members only* Location: California Parlor
08:30 - 15:00	**Workshop #1:** *Advanced Jaw Reconstruction during Head & Neck Oncologic Surgery with Hands-On Afternoon Session* (elective) Location: Marina
14:00 - 16:00	**Exhibit Set-Up** Location: Gold Ballroom
15:00	**Poster Set-Up** Location: Gold Ballroom
15:30 - 16:30	**Shofu Industry Session Presentation:** *No metal, NO problem, New Metal Free Materials* with Robert E. Vasile- For All Location: Mendocino
16:30 - 17:30	**Forward Science Industry Session Presentation:** *Sex, Drugs & Oral Cancer™ & Mitigating Discomfort During Oral Cancer Treatment* with Brian Pikkula- For All Location: Mendocino
17:30 - 20:00	**Poster Session & Exhibit Reception**- For All Location: Gold Ballroom

Sunday, October 29th

07:00 - 08:00 **Continental Breakfast** (Exhibit Review)
Location: Gold Ballroom

08:00 - 08:15 **Welcome Address**
Location: Grand Ballroom

HEAD AND NECK CANCER

Moderators: Hadi Seikaly & Arun Sharma

08:15 - 08:50 **Stephen Sonis**
The Economic Burden of Head and Neck Cancer

08:50 - 09:30 **Alain Algazi**
Immunotherapy for Head and Neck Cancer

09:30 - 10:00 **AM Coffee Break** (Exhibit Review)

Moderators: Vincent Biron & Richard Cardoso

10:00 - 10:45 **D. Gregory Farwell**
Laryngeal Transplantation: A Model for Novel Reconstructive Techniques

10:45 - 11:30 **Stephen Lai**
Evaluating Mandibular Response to Radiation Therapy with Functional Magnetic Resonance Imaging

11:30 - 12:00 **Edmond Bedrossian**
Biomechanical Principles when using the Zygoma Implant

12:00 - 13:30 **Lunch with Exhibitors**
Location: Gold Ballroom

12:00 - 13:30 **AAMP Busines Luncheon**
AAMP Members only
Location: Ralston Ballroom

	SESSION A Moderators: Adrian Mendez & James Piper II	SESSION B Moderators: Evan Rosen & Christine Wallace
13:35 - 13:50	**Janine Rosenberg** *Outcomes and Quality of Life Protocol: Our Craniofacial Center (CFC) Experience*	**Connor Sommerfeld** *External Validation of New Staging Systems for Human Papilloma Virus-Related Oropharyngeal Squamous Cell Carcinoma*
13:50 - 14:05		**Alexander Hopkins** *3-D Modeling and Printing as a Method for Facial Allotransplantation Donor Reconstruction*
14:05 - 14:20	**Denise VeyVoda** *Scan the Facial Defect, Design the Prosthesis, 3D Print the Final Cast for Facial Prosthesis*	**Gaston Bernier** *Benefits of a Virtual 3D Workflow of Custom Made External Breast Prosthesis*
14:20 - 14:35	**Dan O'Connell** *Brief Electrical Stimulation of the Spinal Accessory Nerve for Preventing Shoulder*	**Doke Buurman** *Masticatory Performance and OHRQOL of Edentulous*

	Dysfunction after Neck Dissection	*Maxillectomy Patients: Implant Supported Versus Conventional Obturators*
14:35 - 14:50	**Qu Xingzhou** *Osseointegrated Prosthesis Guided for Reconstruction of Jaw Defects*	**Scott Murray** *Management of Persistent Epistaxis using Floseal Hemostatic Matrix vs. Traditional Nasal Packing: A Prospective RCT*
14:50 - 15:05	**Graeme Mulholland** *Multilevel Surgery for Treatment of Obstructive Sleep Apnea: A Systematic Review and Meta-Analysis*	**Reilly J. De Groot** *Masticatory Function and Related Factors after Oral Oncological Treatment: A Five Year Prospective Study*

15:30 - 20:30 **ISMR & AAMP Social Outing:**
San Francisco City Tour &
SPARK Social Food Truck Park (elective)
Meet in the lobby of Palace Hotel

Monday, October 30th

07:00 - 08:00 **Continental Breakfast** (Exhibit Review)
Location: Gold Ballroom

07:00 - 08:00 **AAMP New Members Breakfast**
AAMP New Members only
Location: Presidio

CONGENITAL CONDITIONS

Moderators: Lawrence Brecht & Robert Taft

08:00 - 08:25 **Pravin Patel**
Solving Structural Problems in the Craniofacial Skeleton: When Things Fail

08:25 - 08:50 **Ramille Shah**
Hyperelastic Bone: A New Class of Osteogenic Materials Enabled Through 3D Printing

08:50 - 09:15 **Martha Somerman**
NIDCR: Advancing Cleft/Craniofacial Research

09:15 - 09:30 **Panel:** *The Future of Cleft/Craniofacial Care*

09:30 - 10:00 **AM Coffee Break** (Exhibit Review)

Moderators: Donna Hecker & Dan O'Connell

10:00 - 10:40 **Jeremy Mao**
To Regenerate: What is the Disconnect Between Science and Clinical Practice

PATIENT EXPERIENCE, FUNCTIONAL OUTCOMES, Q of L

10:40 - 11:20 **Steven Csorba**
Abundance, Resilience and Joy

11:20 - 12:00 **Heather Starmer**
Head and Neck Cancer: Functional Outcomes

12:00 - 12:30	**Hadi Seikaly** *The ART in Head and Neck Surgery: A Digitally Planned and Occlusally Driven Jaw Reconstruction*	
12:30 - 14:00	**Lunch on Own**	
	SESSION A **Moderators:** **Harold Kolodney & Martin Osswald**	**SESSION B** **Moderators:** **Lisa Burnell & Betsy Davis**
14:00 - 14:15	**Lindsay McHutchion** *Integration of Digital Technology in the Workflow for an Osseointegrated Implant Retained Nasal Prosthesis*	
14:15 - 14:30	**Prachi Goel** *Craniofacial Development and Jaw Growth Pattern of an Ectodermal Dysplasia Patient: A Pilot Study*	**Sherif Idris** *Aesthetic Outcomes in Patients with Mandibular Reconstruction*
14:30 - 14:45	**Dheeraj Kumar Koli** *Prosthodontic Treatment Outcome in Mandibulectomy Patients with or without Reconstruction: A 2-Year Retrospective Study*	**Manali Mehta** *Functional Reconstruction of Mandibular Defects 3D Planning with Free Vascularized Fibula and Immediate Implants*

14:45 - 15:00	**Amr Hamour** *A Patient-Centered Outcomes Instrument for Facial Nerve Paralysis: The Alberta Facial Clinical Evaluation (A-Face) Scale*	**Hugh Murphy** *Prosthetic-Centered Multidisciplinary Approach to Surgical Revision and Reconstruction of an Oro-facial Defect: A Case Report*
15:00 - 15:30	**PM Coffee Break** (Exhibit Review)	
15:00 - 17:00	**Workshop #2:** *Cochlear Workshop- VistaFix Training Course* (elective) Location: Marina	
	SESSION A **Moderators:** **Harry Reintsema & Alvin Wee**	**SESSION B** **Moderator:** **Sun-Yung Bak**
15:30 - 15:45	**Lisa Burnell** *The International Society of Maxillofacial Rehabilitation / University of Alberta's Head and Neck Surgery Outreach Program: A Life-Changing Experience*	**Caroline Nguyen** *An Acrylic Repositioning Stent for Radiation Therapy: Description of a New Technique and Feasibility Study*
15:45 - 16:00	**Shuyi Wu** *Evaluation of Speech Improvement Following Obturator Prostheses for Patients*	**Dustin Conrad** *Acellular Human Dermal Allograft as a Graft for Nasal Septal Perforation*

	with Palatal Defect	*Reconstruction*
16:00 - 16:15	**Jacobus Van Den Heever** *The Use of Directly Laser Sintered Titanium Implants in the Reconstruction of Facial Defects*	**Jeremie Oliver** *Craniomaxillofacial Manifestations of Hartsfield Syndrome and Considerations for Plastic Reconstructive Surgeons*
16:15 - 16:30	**Jessica Clark** *Improved Dysphagia and Survival Outcomes in Surgically Treated Patients with Advanced Stage Oropharyngeal Cancer*	**Rula Sabbagh** *Photobiomodulation in the Treatment of Oral Mucositis: Current Status and Future*
16:30 - 16:45	**Ana Soares** *The Prevalence of Osteonecrosis of the Jaw: Risk Factors and Bone Markes Relation*	**Richelle Chuka** *Implant Utilization and Time to Prosthetic Rehabilitation in Advanced Fibular Jaw Reconstruction: A Follow-Up*
16:45 - 17:00	**Chris Butterworth** *Primary vs. Secondary Zygomatic Implant Placement in Head and Neck Cancer Patients – A 10 Year Prospective Study*	
18:30 - 20:00	**Happy Hour Reception with Exhibitors**- For All > Silent Auction Closes Location: Gold Ballroom	

20:00 - 23:00 **ISMR & AAMP Presidential Banquet** (elective)
Location: Grand Ballroom

Tuesday, October 4th

07:00 - 08:00 **Continental Breakfast** (Exhibit Review)
Location: Gold Ballroom

ORAL AND FACIAL PROSTHETICS

Moderators: Azadeh Afshari & Dale Howes

08:00 - 08:45 **Adam Jakus**
3D-Printing Silicone: Where Are We Now and Where Are We Going?

08:45 - 09:30 **Edmond Bedrossian**
Algorithms for the Prevention and the Management of Potential Complications when using the Zygoma Implant

09:30 - 10:00 **AM Coffee Break** (Exhibit Review)

Moderators: James Kelly & Jeff Rubenstein

10:00 - 10:40 **Adrian Mendez**
The Edmonton-33: Patient Centered Outcomes in Head and Neck Surgery

10:40 - 11:20 **Rosemary Seelaus & Eduardo Arias**
Within Hands' Reach, Technology Opens Doors We've Not Yet Considered…

11:20 - 12:00 **Johan Wolfaardt**
Advanced Jaw Reconstruction: Digital Domain Impact on the Future of Oral Rehabilitation

12:00 **Future Meetings Updtate**

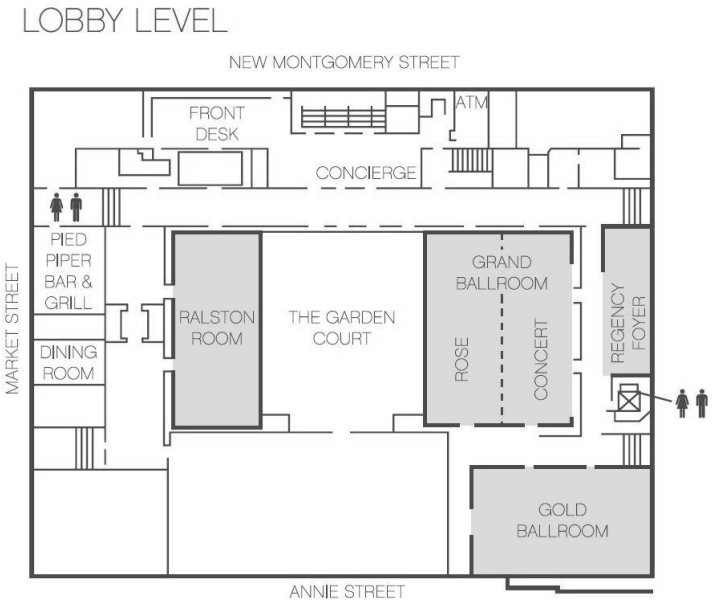
12:15 ***Meeting Adjourns***

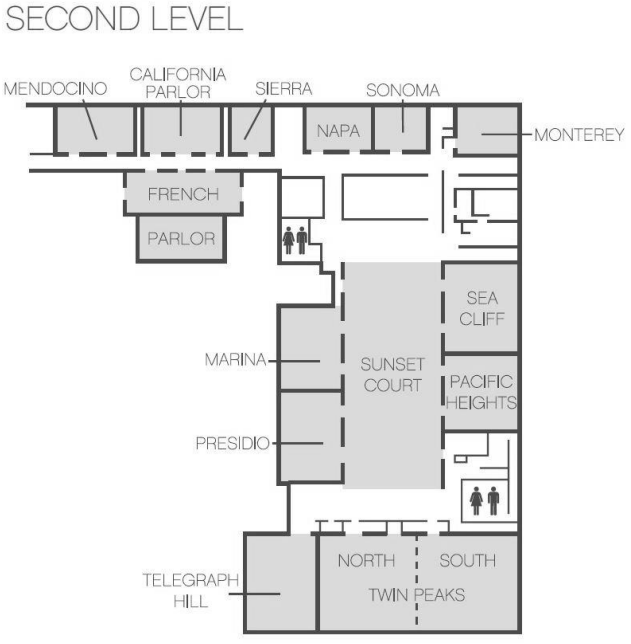
13:30 - 16:00 **Workshop #3:** *Factor II / Technovent Beginner Level Workshop- Silicone Elastomer Understanding* (elective)
Location: Sea Cliff

13:30 - 16:00 **Workshop #4:** *Factor II / Technovent Advanced Level Workshop- Materials, Manipulation, Matching & Magnets* (elective)
Location: Pacific Heights

13:30 - 16:00 **Workshop #5:** *Nobel Biocare Workshop- Zygoma Concept: Surgical Hands-On Session* (elective)
Location: Presidio

PALACE HOTEL FLOORPLAN





Sunday, October 29th

07:00 - 8:00 **Continental Breakfast** (Exhibit Review)
Location: Gold Ballroom

08:00 - 08:15 **Welcome Address**
Location: Grand Ballroom

HEAD AND NECK CANCER

Moderators: Hadi Seikaly & Arun Sharma

08:15 - 08:50 **Stephen T. Sonis, DMD, DMSc**
Invited Keynote
Senior Academic
Harvard School of Dental Medicine
Dana-Farber Cancer Institute
Brigham and Women's Hospital
Boston, Massachusetts USA

The Economic Burden of Head and Neck Cancer

It is estimated that the U.S. 2017 direct medical costs for the management of head and neck cancers (HNC) will be close to $4 billion. On a per case basis, compared to patients with other diseases, HNC is among the most expensive. And, with the availability of new immunotherapy like checkpoint inhibitors which cost $12,500 per month, costs are likely to go up, as is the management of the side effects caused by these agents. Amazingly, these numbers do not take into account costs associated with survivorship or indirect costs such as time lost from work (2010 estimate, $3.4 billion).

Why are the diagnosis and management of HNC so disproportionately expensive? What can be done to curb the acceleration of costs? Is high cost associated with better outcomes? Why are there disparities in quality of care and costs? And why isn't the repair of collateral treatment damage to the dentition and jaws not recognized as being medically necessary by third party payers when it is for other neoplasms? This talk will address these questions and more and hopefully be provocative in posing the question: When we talk about affordable care – what defines "affordable" and to whom does it refer?

08:50 - 09:30 **Alain Algazi**

Invited Keynote

Oncologist and Skin Cancer Specialist
Melanoma Center,
UCSF Helen Diller Family Comprehensive Cancer Center
San Francisco, California USA

Immunotherapy for Head and Neck Cancer

Background: For patients with metastatic head and neck malignancies, cytotoxic chemotherapy is the standard of care, but responses are transient and the median overall survival is often less than 1 year. Immunotherapy, including the FDA approved PD-1 antibodies nivolumab and pembrolizumab, can induce durable responses in a minority of patients with head and neck cancer including virally and non-virally associated malignancies. Novel therapeutic combinations are needed to improve response and durable remission rates to immune therapeutics in head and neck cancer.

Methods: Nivolumab and pembrolizumab were tested clinically in stage 3 clinical trials in patients with recurrent or metastatic squamous cell carcinoma of the head and neck (SCCHN) and biomarkers for resistance and response have been identified using pre-treatment and paired biopsy specimens. Separate studies have examined the clinical activity of these agents in nasopharyngeal carcinoma and salivary adenocarcinoma. Novel therapeutic combinations including PD-1 or PD-L1 antibodies in combination with IDO inhibitors and cytokines are under study to address resistance mechanisms. Intratumoral therapy is also under examination as a means of potentiating response to systemic immunotherapy.

Results: Phase 3 data demonstrate that single agent PD-1 / PD-L1 antibodies induce objective responses in 13-16% of patients with SCCHN. Smaller, separate studies suggest objective responses in approximately 15% of patients with salivary adenocarcinoma and in 26% of patients with EBV-associated nasopharyngeal carcinoma. Translational research examining tumor antigenicity and inflammation demonstrate that tumor mutation burden and inflammatory gene expression predicts response to PD-1 antibody therapy in virus-

negative SCCHN, but only inflammation predicts response in virally-associated tumors. The IDO inhibitor epacadostat is well tolerated in combination with pembrolizumab and there is a strong response signal suggesting clinical synergy. Intratumoral plasmid IL-12 injection with electroporation is an example of a novel in situ vaccination strategy that has demonstrated therapeutic synergy in advanced melanoma and feasibility in SCCHN.

Conclusion: Although objective response rates are modest, immunotherapy can induce durable response in patients with head and neck malignancies. Translational research provides data in support of rational therapeutic combinations that could substantially increased the proportion of patients who benefit from immunotherapy.

09:30 - 10:00 **AM Coffee Break** (Exhibit Review)

Moderators: Vincent Biron & Richard Cardoso

10:00 - 10:45 **D. Gregory Farwell, MD, FACS**
Invited Keynote
Professor and Chair
Department of Otolaryngology-Head and Neck Surgery
University of California, Davis
Sacramento, California USA

Laryngeal Transplantation:
A Model for Novel Reconstructive Techniques

The field of reconstructive surgery continues to evolve at a tremendous pace. We have incorporated a wide range of microvascular tissue replacement techniques to correct severe congenital, traumatic, and oncologic defects. There has been rapid incorporation of computer-planning into reconstructive surgery including the production of customized treatment plans and patient-specific implants. Despite these advances, there remain patients and their associated defects that are still sub-optimally managed. In these patients, composite tissue transplantation has been utilized to replace organs and restore form and function. Our group performed the world's second reported laryngo-tracheal transplant, transforming our patient's life and ability to interact in society.

In this presentation, we will discuss the field of reconstructive surgery and the potential of each of these developments. Relying on our experience with laryngeal transplantation, this presentation will describe the unique challenges and opportunities of this technique. Through this presentation, the excitement of the novel reconstructive procedures, including organ replacement via transplantation, will be demonstrated.

10:45 - 11:30 **Stephen Y. Lai, MD, PhD, FACS**
Invited Keynote Professor, Department of Head & Neck Surgery
MD Anderson Cancer Center
Houston, Texas USA

Evaluating Mandibular Response to Radiation Therapy with Functional Magnetic Resonance Imaging

Changes in the epidemiology of head and neck cancers have resulted in an increasing number of younger and healthier patients being treated with definitive external beam radiotherapy (EBRT). The long-term consequences of radiotherapy in a patient population with good clinical outcomes and extended life expectancy are becoming increasingly relevant in the management of treatment-associated morbidity and mortality.

Osteoradionecrosis (ORN) of the mandible is a challenging issue related to irradiation, occurring in up to 16% of patients with various types of head and neck cancers. Altered bone vascularity and opportunistic infections within the oral cavity contribute to the development of ORN, leading to an inexorable process of bone destruction that does not follow the normal sequence of healing events. Early-stage ORN is often managed using antibiotics, local wound care and hyperbaric oxygen (HBO). Advanced ORN requires surgical resection and reconstruction with healthy non-irradiated tissue. Successful management of this disease process requires an enhanced ability to identify patients at risk for ORN, monitor the effectiveness of conservative management and improve pre-operative planning to ensure clear margins at the time of resection. However, a standardized, objective staging and monitoring system for ORN is not currently available.

Dynamic contrast-enhanced magnetic resonance imaging (DCE-MRI) is a clinically available quantitative imaging method that is increasingly employed to assess microvascular function in the study of solid tumors of the head and neck. At our institution, DCE-MRI is integrated into a multimodality clinical algorithm aimed at improving the diagnosis, staging and oncologic surveillance of head and neck tumors. DCE-MRI can detect altered bone vascularity associated with bone healing, necrosis and metastatic involvement, with excellent spatial resolution. We hypothesize that DCE-MRI can be used to detect alterations in bone vascularity following irradiation to monitor ORN clinical progression and response to treatment. We are evaluating the potential of DCE-MRI to identify patients at risk for mandibular ORN, monitor response to conservative management, and determine the extent of advanced mandibular ORN to assist in surgical planning.

11:30 - 12:00
Invited Keynote

Edmond Bedrossian, DDS, FACD, FACOMS, FAO
Professor, Department of Oral & Maxillofacial Surgery, University of the Pacific
Director, Surgical Implant Training University of the Pacific & Alameda Medical Center
Board Examiner, American Board of Oral & Maxillofacial Surgery
San Francisco, California USA

Biomechanical Principles when using the Zygoma Implant

The volumetric loss of bone and soft tissues associated with enlarged maxillary sinuses and reduced alveolar ridges pose unique surgical and restorative treatment challenges. The presence of remaining compromised dentition may further affect outcome. The successful fabrication and delivery of fixed implant supported prosthesis for this group of patients is dependent upon a systematic interplay between the surgical and prosthetic treatment planning objectives.

In the totally edentulous patient, a paradigm shift has taken place as the graftless surgical approach has gained credibility. In order to execute this treatment concept, an algorithm for treatment as well as the management of complications must exist.

This presentation shares the Surgical as well as the Prosthetic Biomechanical principles associated with the use of the Zygoma implant. Review of the literature as well as the ZAGA classification will be presented in depth.

Learning Objectives:

1. Treatment planning protocol for the edentulous maxilla
2. Surgical and prosthetic Decision-making tree for the use of the Zygoma Implant

12:00 - 13:30 **Lunch with Exhibitors**
Location: Gold Ballroom

12:00 - 13:30 **AAMP Busines Luncheon**
AAMP Members only
Location: Ralston Ballroom

Session A and Session B run concurrently.
The scientific program will be listed in-full, according to the session in which you choose to attend.

SESSION A

Moderators: Adrian Mendez & James Piper II

13:35 - 13:50 **Rosenberg, Janine * Reisberg, David**
University of Illinois Hospital and
Health Science System
The Craniofacial Center
Chicago, Illinois USA

Outcomes and Quality of Life Protocol: Our Craniofacial Center (CFC) Experience

Keywords: quality of life, maxillofacial prostetics, treatment outcomes

Case Presentation: Gathering and analyzing Treatment Outcome and Quality of Life data helps clinicians provide better quality of care. It is

important to know if patient expectations are being met as well as which procedures are beneficial and which ones need to be altered. In the current health care environment, medical insurance coverage and levels of reimbursement are becoming more dependent on patient satisfaction. Developing and managing a protocol to assess patient outcome and quality of life could be time consuming and labor intensive, although ideal. Therefore, there are many instruments already available in addition to the ability to develop new ones that could assist in formulating the most effective protocol.

The Craniofacial Center (CFC) at The University of Illinois Hospital and Health Sciences System is an interdisciplinary team of medical and dental specialists and allied health professionals. This team cares for pediatric and adult patients with congenital and acquired craniofacial conditions that affect function and appearance. The Maxillofacial Prosthetics Clinic (MXP) within The Center fabricates oral, facial, and ocular prostheses. MXP has developed a protocol for measuring treatment outcomes, quality of life, and overall patient satisfaction with the care they have received. This protocol makes use of existing survey instruments, is easy to administer, and the results can be easily reviewed and collated.

This presentation will relate our CFC experience in establishing and maintaining this protocol as a means of monitoring and improving patient care.

13:50 - 14:05 **CANCELLATION**

Application of Prefabricate Denture and Computer-Aided Technique in the Rehabilitation of Oral-Maxillofacial Defect and Deformity

14:05 - 14:20 **VeyVoda, Denise * York, Tyler**
Private Practice
Oyster Bay, New York USA

Scan the Facial Defect, Design the Prosthesis, 3D Print the Final Cast for Facial Prosthesis

Keywords: Digital Facial Prosthetics

Case Presentation: The design of facial prosthetics has historically been made with the recording of measurements and markings on the patients face, to establish size, location, and dimension of the prosthesis. Impressions were made of the intaglio surface and a sculpture created with the use of clay or a mixture of waxes. This was a very time intensive method and left the final prosthetic result dependent on the artistic talent, ability to mix color and understanding of The Golden Ratio to the individual Anaplastologist or Doctor. Not a very predictable result was always achieved.

What if a more accurate, non- invasive method of capturing these measurements, exact surface detail and relationship to the other facial and cranial structures were to be developed? Could the sculpture be achieved in a digital format? Could surface texture, captured from the patient's skin textures and stamped onto this digital sculpture, be achieved and then a counter made, capturing all of this detail and accurate fit? Could this be repeated multiple times without distortion or wear to the casts and could more prints of the casts be made that would mesh completely for many years? Could the workflow be reduced by half?

The protocol that I have developed, with the technological support of Tyler York and 3DSystems, achieves all of the above with predictable results. The development and execution of this protocol has reduced the time from meeting the patient to delivery of a facial prosthesis in half. The artistic role of the Anaplastologists/Maxillofacial Prosthodontist has been preserved and married to the technology of today; increasing the accuracy, design, realistic texture, fit, and preservation of data.

14:20 - 14:35 **O'Connell, Dan * Barber, Brittany; Chan, Ming; McNeely, Margaret; Olson, Jaret; Rhychlik, Shannon; Biron, Vincent; Seikaly, Hadi; Harris, Jeffrey; Curran, Matthew**
University of Alberta
Otolaryngology - Head & Neck Surgery
Edmonton, Alberta CA

Brief Electrical Stimulation of the Spinal Accessory Nerve for Preventing Shoulder Dysfunction after Neck Dissection

Keywords: Nerve stimulation, Functional rehabilitation, Head and neck cancer

Purpose/Aim: Shoulder dysfunction is common after neck dissection for head and neck cancer (HNC). Brief electrical stimulation (BES) is a novel technique that has been shown to enhance neuronal regeneration after nerve injury by modulating the brain-derived neurotrophic growth factor (BDNF) pathways. The objective of this study was to evaluate the effect of BES on postoperative shoulder function following oncologic neck dissection.

Materials and Methods: Adult participants with a new diagnosis of HNC undergoing Level IIb +/- V neck dissection was recruited. Those in the treatment group received intraoperative BES applied to the spinal accessory nerve (SAN) after completion of neck dissection for sixty minutes of continuous 20 Hz stimulation at 3-5V of 0.1msec balanced biphasic pulses, while those in the control group received no stimulation (NS). The primary outcome measured was the Constant-Murley Shoulder (CMS) Score, comparing changes from baseline to twelve months post-neck dissection. Secondary outcomes included the change in the Neck Dissection Impairment Index (?NDII) score and the change in compound muscle action potential amplitude (?CMAP) over the same period.

Results: Fifty-four patients were randomized to the treatment or control group with a 1:1 allocation scheme. No differences in demographics, tumor characteristics, or neck dissection types were

found between groups. Significantly lower ?CMS scores were observed in the BES group at twelve months, indicating better preservation of shoulder function (p=0.007). Only four in the BES group compared to seventeen patients in the NS groups saw decreases greater than the minimally important clinical difference (MICD) of the CMS (p=0.023). However, NDII scores (p=0.089) and CMAP amplitudes (p=0.067) between the groups did not reach statistical significance at twelve months.

Conclusions: Application of brief electrical stimulation (BES) to the SAN may help reduce impaired shoulder function in patients undergoing oncologic neck dissection, and may be considered a viable adjunct to functional rehabilitation therapies.

14:35 - 14:50 **Xingzhou, Qu * Chenping, Zhang**
Shanghai Ninth People's Hospital,
Shanghai Jiaotong University School of Medicine
Oral & Maxillofacial - Head & Neck Oncology
Shanghai, China

Osseointegrated Prosthesis Guided for Reconstruction of Jaw Defects

Keywords: Osseointegrated prosthesis guided, Jaw reconstruction, DID

Purpose/Aim: Jaw defects caused by tumor, trauma, or osteo-radionecrosis are still challenging problem. It is acknowledged that microvascular flap reconstruction continues to be the standard of care.

Materials and Methods: We have performed over 2,000 cases of jaw reconstruction from 1989 to 2013 in Shanghai Ninth People's Hospital, which includes fibular flap, iliac flap, scapular flap and bridging plate. It is only 15-20% patients of jaw reconstruction receive dental implant and attain nearly normal masticatory function in our department. As general approach, surgeons pay attention to survival of bone free flap, wound healing and facial contour during jaw reconstruction, however potential of osseo integrated prosthesis is sometimes to neglect, which results difficulty or impossibility in denture restoration so as to lack of

enough space and sufficient bone stock in osseointegration position or none of common path of insertion.

Results: Considering of so much details during the operation of jaw reconstruction, we need the digital technique to assist to reach every aspect. As our experience, CAD/CAM can offer help to jaw reconstruction plan design. Virtual operation should have great prospect so as to it can offer more details especially for fixation of common path of insertion of osseo-integration. Osseo-integrated prosthesis guided jaw reconstruction, both maxilla and mandible, is a new approach which including: 1. The occlusion position, 2. Path of the implant insertion, 3. The 3-D position of transferred bone graft, and 4. The contour and framework of the defect part of the jaw. As an example of osseo-integration prosthesis guided jaw reconstruction, dental implant distractor (DID) has been used with simultaneous fibular flaps for large mandibular defects in last decade. Moreover, DID technique has significant improvement with assist of digital technique.

Conclusions: Osseointegrated prosthesis guided is new approach for jaw reconstruction, meanwhile, DID is more effective method.

14:50 - 15:05 **Mulholland, Graeme * Jeffery CC; Hans V; Seikaly H**
University of Alberta
Division of Otolaryngology-Head & Neck Surgery
Edmonton, Alberta CA

Multilevel Surgery for Treatment of Obstructive Sleep Apnea: A Systematic Review and Meta-Analysis

Keywords: Obstructive sleep apnea, multi-level surgery, sleep surgery

Purpose/Aim: To summarize the clinical outcomes of multilevel surgery without maxillomandibular advancement (MMA) for treatment of obstructive sleep apnea (OSA).

Materials and Methods: Medline and Embase databases were searched in accordance with PRISMA guidelines for conducting systematic

reviews. Two authors screened all articles and relevant articles where reviewed in detail. Standard inclusion criteria were applied for article selection. Relevant data was extracted and summarized.

Results: Out of 1172 studies, a total of 50 studies met inclusion criteria and were included in the meta-analysis. The majority of the studies (39 of 50) were of Level 4 evidence. This included 12 surgical subgroups and 2712 patients. There was strong male predominance (83.5%) and the average age was 44.4 (+/- 4.3) years. All studies included overweight to obese patients (average BMI = 28.7 (+/- 3.4)). The average preoperative AHI was 34.6 (+/- 15.9) and average post-operative AHI decreased to 17.2 (+/-9.5) as defined by the Sher criteria, the overall success rate was 53.8% (+/-18.0%).

Conclusions: Non-MMA, multi-level surgical procedures for OSA demonstrate improvements in many outcomes, including respiratory physiology during sleep, daytime somnolence, and quality of life. Future research should include larger, higher level studies that compare surgical treatments and identify factors associated with outcomes.

15:30 - 20:30 **ISMR & AAMP Social Outing:**
San Francisco City Tour &
SPARK Social Food Truck Park (elective)
Meet in the lobby of Palace Hotel

SESSION B

Moderators: Evan Rosen & Christine Wallace

13:35 - 13:50

Sommerfeld, Connor * Mendez, Adrian; Zhang, Han; Sivarajah, Priya; Clark, Jessica; Puttagunta, Lakshmi; O'Connell, Daniel; Harris, Jeffrey; Seikaly, Hadi; Biron, Vincent
University of Alberta
Division of Otolaryngology - Head & Neck Surgery
Department of Surgery
Edmonton, Alberta CA

External Validation of New Staging Systems for Human Papilloma Virus-Related Oropharyngeal Squamous Cell Carcinoma

Purpose/Aim: Oropharyngeal squamous cell carcinoma (OPSCC) is now recognized as malignancy that is important to categorize clinically as human papillomavirus (HPV) positive or negative. Recent significant changes to eighth edition of the American Joint Committee on Cancer staging system for OPSCC have added separate staging criteria for HPV positive vs negative tumors. The aim of our study was to externally validate the 8th edition AJCC staging system using a large Canadian cohort of patients treated both surgically and non-surgically. As well, we aimed to introduce detailed confounding variables such as smoking status.

Materials and Methods: Patients treated at the University of Alberta from 1998-2016 with a pathologic diagnosis of OPSCC, known p16 status and staging information available were selected for inclusion in this study. Clinical and pathologic details were obtained to stage patients within the seventh and eighth AJCC staging systems. Univariate and multivariate analyses of survival were performed to compare the stage discrimination of these systems.

Results: A total of 411 OPSCC patients were included, of which 315 (76.6 %) were p16 positive and 96 (23.3%) were p16 negative. P16 negative patients had lower 3 and 5-year OS compared to p16 positive

patients. Eighth edition AJCC staging showed clearer delineation of OS in p16 positive OPSCC patients, with significant differences between stage groupings. Survival at 3 and 5 years post-treatment was higher in non-smokers for all stages. Higher stage discrimination was seen in non-smokers.

Conclusions: In a cohort of patients treated with surgical and non-surgical approaches, our data provides external validation for the eighth edition AJCC staging criteria for HPV-OPSCC.

13:50 - 14:05 **Hopkins, Alexander * Mendez, Adrian; Logan, Heather; Seikaly, Hadi; Côté, David**
University of Alberta
Department of Surgery, Division of Otolaryngology Head and Neck Surgery
Edmonton, Alberta CA

3-D Modeling and Printing as a Method for Facial Allotransplantation Donor Reconstruction

Keywords: Donor, allograft, transplantation

Purpose/Aim: Donor reconstruction following organ transplantation is considered an ethical obligation and has become the standard of care. Donor reconstruction following procurement in facial allo-transplantation is of particular significance with current methods of reconstruction using a plaster based moulding technique. Recently, three-dimensional (3-D) rendering and printing technology has been investigated as a possible reconstructive modality. The objective of this pilot study is to evaluate 3-D printing technology for donor reconstruction after facial allotransplantation using a cadaveric model.

Materials and Methods: Using an embalmed male cadaver, we created two progressive facial defects. The first involved only a soft tissue defect while the second involved both soft tissue and bony resection. Photos prior to and following facial resection were obtained using a 3-D rendering camera (Canfield-Canon) at multiple angles. Soft tissue and

bony reconstruction was performed using computer software (VECTRA). The completed 3-D reconstruction was printed using an Objet260 Connex ® PolyJet 3D printer and a silicone based medium (Tango™). The mask was inlayed onto the donor site and evaluated for reconstructive accuracy and cosmetic outcome.

Results: Total time to acquire pre-reconstructive photos was approximately 10 minutes including camera set up. Post-reconstructive images were taken in approximately 10 minutes with no tissue preparation required. The 3-D reconstructed mask required approximately 10 hours the recreate the soft tissue defect t and 30 hours for the bony defect. We found the aesthetic result of the masks to be appropriately accurate.

Conclusions: We propose that 3-D modeling and printing is a simple, accurate, and easily implementable way to reconstitute donor tissue following facial allotransplantation.

14:05 - 14:20 **Bernier, Gaston * Desmeules, Louise; Laverdiere, Annie**
Laval University
Dental Departement
Quebec City, Quebec, Canada

Benefits of a Virtual 3D Workflow of Custom Made External Breast Prosthesis

Keywords: 3d printing, breast prosthesis, anaplastology

Purpose/Aim: To mesure the benefits of an all virtual worflow of custom made silicone breast prothesis, among women treated for a breast cancer by a complete mastectomy, and for who an autogenous reconstruction is not indicated. To verify the hypothesis that bigger size of prothesis will benefit more for a custom made proethesis. To verify the effect of an auto adhesive contact layer.

Materials and Methods: From a bank of 120 patients previously treated with a unilateral complete mastectomy, and had weared a commercial made prosthesis for at least 6 months. We randomly selected 40 women for a prospective 6 months minimal test of comfort and quality of life. Particpant were asked to complete the same survey prior the trial prosthesis, at 3 months and at 6 months. The scar modeling was made by a white light 3D scanner (GoScan 50, Creaform, QC). The virtual modeling was achieved by a special effects software (Z-Brush, Pixologic, CA). Finaly the mold was made from a 3D print breast volume replica (Projet 360,3D Systems,SC). Study approved by the Hospital Ethical Comittee (# CER 2016-2820).

Results: Participants had to evaluate 8 criteria: general comfort, displacement, weight, perceived shape, shoulder displacement, adaptation to the scar, perceived beauty and overall satisfaction. Results showed that the weight reduction was the major factor link with the overall improve satisfaction. The accuracy of the adaptation to the chest scars was excellent. The majority of the participants had continued to wear the custom made prosthesis after the study. The high technology workflow was very well tolerated.

Conclusions: The particular type of custom made breast prothesis made by high technology demonstrate improvement of satisfaction for patients who received a unilateral complete mastectomy. The realism of the silicone prosthesis made by higly skilled anaplastologist seemed to bring a healing effect to the mourning of a normal anatomy.

14:20 - 14:35 **Buurman, Doke * Speksnijder, Caroline; Engelen, Britt; Van Heumen, Céleste; Kessler, Peter**
Maastricht University Medical Centre
Department of Cranio-Maxillofacial Surgery;
Grow School for Oncology and Developmental Biology
Maastricht, Netherlands

Masticatory Performance and OHRQOL of Edentulous Maxillectomy Patients: Implant Supported Versus Conventional Obturators

Keywords: dental implant, obturator, masticatory performance

Purpose/Aim: The aim of this cross-sectional study was to compare the masticatory performance measured by the mixing ability test (MAT) and oral health related quality of life (OHRQoL) of edentulous maxillectomy patients with implant supported obturators versus conventional obturators.

Materials and Methods: Patients with implant supported obturators or with conventional obturators were recruited at Maastricht University Medical Centre (MUMC+) between April and August 2015. The MAT and 3 questionnaires including the Oral Health Impact Profile for EDENTulous people (OHIP-EDENT), the Obturator Functioning Scale (OFS) and the Dutch Liverpool Oral Rehabilitation Questionnaire version 3 (LORQv3-NL) were used to evaluate the functional rehabilitation and OHRQoL of patients in the study. The presentation of results is primarily descriptive with means and standard deviations (SD). Values of the implant-retained group versus the conventional group were compared with Independent T-tests in case of normal distribution, otherwise the Mann-Whitney test was used. Statistical analyses were regarded as significant if the p-value was equal to or lower than 0.05

Results: Nine patients with implant supported obturators were included in this study (mean age: 64 years (47-78). Ten patients (mean age: 71 years (59-85)) were treated with conventional obturators.

Patients with implant supported obturators had a significant better MAT outcome than the patients with conventional obturators (p=0.014). These results were supported by the OHIP-EDENT subdomains chewing difficulty (p=0.000) and eating comfort (p=0.017), the OFS subdomain difficulties with chewing (p=0.003) and the LORQv3-NL domain oral function (p=0.026).

Conclusions: Edentulous maxillectomy patients have distinct functional advantage of implants, especially for mastication, even if the implants are placed in more remote site as the pterygoid bone and the zygomatic bone.

14:35 - 14:50 **Murray, Scott * Mendez, Adrian; Jeffery, Caroline; Hopkins, Alexander; El-Hakim, Hamdy; Cote, David**
University of Alberta
Department of Surgery,
Division of Otolaryngology-Head and Neck Surgery
Edmonton, Alberta CA

Management of Persistent Epistaxis using Floseal Hemostatic Matrix vs. Traditional Nasal Packing: A Prospective RCT

Purpose: Epistaxis is the most common emergent consultation to OHNS with 60% of the population having experienced an episode and 1.6 in 10,000 requiring hospitalization in their lifetime. In preliminary studies Floseal hemostatic matrix has shown efficacy in up to 80% of persistent anterior epistaxis. Our objective was to evaluate the efficacy, cost-effectiveness and comfort of Floseal compared to traditional nasal packing.

Design: A prospective, randomized controlled trial.

Setting: Tertiary referral center for otolaryngology-head and neck surgery.

Participants: Adult patients consulted to the OHNS service at the University of Alberta Hospital for anterior epistaxis were recruited. Patients were randomized to the Floseal or traditional packing study arms. Hemostasis, patient comfort, age, re-bleeding, time to consultation and readmission rates were included in this analysis.

Intervention: Experimental group: Floseal hemostatic matrix

Control Group: Traditional non-dissolvable nasal packing techniques

Main Outcome Measure(s):
1. Hemostasis directly following treatment and at 48 hours post-treatment
2. Self-reported patient comfort at 48 hours post-treatment
3. Cost-effectiveness analysis
Results: There were no significant differences between groups for hemostasis initially (83.3% vs. 100%, p=0.2200) or at 48 hours (83.3% vs. 69.2%, p=0.6447). Floseal demonstrated significantly less admissions (0 vs. 46.1%, p=0.0149). Floseal was superior for pain during placement (2.27 vs. 7.77, p=0.0001), treatment (0.50 vs. 4.46, p=0.0001) and removal (0 vs. 3.85, p=0.0017). Following a economic analysis cost savings per patient for Floseal was $1567.61 (healthcare) and $2233.52 (society).

Conclusions: Compared to traditional nasal packing, Floseal has demonstrated promise as a first-line therapy for epistaxis considering hemostasis, cost-effectiveness and comfort.

14:50 - 15:05 **De Groot, Reilly J * Wetzels, Jan-Willem; Merkx, Matthias A.W.; Rosenberg, Antoine J.W.P.; De Haan, Anton F.J.; Van Der Bilt, Andries; Abbink, Jan H.; Speksnijder, Caroline**
University Medical Center Utrecht
Oral- and Maxillofacial Surgery/Special Dental Care
Utrecht, Netherlands

Masticatory Function and Related Factors after Oral Oncological Treatment: A Five Year Prospective Study

Keywords: masticary performance, oral cancer, prospective

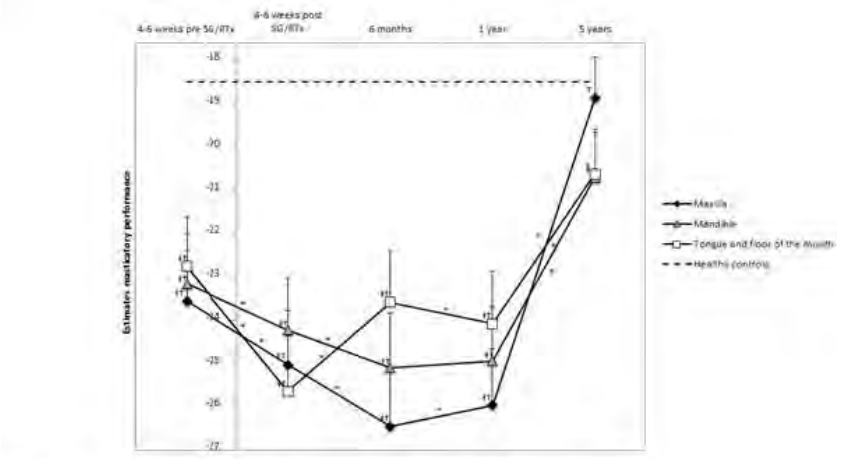
Purpose/Aim: Masticatory performance is highly at risk in persons confronted with oral cancer. The aim of this study was to prospectively follow the time-course of masticatory performance in 143 patients who were treated for a malignancy that involved the oral cavity for up to 5 years following treatment. The secondary aim of this study was to follow in that period clinical and measured factors (i.e. number of occlusal units, dental status, maximum bite force, maximal mouth opening) to see how they relate to changes in masticatory performance.

Materials and Methods: Masticatory performance, maximum bite force, maximal mouth opening, dental status, and clinical parameters were measured in 143 patients shortly before and after treatment, after 6, 12, and 60 months and was analysed with linear mixed-effects models.

Results: Higher maximum bite force, greater maximal mouth opening, a dental state other than edentulous without dentures, a higher number of occlusal units, a tumor located in the maxilla rather than in the mandible or tongue and floor of the mouth and alcohol use before intervention all positively affected masticatory performance in patients treated for oral cancer. Higher age at the beginning of treatment had a negative effect on masticatory performance. The effect of maximum bite force, tumor location, and alcohol use on masticatory performance is modified by the time of measurement. The course of masticatory

performance, classified per location of the primary tumor is presented in figure 1.

Conclusions: The masticatory performance in patients treated for oral cancer depends on a number of influenceable factors, i.e. maximum bite force, maximal mouth opening, number of occlusal units, and dental status. To preserve and optimize the post treatment outcome of masticatory function in patients treated for oral cancer an interdisciplinary (para)medical team is necessary.



Δ Means	Before	after	6 months	1 year	5 years
Δ Mandible - Maxilla	0,4*	0,8*	1,4*	1,0*	-1,8*
Δ TFM - Maxilla	0,8*	-0,6*	2,9*	1,9*	-1,7*
Δ Mandible - TFM	0,4*	-1,4*	1,6*	0,9*	0,1

Figure 1. Means of estimates rendered by mixed model analysis of masticatory performance *-1 in patients with an oral malignancy devided by location of the primary tumour over a 5 year follow up. * indicates a significant difference (p<0,05) between two measurements, † indicates a significant difference (p<0,05) between two groups and ‡ indicates a significant difference (p<0,05) between health controls and subgroup at that measurement moment as calculated by One way ANOVA.

15:30 - 20:30 **ISMR & AAMP Social Outing:**
San Francisco City Tour &
SPARK Social Food Truck Park (elective)
Meet in the lobby of Palace Hotel

07:00-08:00 **Continental Breakfast** (Exhibit Review)
Location: Gold Ballroom

07:00-08:00 **AAMP New Members Breakfast**
AAMP New Members only
Location: Presidio

CONGENITAL CONDITIONS

Moderators: Lawrence Brecht & Robert Taft

08:00 - 08:25 **Pravin Patel, MD, FACS**
Invited Keynote
Professor of Surgery and Chief of Craniofacial Surgery,
University of Illinois Hospital
Chief of Pediatric Plastic and Craniofacial Surgery,
Shriners Hospital for Children
Chicago, Illinois USA

Solving Structural Problems in the Craniofacial Skeleton: When Things Fail

This presentation will focus on the unique challenges that the surgeon faces when confronted with structural defects of the craniofacial skeleton. We will review our experience of over two decades in managing the skeletal framework in both children and in adults that occur either from congenital or acquired conditions. 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. Autogenous bone grafts have been the primary source that the surgeon traditionally reaches for when faced with a defect.

In recent years biomaterials have been used with increasing frequency in craniofacial reconstruction to replace autogenous bone. Several

reasons for their popularity include the elimination of donor site morbidity and cost effectiveness in reducing operating time and hospitalization. In identifying the ideal biomaterial for reconstruction of the craniofacial skeleton, several criteria should be met. The material should be biocompatible with the surrounding tissues without elucidating a foreign body or inflammatory response; adapted to fill the 3D deformity; maintain volume long after implantation; osteoactive, inducing replacement of the biomaterial by bone at a rate equal to the biomaterial resorption; and readily available. Moreover, the biomaterials should match biomechanically match the surrounding hard tissues to accommodate load transfer at the interface. However, because of the differing requirements of the reconstruction from restoring the continuity of the defect to altering the biologic boundary taking into account growth and development no single material can fulfill the varied requirements. The choice of the material whether alloplastic or autogenous must be tailored to the reconstructive requirements.

This presentation will set the stage for the subsequent discussion in this panel.

08:25 - 08:50 **Ramille Shah, PhD**

Invited Keynote

Assistant Professor
Departments of Materials Science and Engineering & Surgery (Transplant Division)
Simpson Querrey Institute for BioNanotechnology
Northwestern University
Chicago, Illinois USA

Hyperelastic Bone: A New Class of Osteogenic Materials Enabled Through 3D Printing

A new 3D-printable biomaterial system, Hyperelastic Bone (HB), comprised of 90 wt.% hydroxyapatite (HA) ceramic particles and 10 wt.% biocompatible elastomer will be presented. Unlike other high HA-content biomaterials, which are brittle, require high temperature processing, and have limited bioactivity, HB is hyperelastic, and can be quickly fabricated at room temperatures into complex, implantable

structures using an extrusion-based 3D-printing system. Structures as small as 1 mm3 or as large as many cm3 can be fabricated with ease and manipulated post printing via rolling, folding, cutting, or fusing with other HB parts. Although comprised of majority HA the constructs can be cyclically compressed at least up to 55% and return to their net original form after unloading. The microstructure not only permits rigid HA particles to translate upon mechanical loading and return to their original position upon unloading, but it also presents a composition and nano- and micro-porosity that gives HB excellent absorption properties. In vitro studies using human mesenchymal reveal that HB is highly supportive of cell viability, proliferation, and function. HB is also inherently osteoinductive, promoting osteogenic differentiation of stem cells, including extracellular matrix (ECM) deposition and de novo mineralization without the need for additional osteogenic chemical or mechanical factors. We also demonstrate the ability of HB to promote host tissue integration and post-implantation ossification in vivo, within a rat posteriolateral spine fusion model and a calvarial-defect Rhesus macaque case study. 3D-printed hyperelastic bone's unique mechanical and biological properties, combined with the ease of fabrication, potential for scalability, and low material and processing costs make this material system a promising candidate for orthopaedic, dental, and craniofacial tissue regeneration applications.

08:50 - 09:15 **Martha Somerman, DDS, PhD**

Invited Keynote

Director, National Institute of Dental and Craniofacial Research/NIH
Chief, Laboratory for Oral Connective Tissue Biology, National Institute of Arthritis and Musculoskeletal and Skin Diseases/NIH
Bethesda, Maryland USA

NIDCR: Advancing Cleft/Craniofacial Research

This presentation will provide an overview of NIH and NIDCR and in particular, feature some NIDCR-supported craniofacial and cleft lip/palate research. NIDCR funds a dynamic portfolio of intramural and extramural dental, oral, and craniofacial research spanning basic, translational, behavioral and clinical research domains. Also, NIDCR

supports a strong research workforce through training and career development awards. NIDCR-supported basic research provides an important foundation from which the development of many prevention strategies, therapeutics, and products emerge. This presentation will highlight exciting new craniofacial research results, tools and technology developments, and resources for the craniofacial research community, such as FaceBase. Dr. Somerman will also present on longitudinal studies and clinical trials related to craniofacial anomalies, including imaging and surgical procedures.

NIDCR hopes to actively engage health care providers, including maxillofacial prosthodontists, in oral health research advances through participation in programs such as the National Dental Practice-Based Research program and small business opportunities. Looking to the future, NIDCR is implementing a long-term visioning plan – called 'NIDCR 2030' – to engage the community and generate bold research goals to be achieved by year 2030. In response to community ideas and participation, NIDCR is developing innovative research areas, promoting emerging science, and encouraging the public to participate in guiding future research directions.

09:15 - 09:30 **Panel:** *The Future of Cleft/Craniofacial Care*

09:30 - 10:00 **AM Coffee Break** (Exhibit Review)

<u>Moderators</u>: Donna Hecker & Dan O'Connell

10:00 - 10:40 **Jeremy Mao**
Invited Keynote
Professor of Dentistry
Edwin Robinson Endowed Chair
Columbia University College of Dental Medicine
New York, New York USA

To Regenerate: What is the Disconnect Between Science and Clinical Practice

Regeneration of tissues that function as native replacements remains to be broadly realized. A common approach for tissue regeneration is

cell delivery, including cell isolation, ex vivo culture and transplantation into the patient. Is it possible to heal tissue and organ defects by endogenous cells, including stem cells. I will present emerging data from my laboratory and others in several recent reports that chemotactic cell homing is responsible for the regeneration of multiple and, in some cases, complex tissues, such as dermal, muscle, dental, cardiac, cartilage and bone. These data suggest an emerging concept that single or complex tissues can regenerate by the homing of endogenous stem cells. A multitude of approaches will be discussed to orchestrate cell homing including active recruitment of host endogenous cells by chemokines, cytokines, drugs, polymeric materials and bioengineering models. Information on the mechanisms of cell homing will be explored primarily by in vitro studies of cell migration, cell recruitment and cell motility in 2D and 3D models. Endogenous stem cells may accelerate clinical application of stem cell technology.

PATIENT EXPERIENCE, FUNCTIONAL OUTCOMES, Q of L

10:40 - 11:20 **Steven Csorba**
Invited Keynote Artist
Throat and Neck Cancer Survivor
Edmonton, Alberta CA

Abundance, Resilience and Joy

"The human spirit once elevated has a way of making you see the world and the things around you in a different way".

Steven will take you on a visual journey of the unique and innovative health care measures he took to beat cancer and endure numerous surgeries to his head and neck.

His experience is an inspirational platform that proves the powerful combination of how the latest research and innovation in cancer treatments – combined with patient powered pre-habililatiative

approaches, can make a lasting impact to community and the world. As a measure to maximize the efforts of the iRSM team and improve the quality of his life, Steven used creativity as medicine ("Arts in Medicine Therapy"), trained like an Olympic athlete to elevate his immune function ("Pre-habilatative Self-Empowered Healing") and gave back to others ("the Power of Building Community"). Your perception of art making, the joy of doing burpees and the potential of community will be radically elevated.

His presentation will also showcase some unique insights into his latest photography project www.yegjoy.com which celebrates people as superstars of joy, enlightenment and community building. To learn more about Steven, his cancer path and his art visit www.csorba.art

11:20 - 12:00 **Heather M. Starmer, MA CCC-SLP, BCS-S**

Invited Keynote

Clinical Assistant Professor
Department of Otolaryngology, Head and Neck Surgery
Director, Head and Neck Cancer Speech and Swallowing Rehabilitation
Stanford Cancer Center
Stanford, California USA

Head and Neck Cancer: Functional Outcomes

Head and neck cancer and its treatments may result in significant communication and swallowing challenges. Speech and swallowing deficits may have a significant impact on quality of life as well as health outcomes. Rehabilitation services provided by speech language pathologists have been shown to reduce this potential. In this session we will highlight standard and emerging rehabilitative strategies to optimize patient outcomes after head and neck cancer treatment.

12:00 - 12:30 **Hadi Seikaly**

Invited Keynote

Professor, Depts. of Surgery & Oncology
University of Alberta in Edmonton
Director, Division of Otolaryngology-
Head and Neck Surgery
Edmonton Zone Clinical Section Head for
Alberta Health Services
Co-Editor of the Journal of Otolaryngology Head &
Neck Surgery
Edmonton, Alberta CA

The ART in Head and Neck Surgery: A Digitally Planned and Occlusally Driven Jaw Reconstruction

Background: The conventional and surgically intuitive use of bone containing free flaps has improved the functional and cosmetic outcomes of head and neck reconstruction but the long-term results of full rehabilitation with osseointegrated implants are inconsistent and at times suboptimal. The use if digital surgical design and simulation has recently emerged as a viable technology in jaw reconstruction with the promise of improved accuracy and cost effectiveness.

Objective: To report on a cohort of patients that underwent a digitally planned and occlusally driven reconstruction of the jaw we termed the Alberta reconstructive technique (ART)

Methods: 15 pair matched cohort of ART and conventional intuitive reconstruction patients with delayed dental rehabilitation were reviewed. The cohorts were matched for age, sex, diagnosis, and type of jaw reconstruction. The cohorts were evaluated and compared for the following:

1. Safety (Free flap and patient's survival)
2. Effectiveness (Number of ostectomies as a surrogate of complexity of reconstruction and number of procedures)
3. Accuracy (Implant utilization)
4. Timeliness (Time to complete dental rehabilitation)
5. Cost effectiveness (Total OR time for complete oral and dental rehabilitation)

Results: 30 patients were included in the study. The demographics are seen in table 1.

Table 1.

Variable	ART (n = 15)	Conventional (n = 15)	P
Age	57	58	0.81
Sex	9 (M)	9 (M)	1
Malignant	13	13	1
Mandible	7	7	1
Radiation	7	9	0.28
HBO	4	8	0.15
Survival	14	14	1

The results are shown below in table 2.

Table 2.

Variable	ART (n = 15)	Conventional (n = 15)	P
Flap loss	0	0	1
Osteoectomies	21 (1.4 avg)	16 (1.07 avg)	0.03
# of procedures	39 (2.6 avg)	89 (5.9 avg)	0.0003
Implant utilization	96%	83%	0.04
Time to rehab (Month)	21.4	73.1	0.00
Total OR time (Min)	1204.3	1702.6	0.03

Conclusions: The Alberta Reconstructive Technique provides selected patients with an excellent jaw reconstructive option that is safe, effective, accurate, timely, and cost effective.

12:30 - 14:00 **Lunch on Own**

Session A and Session B will run concurrently.
The scientific program will be listed in-full, according to the session in which you choose to attend.

SESSION A

Moderators: Harold Kolodney & Martin Osswald

14:00 - 14:15 **McHutchion, Lindsay * Kincade, Carolyn; Wolfaardt, Johan**

Institute for Reconstructive Sciences in Medicine
Edmonton, Alberta CA

Integration of Digital Technology in the Workflow for an Osseointegrated Implant Retained Nasal Prosthesis

Case Presentation: Digital technology has found wide application in the treatment of patients with facial prostheses. An implant-retained nasal prosthesis case study demonstrates the integration of technology at all stages of the treatment pathway. Surgical planning was performed digitally and implant installation guides were digitally designed and additive manufactured. Prosthetic components including the abutments, substructure and prosthesis prototype were digitally designed concurrently and then 3D printed or milled. Prosthesis coloration was performed in part through the use of spectrophotometry and computerized color formulation. The integration of digital technology in this pathway allowed for greater predictability, efficiency, and optimized surgical and prosthetic outcomes than would have been achievable through traditional techniques alone.

14:15 - 14:30 **Goel, Prachi * Agrawal, Kaushal**

Lucknow, Uttar Pradesh, India

Craniofacial Development and Jaw Growth Pattern of an Ectodermal Dysplasia Patient: A Pilot Study

Purpose/Aim: An experimental study on craniofacial development and jaw growth pattern of an ectodermal dysplasia patient was performed and was compared with normal individual.

Materials and Methods: Firstly, the patient with complete anodontia

was prosthetically rehabilitated with complete dentures at age of 6 and 8 years with age appropriate denture teeth and a lingualized occlusal scheme. Periodic follow up and adjustments were done to maintain proper oral function and aesthetics. Serial cephalometric analysis and cast analysis done.

Results: Serial cephalometric analysis exhibited a marked restriction of forward growth at the ANS point during 6–8 years of age although there was a little change from average in the anteroposterior length of mandibular body and the height of mandibular ramus. So, the maxillary growth was reduced but there was no significant change in the mandibular growth. Cast analysis showed that increase in arch length was greater than in arch width for both maxilla and mandible. There was a little increase in alveolar ridge height in the anterior region but there was a considerable increase in the height of the alveolar ridge in the middle and the posterior region.

Conclusions: The study concluded that the absence of teeth did not affect the jaws growth and probably the denture flange did not arrest the jaw growth, rather it improved the masticatory function by providing good denture stability and retention.

14:30 - 14:45 **Koli, Dheeraj Kumar * Jain, Veena**
All India Institute of Medical Sciences
Department of Prosthodontics,
Centre for Dental Education and Research
New Delhi, India

Prosthodontic Treatment Outcome in Mandibulectomy Patients with or without Reconstruction: A 2-Year Retrospective Study

Purpose/Aim: Prosthodontic rehabilitation of mandibulectomy patients is a difficult task for the clinician in term of restoration of functions after treatment. Disabilities result from segmental mandibular resection may leads to facial disfigurement, uncoordinated movement; difficulty in chewing and impaired speech. This retrospective study was

performed to evaluate the Prosthodontic treatment outcome of segmental mandibulectomy patients with or without reconstruction.
Materials and Methods: All segmental mandibulectomy patients (12) rehabilitated using prosthesis in the Department of Prosthodontic, at Centre for Dental Education and Research, AIIMS, New Delhi between April, 2015 to April, 2017 were reviewed retrospectively by two Prosthodontists. Prosthodontic treatment outcome of all the patients pre- and post-restoration were evaluated on the basis of occlusion, number of cusp contact present, speech, saliva control, saliva quantity, deglutition, mandibular movements, deviation of mandible during mouth opening, facial disfigurement, and mastication. Findings were recorded in a predesigned Performa. Data were evaluated statistically using SPSS - 16 software.

Results: Statistical analysis for patients having mandibulectomy without reconstruction showed marked improvement for the entire factor evaluated in the study. Like before rehabilitation 66.6% of patients have occlusion, with only 0.833 mean number of cusp in contact and 100% of patients were on liquid diet. While after rehabilitation 100% of patient have occlusion with 5.5 mean number of cusp in contact and 100% of patients can take semisolid/soft food. But facial disfigurement accentuated after guidance flange therapy. In surgical reconstruction group after prosthetic rehabilitation improvement was noticed mainly for saliva flow control i.e. before rehabilitation only 66.6%, while after rehabilitation 100% of patients have adequate control. Similarly, before rehabilitation 100% of patients were able to take semisolid/ soft diet only while after rehabilitation 100% patients were able to take all type of food except very hard. Other factor like number of cusp in contact, speech and aesthetics also showed improvement after rehabilitation.

Conclusions: With in the limitation of the study it was concluded that prosthodontics rehabilitation is essential for mandibulectomy patients irrespective of surgical reconstruction. Although Mandibulectomy patients without reconstruction were benefited more from prosthodontics treatment in terms of restoration of oral function.

14:45 - 15:00 **Hamour, Amr * Mendez, Adrian; Biron, Vincent; Seemann, Robert; Ansari, Kal; Liu, Richard; Seikaly, Hadi; Cote, David**
University of Alberta
Division of Otolaryngology - Head and Neck Surgery, Department of Surgery
Edmonton, Alberta CA

A Patient-Centered Outcomes Instrument for Facial Nerve Paralysis: The Alberta Facial Clinical Evaluation (A-Face) Scale

Purpose/Aim: Facial nerve paralysis has functional, psychological, and social consequences for patients. Traditionally, outcome measurements for facial nerve injuries have been clinician derived. Recent literature has shown that patient perspective is valuable and necessary in outcomes research. Currently, there are no validated patient-centered instruments that appropriately assess functional and social implications of facial nerve injury. This study aimed to identify patient domains of concern and subsequently, to develop a point-of-care questionnaire for clinical use.

Materials and Methods: This mixed-methods prospective study was completed in three phases. In Phase I, 15 facial nerve injury patients interviewed individually. Interviews were digitally recorded, transcribed, then coded with NVIVO software. Analysis led to a conceptual framework detailing the most important quality of life outcomes. During Phase II, a focus group was held with 5 new patients in order to prioritize the outcome domains to a top five list. A second focus group was held with 5 Otolaryngology – Head and Neck staff surgeons to create a 25-item questionnaire based on the five outcomes domains. In Phase III, the questionnaire was administered to 10 new patients to test for comprehension.

Results: Patients identified a total of 16 domains of concern encompassing both functional and psychological deficits related to their facial nerve injury. From these findings, a 25-item Likert-type scale, the A-FaCE scale, was developed for clinical use.

Conclusions: Patients with facial nerve paralysis experience functional and psychological deficits. This study led to the creation of a reliable and feasible 25-item questionnaire that addresses these quality of life implications.

15:00 - 15:30 **PM Coffee Break** (Exhibit Review)

15:00 - 17:00 **Workshop #2:** Cochlear Workshop- Vistafix Training Course (elective)

SESSION A continued

Moderators: Harry Reintsema & Alvin Wee

15:30 - 15:45 **Burnell, Lisa ***

Outreach Head & Neck Clinical Fellowship
University of Alberta, Canada
ENT, Head & Neck Surgeon
Charlotte Maxeke Johannesburg Academic Hospital
Johannesburg, South Africa

The International Society of Maxillofacial Rehabilitation / University of Alberta's Head and Neck Surgery Outreach Program: A Life-Changing Experience

I am a South African otorhinolaryngologist with a passion for head and neck oncology. The three-month International Head and Neck Outreach Program run by Dr Dan O'Connell through the University of Alberta provided me with a life changing experience. I will speak on what this phenomenal program offers, and how it is run, as well as provide insight into how it has enabled me to achieve my goals with regards to Head and Neck oncology management and services at Charlotte Maxeke Johannesburg Academic Hospital (WITS University), South Africa.

15:45 - 16:00 **Wu, Shuyi * Huang, Xiaoqiong; Wang, Junjie; Hong, Nanrui; Li, Yan***
Hospital of Stomatology, Sun Yat-Sen University
Department of Prosthodontics
Guangzhou, Guangdong, China

Evaluation of Speech Improvement Following Obturator Prostheses for Patients with Palatal Defect

Keywords: palatal defect, obturator prostheses, Speech Disorders

Purpose/Aim: Palatal defect, as a common maxillofacial defect after maxillectomy, can be repaired by obturator prostheses, which can effectively improve patients' speech. However, comprehensive evaluation methods for speech recovery are still controversial and remain undefined. This study aimed to evaluate the recovery of speech function of patients with palatal defect through the combination of subjective and objective assessment methods.

Materials and Methods: A prospective cohort study on 34 patients with palatal defect and 34 healthy controls was performed. The 34 patients received obturators and their speech was recorded with and without the obturators. Participants pronounced six Chinese vowels and 100 syllables for the recording. Untrained listeners evaluated the speech intelligibility (SI) value, while vowel formant frequency and quantified vowel nasalization were measured using analysis software.

Results: The SI of the patients with and without the obturators was 45.7 ± 15.0% and 92.8 ± 5.8%, respectively. The SI of the control group was 96.3 ± 3.6%. In the quantitative evaluation, the formants of patients with the obturators were significantly different from that without the obturators. According to the analyses of quantified vowel nasalization, the ability to control the pronunciation of /i/ and /u/ improved greatly with the obturators.

Conclusions: The combination of subjective and objective assessment methods could well evaluate the recovery of speech function of

patients with palatal defect. SI of patients with palatal defect could be effectively improved using obturator prostheses, morover the vowel nasalization decreased and vowel formants gradually approached normal values after obturators repair.

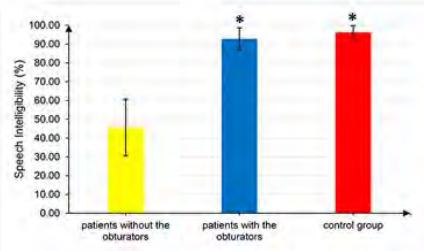


Figure 1: Comparison of speech intelligibility (SI) in patients with palate defect with and without the obturators and control group (*P < 0.05 vs the SI of the patients without the obturators). (Color online)

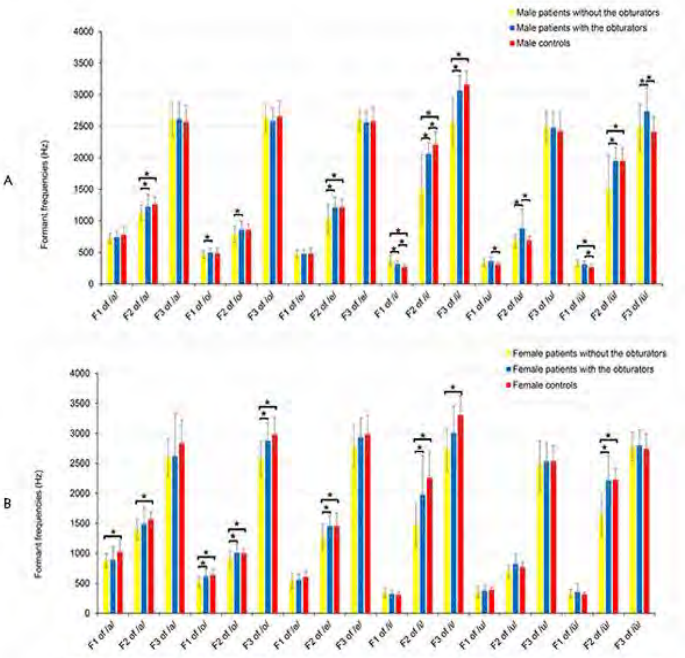


Figure 2: Comparison of vowel formant frequencies of patients with and without the obturators and controls (*P < 0.05). (A) For male subjects. (B) For female subjects. (Color online)

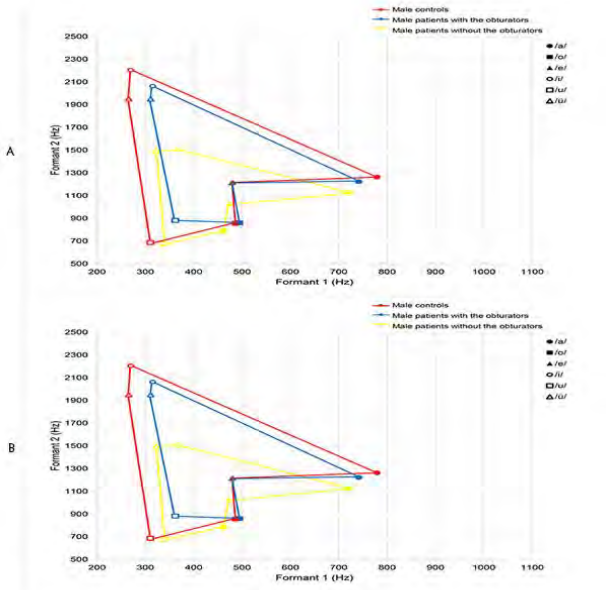


Figure 3: Acoustic Chinese vowel-graph (F1-F2 plane). The F1 range of all six vowels was the width along the X-axis and the F2 range was the width along the Y-axis. Yellow line represents patients without the obturators, blue line represents patients with the obturators, and red line represents controls. The area of the control group was the largest, and the area of the patients with the obturators was only slightly smaller, while the area of the patients without the obturators was markedly smaller than both of the above groups. (A) For male subjects. (B) For female subjects.

16:00 - 16:15 **Van Den Heever, Jacobus * Booysen Gerrie, Els Johan**
Central University of Technology
Mechanical Engineering
Bloemfontein, Freestate, South Africa

The Use of Directly Laser Sintered Titanium Implants in the Reconstruction of Facial Defects

Case Presentation: One of the structural responsibilities of the skeleton is to withstand and distribute the loads engendered during physiological movements. The design of the human facial skeleton is no different, and one of the functions is to control the masticatory forces without endangering the integrity of the facial structures. This ability is

interrupted in the case of ablative surgery where the support structures are removed or altered. There are several methods of reconstruction of these defects that attempt to provide the same structural and functional support as the original structures with variable success. The outcome can be quite unpredictable and can be attributed to a wide variety of defect related factors, patient related factors and surgeon related factors. The Centre for Rapid Prototyping and Manufacturing at the Central University of Technology have designed several prosthesis for reconstruction of extensive midfacial and mandibular defects with the use of computer-aided design and computer-aided manufacturing (CAD-CAM) technology. In this report we will discuss the design and manufacturing of these direct laser sintered patient-specific titanium implants (PSI) and present several cases treated over the past four years. We also briefly report on the findings of the finite element analysis (FEA) that was performed to predict the ability of the prosthesis to manage the forces of mastication.

16:15 - 16:30 **Clark, Jessica * Holmes, Emma; O'Connell, Daniel; Harris, Jeffrey; Seikaly, Hadi; Biron, Vincent**
University of Alberta
Department of Surgery, Division of Otolaryngology - Head and Neck Surgery
Edmonton, Alberta CA

Improved Dysphagia and Survival Outcomes in Surgically Treated Patients with Advanced Stage Oropharyngeal Cancer

Keywords: HPV, aspiration, surgery

Purpose/Aim: Human papillomavirus (HPV) related oropharyngeal squamous cell carcinoma (OPSCC) has recently been recognized as a malignancy distinct from HPV negative OPSCC. There is a paucity of studies reporting long-term survival outcomes (>5 years) for HPV-OPSCC. This study aims to compare long-term survival and dysphagia outcomes of advanced stage HPV positive and negative OPSCCs, treated by surgical and non-surgical modalities.

Materials and Methods: All OPSCC diagnosed and from 1998-2012 were identified through a prospectively collected provincial cancer registry. Demographic, pathologic and clinical treatment information was obtained. P16 immunohistochemistry was performed and used as a surrogate marker for HPV-OPSCC. Overall survival (OS) comparisons were made between patients treated with chemoradiation +/- salvage surgery (CRT) versus primary surgery and radiation/chemoradiation (S+RT/CRT) at 5, 10 and 15 years post-treatment using Kaplan Meier and Cox Regression analyses. Rates of aspiration were measured from post-operative swallowing studies to calculate aspiration-free survival (AFS).

Results: 460 consecutive patients with OPSCC were curatively treated, of which 319 had advanced stage disease and p16 data. P16 positive patients and non-smokers had significantly higher 5, 10 and 15-year overall survival (OS). When stratified by treatment modality, smokers and p16 negative patients who were treated with S+RT/CRT had

improved long-term OS compared to patients who received CRT. Smokers and p16 negative patients also had lower aspiration free survival at 5, 10 and 15 years post-treatment. When treated surgically, aspiration free survival was higher in smokers and p16 negative patients.

Conclusions: In smokers and HPV-negative OPSCC patients, primary surgery is associated with improved long-term survival and dysphagia-related outcomes. Further prospective studies are suggested to validate these findings.

16:30 - 16:45 **Soares, Ana * Lazzaretti-Castro, Marise; Simon, Sergio**
Hospital Alemão Oswaldo Cruz -Sao Paulo Unifesp
Oral Medicine
Sao Paulo, Brazil

The Prevalence of Osteonecrosis of the Jaw: Risk Factors and Bone Markes Relation

Keywords: Bisphosphonates, oral care

Purpose/Aim: Bisphosphonates (BPs) are widely used drugs with proven efficacy for the treatment of different osteometabolic diseases as Osteoporosis and Bone Metastasis. However, since 2003 these drugs are associated with dental complications, currently called MRONJ. Prevalence in Brazil is still unknown. This pioneering project aimed to study MRONJ in two different populations of women (oncological and osteoporotic) treated with BPs from the city of São Paulo.

Materials and Methods: It's a cross-sectional study wich evaluated 287 women receiving BP for> 3 months from 3 different institutions, divided into 2 groups: 153 women diagnosed with osteoporosis (G1) and 134 women with metastatic (G2) breast cancer. Patients who had MRONJ were analyzed separately. All patients underwent a clinical dental evaluation and medical records, and in a subsample were dosed markers of blood bone metabolism (P1NP and CTX)

Results: No case of MRONJ was detected in G1, however, the prevalence in G2 was 3%. Associated risk factors were: number of BP doses, dental visits and dental extractions. The median P1NP values found were 19.5 ng / mL at G1; 26.9 ng / mL in G2, and 14.5 ng / mL in patients with MRONJ. P1NP was shown to be a potential risk marker, suggesting very intense suppression in patients with MRONJ (G3). CTX was similar in all groups (0.1 ng / mL) with no difference in MRONJ.

Conclusions: The study confirms the low risk of MRONJ in patients treated with BP for osteoporosis. However, in cancer patients with bone metastases, this risk was not negligible, reaching 3% of the sample. The use of markers such as P1NP may be useful in assessing risk.

16:45 - 17:00 **Butterworth, Chris ***
University of Liverpool
School of Molecular & Clinical Cancer Medicine
Liverpool, Great Britain UK

Primary vs. Secondary Zygomatic Implant Placement in Head and Neck Cancer Patients – A 10 Year Prospective Study

Purpose/Aim: Zygomatic Implants provide excellent remote anchorage opportunities to support dental & facial prostheses in head & neck oncology patients following maxillary & mid-face resection and can be placed at primary surgery or a later date.

Materials and Methods: The primary aim of this prosepctive study was to examine the survival of zygomatic (and modified zygomatic implants) used in the management of consecutive patients with maxillary & mid-face malignant disease in a high-volume head & neck cancer centre. The secondary aim was to examine whether the placement of zygomatic implants at the time of primary cancer surgery carried any advantage in terms of implant survival and utlisation compared to placement at a secondary time-point following successful oncology treatment.

Results: 53 patients received 140 zygomatic implants as part of their rehabilitative treatment for maxillary/ mid-facial disease. 4 patients died prior to restoration and their 9 implants were excluded from the analysis, leaving a study population of 49 patients with 131 zygomatic implants. 27 patients received primary placed implants at the time of tumour resection whereas 22 patients were treated secondarily. The primary and secondary groups were fairly evenly matched in terms of gender, age with smoking (see table). The secondary group was disadvantaged in terms of radiotherapy with 36% of patients having been irradiated prior to surgery. 9 implants were removed from 4 patients, 5 within 3 months of placement, 2 within one year and 1 after 3 years of function. Primary placement cases demonstrated improved survival (96% v 89%) although this was not statistically significant at the implant (Fishers exact test p=0.17) or patient level (Fishers exact test p=0.31). All surviving implants were utilised and the overall prosthetic follow-up of our cohort was 24 + 20 months with the longest follow-up being 70 months. A small number of additional dental implants were used in each group demonstrating the reliance we now place on zygomatic implants with their excellent primary stability and robustness, even in high-risk situations.

Conclusions: The use of zygomatic implants in the management of oro-facial malignancy is a predictable prosthetic treatment modality to support complex oral and facial prostheses. The installation of implants at the time of primary tumour resection is advantageous and can result in high implant survival and useability.

18:30 - 20:00 **Happy Hour Reception with Exhibitors**- For All
> Silent Auction Closes
Location: Gold Ballroom

20:00 - 23:00 **ISMR & AAMP Presidential Banquet** (elective)
Location: Grand Ballroom

SESSION B

Moderators: Lisa Burnell & Betsy Davis

14:00 - 14:15 **CANCELLATION**

Considerations of Maxillofacial Surgery to Enhance the Prosthetic Result

14:15 - 14:30 **Idris, Sherif * Makki, Fawaz; Wolfaardt, Johan; Osswald, Martin; Nayar, Suresh; Ansari, Kal; Harris, Jeffrey; Biron, Vincent; Côté, David; O'Connell, Daniel; Seikaly, Hadi**
University of Alberta
Otolaryngology - Head and Neck Surgery
Edmonton, Alberta CA

Aesthetic Outcomes in Patients with Mandibular Reconstruction

Keywords: mandibulectomy, aesthetics, reconstruction

Purpose/Aim: Surgery to reconstruct mandibular defects has become a viable option with the introduction of microvascular osseous free flaps.

Although restoring function is of paramount importance when managing mandibular defects, patient satisfaction also will depend on the aesthetic outcome of the treatment. The classic technique of reconstruction involves bending a plate along the lower border of the mandible then placing the fibular segments in position, using the plate as a template. The final position places the fibula in continuity with the lower border of the mandible. Functional reconstruction involves occlusion-based positioning of the fibula. This invariably results in a step-deformity due to the fibula not being in continuity with the lower border of the mandible. Although functional reconstruction allows for optimal bony positioning for dental implant placement, it may result in suboptimal aesthetic outcomes due to discontinuity of the bony segments of the lower border of the mandible. The purpose of this study was to evaluate facial aesthetic outcomes after mandibulectomy with functional free flap reconstruction.

Materials and Methods: Ten patients that underwent functional fibular free flap reconstruction of the mandible were included. These patients typically underwent mandibulectomy as part of their treatment for head and neck tumors. Using digitized photographs, facial attractiveness was rated on a 10-point scale by naïve judges comparing pre-and-post operative images.

Results: Ten patients were evaluated. All of the patients had fibular free flap reconstructions with an average of 2.8 dental implants placed at the time of surgery. The position of the fibula from the lower border of the mandible ranged from 0-5.8mm (Mean = 3.4 ± 1.7mm). There were no significant differences found on facial attractiveness ratings ($p= 0.81$).

Conclusions: This study found no difference between pre-and post-operative facial attractiveness when functionality-driven positioning is used for reconstruction after mandibulectomy as assessed by naïve raters. Functional reconstructions of the mandible are aesthetically appealing. This is the first study to assess cosmetic outcomes after functional mandibular reconstruction.

14:30 - 14:45 **Mehta, Manali ***
D Y Patil University School of Dentistry,
Navi Mumbai, India
Prosthetic Dentistry
Navi Mumbai, Maharashtra, India

Functional Reconstruction of Mandibular Defects 3D Planning with Free Vascularized Fibula and Immediate Implants

Keywords: Head and neck cancer, Reconstruction, Microvascular flap

Case Presentation: Introduction: Major facial defects due to malignant or non-malignant tumors can be reconstructed through microvascular osteocutaneous flaps. Hereby CAD/CAM workflows offer a possibility to optimize reconstruct and reduce surgical time.

Objectives: In the reconstruction of maxillary or mandibular continuity defects in dentate patients, the most favourable treatment is placement of implant-retained crowns or bridges in a bone graft that reconstructs the defect. Proper implant positioning is often impaired by suboptimal placement of the bone graft. This case describes a new technique of a full digitally planned, immediate restoration, two-step surgical approach for reconstruction of a mandibular defect using a free vascularised fibula graft with implants and a fixed screw retained prosthesis. The resection, cutting and implant placement in the fibula were virtually planned. Cutting and drilling guides were 3-D printed. Implants were placed immediately post resection followed by intermediate prosthesis. Final screw retained prosthesis was fabricated.

Discussion: Without using expensive software or products, we were able to design surgical cutting guides for the mandible and fibula and used these to perform virtual simulation of mandibular segmental osteotomy and fibular reconstruction. Surgical cutting guides are used in mandibular reconstruction involving osteotomy of the mandible and fibula. Cutting guides produced using computer- aided design (CAD) and computer-aided manufacturing (CAM) technologies have been reported recently. These guides aim to increase the benefits to patients by improving the accuracy, shortening the operating time, and correcting occlusion.

14:45 - 15:00 **Murphy, Hugh * McClennen, Jay; Minsley, Glenn; Lee, Sarah; Thorp, Brian**
UNC Chapel Hill School of Dentistry
Graduate Prosthodontics
Chapel Hill, North Carolina USA

Prosthetic-Centered Multidisciplinary Approach to Surgical Revision and Reconstruction of an Oro-facial Defect: A Case Report

Keywords: multidisciplinary, oral maxillofacial prosthodontics, maxillofacial prostheses

Case Presentation: This clinical case reports on the surgical revision and fabrication of a combination maxillary obturator and nasal prosthesis to rehabilitate a patient with a mid-facial defect. The patient was diagnosed with squamous cell carcinoma resulting in the resection of the anterior region of her edentulous maxilla and rhinectomy. The patient had a totally edentulous intact mandible. The patient presented for prosthetic rehabilitation of her mid-facial defect with two initial complicating factors: microstomia, which prevented intraoral access with any impression tray, and facial asymmetry. Multidisciplinary treatment, driven by the definitive prosthetic design, was necessary to restore esthetics and function. Basic prosthodontic principles and procedures were modified to accommodate the unique challenges presented during the restorative process. This included customization of impression trays and creation of an acrylic resin-silicone mandibular complete denture to provide flexibility of insertion of the prosthesis.

An acrylic resin duplicate of the diagnostic nasal prosthesis wax-up was used as a surgical guide to release and reposition the patient's lower lip inferiorly and laterally to the defect to mitigate some of the patient's microstomia and facial asymmetry which had previously prevented prosthetic rehabilitation. Eight weeks following surgery, initial impressions were made using high and medium viscosity PVS materials and a modified plastic impression tray. Access for intra-oral impressions remained challenging so flexible custom trays were made

by sectioning rigid acrylic resin custom trays at the midline and then reconnecting the segments with PVS impression material. Final impressions were made using heavy and medium viscosity PVS in the flexible custom trays. A conventional edentulous maxillary obturator and a flexible mandibular complete denture were fabricated for the patient. The mandibular denture consisted of rigid acrylic resin over the load bearing areas of the mandible with flexible 70 durometer silicone encompassing the flanges of the denture. After insertion of the flexible mandibular denture, a rigid lingual connector was inserted into place to provide additional rigidity and support for the denture. The rigid lingual connector was retained to the mandibular complete denture using ball attachments. A nasal prosthesis was fabricated and retained using magnetic assemblies incorporated in the maxillary obturator and the nasal prosthesis. The final prostheses were inserted with restoration of function and esthetics for the patient. The final prostheses represent a successful rehabilitation of a patient with a very challenging clinical situation and demonstrates the effectiveness of a prosthetic-centered multidisciplinary approach involving surgical revision and prosthetic reconstruction of an oro-facial defect.

15:00 - 15:30 **PM Coffee Break** (Exhibit Review)

15:00 - 17:00 **Workshop #2:** Cochlear Workshop- Vistafix Training Course (elective)

SESSION B continued

Moderator: Sun-Yung Bak

15:30 - 15:45

Nguyen, Caroline * Lee, Vincent
University of British Columbia and
British Columbia Cancer Agency
Oral Oncology and Dentistry
Vancouver, British Columbia CA

An Acrylic Repositioning Stent for Radiation Therapy: Description of a New Technique and Feasibility Study

Keywords: radiation therapy, radiation stent, bite block

Purpose/Aim: Radiation therapy is one of the main treatment modalities for malignant head and neck cancers. To minimize the damage to normal tissues during radiation therapy, various methods of stabilization have been utilized, including thermoplastic facemasks and bite blocks. Our goal is to assess the feasibility of a customized oral repositioning stent and its potential benefits.

Materials and Methods: Ethics Approval: Approval for this project was obtained through the BC Cancer Agency Research Ethics Board.

Participants: 10 consecutive patients scheduled to undergo Intensity Modulated Radiation Therapy (IMRT) for cancers of the maxillary sinus, nasal cavity or oral cavity were recruited and consented to participate in the study.

Radiation stent fabrication: Hard baseplate wax was used to create a customized wax pattern of the proposed acrylic stent at chair side and the customized wax pattern was processed in heat-cured clear hard acrylic overnight.

Measuring the Stability of the Patient Position: Utilizing data from the daily KeV images, the relative stability of the patient setup was assessed.

Monitoring of side effects: Participants completed a questionnaire to evaluate side effects. Assessments were performed at four-time points at: baseline; 3 weeks (mid-treatment); last day of radiation (6-weeks); and 3-months post-IMRT.

Results: A new workflow protocol has been developed and implemented at the BCCA. Patient stability data demonstrated mean vertical, longitudinal and lateral variations that were not statistically different when compared to two retrospective cohorts. Descriptive analysis of the questionnaire data seems to indicate a similar trend for self-reported oral symptoms as described in the literature.

Conclusions: It is possible to fabricate customized repositioning stents for HN cancer patients without affecting their IMRT treatment timeline.

In addition, while utilizing the customized repositioning stent we were also able to maintain patient stability comparable to prior protocols and within a range of clinical guidelines as no patients' treatments were aborted.

15:45 - 16:00 **Conrad, Dustin * Zhang, Han; Côté, David**
University of Alberta
Otolaryngology - Head and Neck Surgery
Edmonton, Alberta CA

Acellular Human Dermal Allograft as a Graft for Nasal Septal Perforation Reconstruction

Purpose/Aim: Nasal septal perforations pose a troubling source of morbidity for patients and a difficult problem for the Otolaryngologist. Multiple surgical techniques have been tried with inconsistent success. Prosthetic nasal buttons also have limitations, including patient intolerance and dissatisfaction. Acellular human dermal allograft, AlloDerm™ (LifeCell Branchburg, NJ) has been previously described as an alternative material for septal perforation repair. We aim to demonstrate objective and subjective outcomes of septal perforation repair with AlloDerm.

Materials and Methods: A prospective cohort study of twelve patients with 1-2cm anterior septal perforations that were recruited from a tertiary care practice. Patients with admitted smoking or cocaine use in the previous three months, vascular or granulomatous diseases were excluded. Subjective SNOT-22 scores along with objective nasal endoscopy and acoustic rhinometry measures were collected at baseline and 2, 4, and 12 weeks postoperatively. Data was normalized to baseline values and analyzed using ANOVA and Bonferroni correction.

Results: Successful closure of the septal perforation was obtained in 11/12 patients and confirmed with rigid nasal endoscopy. Nasal symptom scores (SNOT-22) were significantly reduced to 52.8% (95%CI[35.1%-70.5.%];$p<0.01$) of baseline symptoms at 4 weeks postoperatively. At 12 weeks postoperatively symptoms were

measured at 26.6% (95%CI[10.9%-42.1%];p<0.01) of baseline symptoms. Acoustic Rhinometry confirmed perforation closure, demonstrating a reduction in cross sectional nasal area from baseline of 55.1% (95%CI[37.7%-66.8%];p<0.01).

Conclusions: This is the first study to use objective and subjective measurements to confirm success with acellular dermis allograft as an adjunct for septal perforation repair. Demonstrating a statistically significant reduction in patient nasal symptoms following repair.

16:00 - 16:15 **Oliver, Jeremie * Menapace, Deanna; Cofer, Shelagh**
Mayo Clinic, Rochester, Minnesota
Otorhinolaryngology
Rochester, Minnesota USA

Craniomaxillofacial Manifestations of Hartsfield Syndrome and Considerations for Plastic Reconstructive Surgeons

Keywords: cleft-palate, hartsfield, holoprosencephaly

Case Presentation: Study Objective: The first case of familial Hartsfield syndrome was seen at our institution approximately three years ago. An established clinical diagnosis of Hartsfield syndrome is achieved through the recognition of three distinct pathologies: holoprosencephaly, ectrodactyly, and bilateral cleft lip-palate syndrome. Accurate diagnosis of this disease can be achieved through prenatal ultrasound to detect holoprosencephaly, ectrodactyly of the hands and feet, as well as cleft-lip and palate. Physical findings should be confirmed by genetic evaluation of the FGFR1 gene. This report focuses on the pertinent craniomaxillofacial manifestations and management strategies of Hartsfield syndrome that, to our knowledge, have never been reported.

Cleft management: In Hartsfield syndrome, the degree of clefting is severe, and consequently, columellar length in this patient population is drastically shortened to the point of near agenesis, which makes for particularly difficult cleft-lip nasal repair. Primary cleft-lip repair may be

undertaken within the normal 10-week window provided the patient is medically stable. Recommended pre-operative consults include Endocrinology, Nutrition, and Airway Management, to ensure the patient can tolerate the procedure. Pre-surgical infant orthopedics, including passive taping and obturator placement with or without nasoalveolar molding may be attempted prior to cleft-lip and palate repair. Bilateral straight-line closure technique was employed for a “cut-as-you-go”, tissue-sparing approach. Consideration must be paid to the large premaxillary segment protrusion which makes primary orbicularis oris repair challenging. Severe hypoplasia of the nasal tip cartilages should be addressed by utilizing primary rhinoplasty techniques at time of cleft-lip repair. Single dome and intradomal sutures may be performed at time of cleft-lip repair to improve nasal tip clefting and tip position. It is important to be aware of poor wound healing in the premaxillary segment in these patients. Minimalistic dissection is encouraged. Delayed palate repair is recommended to allow for growth prior to reconstruction. In our experience, clefting seen in this patient population is extremely wide and subject to high-tension closures. In performing cleft-palate repair, a two-flap palatoplasty approach was taken utilizing bilateral vomer flaps. A nasoalveolar molding or a latham appliance is therefore helpful if tolerated.

Conclusions: Hartsfield syndrome is a very rare disorder with less than 20 cases reported in the literature. Manifestations of Hartsfield syndrome include: congenital bilateral cleft-lip and palate, retrognathia, gastroesophageal reflux disease, ear deformities, eustachian tube dysfunction, midface abnormalities and craniosynostosis. Management should include multidisciplinary and longitudinal care coordination including: pediatrician, geneticist, otolaryngologist, plastic surgeon, endocrinologist, neurologist and speech and swallow specialist.

16:15 - 16:30 **Sabbagh, Rula * Alami, Arwa; Cherepynska Juliya; Selting, Wayne**
King Hussein Cancer Center
Amman, Jordan
Kharkiv National Medical University
Kharkiv, Ukraine

Photobiomodulation in the Treatment of Oral Mucositis: Current Status and Future

Keywords: Photobiomodulation, Oral Mucositis

Purpose/Aim: Aim of presentation is to educate personnel working in cancer centers and are faced with cases of oral mucositis information about Photobiomodulation by reviewing literature and the main points which makes this treatment valid and of its importance in providing this valuable treatment to their patients

Materials and Methods: Evidence-based literature regarding Photobiomodulation in oral mucositis of published systematic reviews in addition to clinical trials and case reports present in literature will be highlighted. Also, the Laser parameters and protocol of application of this modality and the correct approach in making this modality valid by suggesting a protocol for this treatment.

Results: This presentation will increase the use of photobiomodulation in treatment of Oral mucositis in cancer centers through education of personnel and will help in getting this modality of treatment a standard of care in all centers.

Conclusions: The suggestions and collaboration between centers worldwide may give rise to multicenter studies to reach a standardized laser protocol that will be of benefit in the treatment of Oral Mucositis.

16:30 - 16:45 **Chuka, Richelle * Al Attas, Mohammed, Rieger, Jana; Seikaly, Hadi; Nayar, Suresh; Osswald, Martin; Wolfaardt, Johan**
Institute for Reconstructive Science in Medicine, iRSM
Edmonton, Alberta CA

Implant Utilization and Time to Prosthetic Rehabilitation in Advanced Fibular Jaw Reconstruction: A Follow-Up

Keywords: Head and neck tumour, digital surgical design, fibular jaw reconstruction

Purpose/Aim: Advanced three-dimensional (3D) digital surgical design and simulation (SDS) techniques is an emerging area of interest in the area of jaw reconstruction rehabilitation (JRR). Advanced digitally designed surgery techniques have the potential for early functional oral rehabilitation through improved patient treatment times for prosthetic rehabilitation.

In the previous study, the advanced 3D SDS group completed their prosthetic rehabilitation with a significantly higher utilization of osseointegrated dental implants as well as a significantly shorter time to prosthetic delivery. The purpose of this follow-up study was to further compare the same outcomes between conventional and advanced SDS JRR using a larger sample size and longer follow-up data.

Materials and Methods: This follow-up study is a retrospective analysis of 35 adult head and neck tumor (HNT) participants treated at the Institute for Reconstructive Sciences in Medicine (iRSM). Participants completed JRR treatment with a fibular free flap reconstruction (FFF) and had either undergone an advanced 3D SDS technique (with-SDS) or conventional/non-digitally planned (without-SDS) technique, both treatment approaches included the use of osseointegrated dental implants. The current study continued data collected up to July 1, 2016

and applied the same methods to the follow-up study. The conventional (without-SDS) group underwent a non-guided FFF reconstruction, and non-guided implant installation after the FFF. The advanced (with-SDS) group underwent a guided FFF reconstruction, and guided implant installation during the FFF surgery. The outcome measures implant utilization (ratio of implants installed to connected), time to prosthetic connection after FFF and patient demographics were analysed using the Mann-Whitney U test.

Results: Thirty-five subjects (19 with-SDS, 16 without-SDS) fulfilled the inclusion criteria for the study. The time to prosthetic connection for the with-SDS group (422 days) was statistically significant ($p < 0.001$) compared to the without-SDS group (1391 days). The advanced 3D SDS technique (with-SDS) group completed their prosthetic rehabilitation with a higher utilization of implants (94%) compared to the without SDS (78%), although this was not statistically significant.

Conclusions: The findings support the previous study that advanced three-dimensional digital SDS techniques yielded a higher implant utilization as well as shorter time to prosthetic connection.

18:30 - 20:00 **Happy Hour Reception with Exhibitors**- For All
> Silent Auction Closes
Location: Gold Ballroom

20:00 - 23:00 **ISMR & AAMP Presidential Banquet** (elective)
Location: Grand Ballroom

07:00-08:00 **Continental Breakfast** (Exhibit Review)
Location: Gold Ballroom

ORAL AND FACIAL PROSTHETICS

Moderators: Azadeh Afshari & Dale Howes

08:00 - 08:45 **Adam Jakus, PhD**
Invited Keynote Chief Technology Officer
Dimension Inx LLC
Chicago, Illinois USA

3D-Printing Silicone: Where Are We Now and Where Are We Going?

Silicones are arguably one of the oldest classes of medical materials still in clinical use today. Their widespread, long-term use is not only because they are reliable and relatively easy to work with and shape, but because they are continuously being advanced and improved upon. In this presentation, I will be reviewing current state-of-the-art, advanced manufacturing techniques and processes utilized to create complex, medical silicone structures, as well as discuss the current trends and future directions of advanced silicone technologies (materials and processes). To make sure everyone is on the same page, I will begin the presentation with an overview of additive manufacturing technologies, and the three categories of medical 3D-printing: inert, acellular bioactive, and cellular bioprinting. I will distinguish between those silicone materials and processes that are currently in academic research stages and those that are seeing clinical use for a variety of prosthetic applications. For the current technologies, I will focus on how new processes are resulting in complex silicone objects that are not only light weight and structurally/geometrically matched to individual patients, but can be accurately and precisely colored to match individual patients. As these structural and aesthetic forms of silicone technologies are beginning to mature and attain greater acceptance and use, new silicone technologies are on the horizon; mainly functional, or smart silicones

and silicone composites. I will end this presentation with a brief discussion of emerging silicone technologies that elevate this long established medical material from being structurally sound, but inert, to being structurally sound and environmentally (active or passive) responsive – functional or smart silicones.

08:45 - 09:30 **Edmond Bedrossian, DDS, FACD, FACOMS, FAO**
Invited Keynote
Professor, Department of Oral & Maxillofacial Surgery, University of the Pacific
Director, Surgical Implant Training University of the Pacific & Alameda Medical Center
Board Examiner, American Board of Oral & Maxillofacial Surgery
San Francisco, California USA

Algorithms for the Prevention and the Management of Potential Complications when using the Zygoma Implant

In the totally edentulous patient, a paradigm shift has taken place as the graftless surgical approach has gained credibility. The popularity and the adoption of these treatment concepts highlight the need for a pragmatic algorithm for the prevention and the management of potential complications.

This presentation shares the different surgical management of intra-operative as well as post operative complications using the "Zygoma Concept".

Learning Objectives:
1. Management of prosthetic complications
2. Management of surgical complications
3. Pragmatic maintenance protocol for the edentulous patients

09:30 - 10:00 **AM Coffee Break** (Exhibt Review)

ORAL AND FACIAL PROSTHETICS continued

Moderators: James Kelly & Jeff Rubenstein

10:00 - 10:40
Invited Keynote

Adrian Mendez, MD
PGY-5 Otolaryngology-Head & Neck Surgery,
PhD Candidate (Experimental Surgery),
University of Alberta
Edmonton, Alberta CA

The Edmonton-33: Patient Centered Outcomes in Head and Neck Surgery

Cancers in the head and neck often lead to disability in basic functions, including speech and swallowing. Restoration of these functional impairments is the main treatment goals in managing patients affected by head and neck cancer. Historically, expert stakeholders including clinicians and researchers determine the outcomes measured. Increasingly, it is now believed that these conventional outcomes measures do not provide all the information needed to fully capture treatment effects. Incorporation of patient perspectives, or patient-reported outcomes (PRO), in functional outcome measures has been gaining increasing prominence in the reconstructive literature. The objective of this study was to create and validate the first instrument to measure the main functional areas of concern of the head and neck oncology patient. This was a four-phase qualitative study. In Phases I and II, function domains of importance were identified using open-ended questioning of head and neck cancer patients and grounded theory. The itemized PRO (i.e., Edmonton-33) was created in Phase III with expert and patient input. In the final phase, patients completed the Edmonton-33 (E-33) as well as completed modified barium swallow testing, speech intelligibility (SI) testing, MD Anderson Dysphagia Inventory, and the European Organization for Research and Treatment of Cancer (EORTC) quality of life head and neck questionnaire in order to perform criterion validity testing. The E-33 correlated strongly with assessments of swallowing (0.77, -0.73, and -0.60). Similarly, strong correlations were observed between the E-33 and assessments of speech (-0.64, 0.61, and 0.55). Assessments of dry mouth and chewing domains correlated moderately to strong, with observed r values of -

0.54 and -0.45, respectively. A factor analysis was also performed using multi-institutional data. The factor loading values for the domains of swallowing, speech, dry mouth, and chewing were all observed to be greater than 0.3 with p-values < 0.001. The E-33 is the first validated patient-reported outcome instrument designed to assess functional outcomes in head and neck oncology patients and could serve as a single comprehensive measure for functional outcomes. Future research may entail attempting to validate the E-33 as a screening tool for functional assessment in head and neck cancer patients.

10:40 - 11:20

Rosemary Seelaus, MAMS, CCA
Senior Anaplastoligist, Department of Surgery
The Craniofacial Center, University of Illinois
Hospital & Health Sciences System
Chicago, Illinois USA

Eduardo Arias
Clinical Anaplastologist and Ocularist
The Craniofacial Center, University of Illinois
Hospital & Health Sciences System
Chicago, Illinois USA

Within Hands' Reach, Technology Opens Doors We've Not Yet Considered…

In the pressures of today's clinical and academic environment, maintaining productivity and progress simultaneously seems at times an unachievable pursuit. Today, digital technologies available to the clinician and researcher are multiple and varied. New developments and applications are so rapid it often seems as though the minute a new digital tool is available, it is already no longer novel. Additionally, finding funding to acquire technologies is challenge enough, let alone maintaining their usefulness and avoiding becoming outdated.

While there has been much exploration of applied technology in facial prosthetic treatment, demonstrable, definitive evidence of technology's value and application remains limited. Reviews reveal multitudes of case studies demonstrating explorative and innovative technology development. With this, identifying "best practices" in

facial surgical and prosthetic reconstruction in today's digital climate becomes confounding and overwhelming.

In spite of this, development is essential given the rapid flux of technology which is our current working environment. Millennials offer new and different opportunities for continued development, though with new and different, approaches, working requirements, inherent skill sets and ways of thinking. Implicit with our new generations is the necessity of environments to fuel their thirst for innovation through technology. The opportunity exists to open new doors in our improved understanding of best practices in a digital clinical environment.

Demonstration of both established and novel digital approaches in clinical care will provide the foundation for an exploratory discussion of our ability to define and sustain continued development and best practices in facial reconstruction and rehabilitation moving forward.

11:20 - 12:00
Invited Keynote

Johan Wolfaardt, BDS, MDent (Prosthodontics), PhD
Professor, Division of Otolaryngology-Head and Neck Surgery,
Department of Surgery
Faculty of Medicine and Dentistry,
University of Alberta
Institute for Reconstructive Sciences in Medicine (iRSM)
Edmonton, Alberta CA

Advanced Jaw Reconstruction: Digital Domain Impact on the Future of Oral Rehabilitation

Digital technologies have become increasingly adopted in reconstruction of both continuity and discontinuity defects of the jaws. Digital technologies include a continuum of imaging, software applications for segmentation and 3D printing, surgical design applications, 3D printers, navigation and robotics amongst others. The presentation will reflect on the arrival of these technologies in the surgical design and simulation arena. These technologies have radically

altered the resection, reconstruction and rehabilitation workflow. This has created need to change the education and training environment with the result that programs are challenged to accommodate to these rapidly advancing changes. Equally, the digital workflow has also produced need to reconsider head and neck team structure and interaction. The digital workflow provides opportunity to markedly reduce treatment times and this brings new challenges to the head and neck team. The decision of the team and institution to adopt the appropriate business model for a digital workflow becomes fundamental to technology deployment. Along with this travels regulatory and legal issues to be understood with technology adoption. Future innovations include the integration of an increasingly digital workflow with adoption of navigation and robotics. This will inevitably produce a decreased need to use solid model and surgical device printing.

With these developments there is considerable need to develop knowledge around digital skills required, educational and training structures, optimal team structure, legal and regulatory frameworks, health economics and other emerging issues. The innovation, emergence, convergence and democratization of technology in head and neck surgery are now an inevitability that provides for a future with great opportunity to improve care. This opportunity includes improvement of treatment options; enhanced quality of care decreased treatment time and reduced global cost of care. With thoughtful application of digital technology, this will translate into improving outcomes of care for patients requiring reconstruction of the jaws.

12:00 **Future Meetings Update**

12:15 ***Meeting Adjourns***

13:30 - 16:00	**Workshop #3:** Factor II / Technovent Beginner Level Workshop- Silicone Elastomer Understanding (elective)
13:30 - 16:00	**Workshop #4:** Factor II / Technovent Advanced Level Workshop- Materials, Manipulation, Matching & Magnets (elective)
13:30 - 16:00	**Workshop #5:** Nobel Biocare Workshop- Zygoma Concept: Surgical Hands-On Session (elective)

ADA C·E·R·P® | Continuing Education Recognition Program

The American Academy of Maxillofacial Prosthetics (AAMP) is an ADA CERP recognized provider.

ADA CERP is a service of the American Dental Association to assist dental professionals in identifying quality providers of continuing dental education. ADA CERP does not approve or endorse individual courses or instructors, nor does it imply acceptance of credit hours by boards of dentistry.

Concerns or complaints about a CE provider may be directed to the provider or to the **Commission for Continuing Education Provider Recognition** at ADA.org/CERP.

This continuing education activity has been planned and implemented in accordance with the standards of the ADA Continuing Education Recognition Program (ADA CERP) through joint efforts between the American Academy of Maxillofacial Prosthetics and the International Society of Maxillofacial Rehabilitation.

Sunday, October 29th

Stephen T. Sonis, DMD, DMSc
Senior Academic
Harvard School of Dental Medicine
Dana-Farber Cancer Institute
Brigham and Women's Hospital
Boston, Massachusetts USA

Dr. Sonis is a senior academic at Harvard, the Dana-Farber Cancer Institute, and Brigham and Women's Hospital.

After receiving his DMD from Tufts, Dr. Sonis completed a combined doctorate and residency at Harvard and then was a Knox Fellow at Oxford.

In addition to his academic appointments, Dr. Sonis is the Chief Scientific Officer (CSO) of Biomodels; Co-Founder and Scientific Advisor of Inform Genomics; Past president of TRIAD, a not-for-profit focused on the adverse health and economic outcomes of cancer toxicities; co-Founder and CSO of Primary Endpoint Solutions, LLC, co-Founder and Chairman of BioInsight Diagnostics, and a special government employee of the FDA.

He has published extensively on the clinical, biological, and health economic aspects of head and neck cancer and complications associated with its treatment. He holds several patents and is the author of more than 250 original publications, reviews, and chapters and is completing his eleventh book.

Alain Algazi
Program Leader
UCSF Head and Neck Medical Oncology
San Francisco, California USA

I am currently developing a portfolio of clinical and translational trials focused on immune therapy in squamous cell carcinoma of the head and neck. Anti-tumor immune responses induced by PD-1 antibodies can be limited by inadequate tumor infiltration by effector T-cells, the presence of regulatory cells, or the absence of pro-inflammatory cytokines in the tumor. In one study, we demonstrated that intratumoral IL12 plasmid injection followed by electroporation (IT-pIL12-EP) induces TIL infiltration and cytokine elaboration leading to regression of both injected and uninjected lesions. Our group also demonstrated that IT-pIL12-EP can prime tumors to respond to PD-1 antibodies and we pioneered the use of IT-pIL12-EP in patients with advanced squamous cell carcinoma of the head and neck. Since 2016, I have served as UCSF's Program Leader for Head and Neck Medical Oncology as well as Chair of the Head and Neck Research Committee.

D. Gregory Farwell, MD, FACS
Professor and Chair
Department of Otolaryngology-Head and Neck Surgery
University of California, Davis
Sacramento, California USA

D. Gregory Farwell, M.D., FACS is the Professor and Chair of Otolaryngology-Head and Neck Surgery at the University of California, Davis. Growing up in the Midwest, he had the privilege and unique experience of graduating from the high school that his father ran as principal and his mother served as a teacher. He subsequently attended Drury University before attending Washington University in St. Louis. There he fell in love with head and neck surgery and research in oncology and microvascular reconstruction. After graduating first in his class, he performed his residency and fellowship at the University of Washington and the Fred Hutchinson Cancer Research Center. He began his academic career in 2000 at the University of Washington, performing the majority of his reconstructive surgery at the famed Harborview Medical Center which was the only level 1 trauma center for the 5 northwest states. He continued to do research and obtained RO1 funding through the Fred Hutchinson until moving to the University of California, Davis in 2004. Since coming to UC Davis, he has been promoted to Professor and Director of the Head and Neck Oncology and Microvascular Surgery, a position in which he served until being selected as the fourth Chairman of the Department of Otolaryngology-Head and Neck Surgery this year. He continues to have RO1 funded research in biomedical engineering work looking at novel diagnostic technologies while maintaining a busy practice. He has been an active faculty of the AO-ASIF (an international society of Otolaryngologists, Oral Surgeons, and Plastic Surgeons dedicated to craniofacial reconstructive surgery) and currently serves on its International Board.

Stephen Y. Lai, MD, PhD, FACS
Professor, Department of Head & Neck Surgery
MD Anderson Cancer Center
Houston, Texas USA

Dr. Lai is Professor in the Department of Head and Neck Surgery at The University of Texas MD Anderson Cancer Center and a board-certified head and neck cancer surgeon. Dr. Lai received his undergraduate degrees from Stanford University and his medical and doctorate degrees from The University of California, San Francisco. He performed residency at The University of Pennsylvania and completed his fellowship in oncologic head and neck/cranial base surgery at The University of Pittsburgh School of Medicine. His clinical expertise is head and neck cancers with special emphasis on oral cavity cancer, thyroid/parathyroid disease, salivary gland neoplasms, conservation laryngeal surgery and sentinel lymph node biopsy. Dr. Lai has received research awards from the National Institutes of Health, Cancer Prevention Research Institute of Texas, American College of Surgeons, American Head and Neck Society, American Academy of Otolaryngology and the Thyroid Head and Neck Cancer (THANC) Foundation.

Edmond Bedrossian, DDS, FACD, FACOMS, FAO
Professor, Department of Oral &
Maxillofacial Surgery,
University of the Pacific
Director, Surgical Implant Training University of the Pacific & Alameda Medical Center
Board Examiner, American Board of Oral & Maxillofacial Surgery
San Francisco, California USA

Dr. Edmond Bedrossian received the DDS degree from the University of the Pacific, and completed his Oral and Maxillofacial Residency at Alameda Medical Center. Dr. Bedrossian is a Diplomate of the American Board of Oral and Maxillofacial Surgery. He is also A Honorary Member of the American College of Prosthodontists. He is a Professor at the University of the Pacific School of Dentistry combining private practices with academics as the director of implant surgical training at University of the Pacific's Department of Oral & Maxillofacial surgery. He has authored multiple articles and chapters on the various uses of the Zygomatic implant, bone grafting and treatment planning implant dentistry. He has also authored the textbook; "Implant treatment planning for the edentulous patient", Forewarded by Professor Brånemark. Dr. Bedrossian is an Examiner for the American Board of Oral & Maxillofacial surgery. He is an Honorary member of the American College of Prosthodontist as well as a member of:
Board of Directors for the Brånemark Institute.
Treasurer for California Association of Oral & Maxillofacial Surgeons.
Delegate to The American Association of Oral & Maxillofacial Surgeons.
President of the Brånemark Foundation North America.

Dr Bedrossian is on the Editorial Review Board of:

- The International Journal of Oral & Maxillofacial Implants
- The Journal of Oral & Maxillofacial Surgery
- The Clinical Implant Dentistry and Related Research

Monday, October 30th

Pravin Patel, MD, FACS
Professor of Surgery and Chief of
Craniofacial Surgery,
University of Illinois Hospital
Chief of Pediatric Plastic and Craniofacial Surgery,
Shriners Hospital for Children
Chicago, Illinois USA

Dr. Pravin K. Patel is Professor of Surgery and Chief of Craniofacial Surgery at University of Illinois, Chicago, and an adjunct academic position in the Department of Biomedical Engineering at Marquette University. He is Chief of Pediatric Plastic and Craniofacial Surgery at Shriners Hospitals for Children.

Dr. Patel studied quantum electrodynamics at Johns Hopkins University, worked for IBM in laser optics, and then graduate studies in physics and neuroscience. He received his medical training at Drexel University [Hahnemann] College of Medicine, general surgical training at the Mayo Clinic, research fellowship at the University of Chicago and clinical fellowship in plastic and reconstructive surgery at Northwestern University, followed by a fellowship in craniofacial surgery at the University of California at Los Angeles.

For over two decades his interest has been at the intersection of imaging science and engineering to help solve structural problems that the surgeon faces in the operating theater.

Ramille Shah, PhD
Assistant Professor
Departments of Materials Science and Engineering & Surgery (Transplant Division)
Simpson Querrey Institute for BioNanotechnology
Northwestern University
Chicago, Illinois USA

Prof. Ramille Shah's research involves the development, characterization, and translation of new functional material 3D-inks that are compatible with room temperature extrusion based 3D printing for both biomedical (e.g. complex tissue and organ engineering) and non-biomedical (e.g. energy and advanced structural) applications. Her group also focuses on understanding how 3D material ink processes and composition influence printability, as well as the properties and functionality of the resulting 3D-printed constructs. Shah's work relating to everything from ovary organ and musculoskeletal tissue printing to new methods for printing metals and alloys (all using the same 3D printing platform) has been published in numerous high impact journals, as well as featured in Crain's Chicago Business Magazine (named Crain's 40 Under 40) and other major national and international media outlets. She is also a co-founder of Dimension Inx, LLC, a startup that focuses on the translation and commercialization of the 3D printable ink technologies developed in her lab. She earned her B.S. in Materials Science and Engineering (MSE) at Northwestern University and her Ph.D. in MSE with a specialty in Biomaterials from the Massachusetts Institute of Technology with a research focus on gene-supplemented collagen scaffolds for musculoskeletal tissue engineering. In 2006, she returned to Northwestern as a postdoctoral fellow at the Simpson Querrey Institute for BioNanotechnology focusing on self-assembling nanomaterials for regenerative medicine. In September 2009, she joined the faculty at Northwestern with a joint appointment in the Departments of MSE and Surgery.

Martha Somerman, DDS, PhD
Director, National Institute of Dental and Craniofacial Research/NIH
Chief, Laboratory for Oral Connective Tissue Biology, National Institute of Arthritis and Musculoskeletal and Skin Diseases/NIH
Bethesda, Maryland USA

Dr. Martha J. Somerman is the Director of the National Institute of Dental and Craniofacial Research, National Institutes of Health. She also is Chief of the Laboratory of Oral Connective Tissue Biology at the National Institute of Arthritis and Musculoskeletal and Skin Diseases. The NIDCR mission is to improve dental, oral and craniofacial health through research, research training, and dissemination of health information. It is our vision that these activities will be recognized as a catalyst of change in transforming how oral health care is delivered. Prior to becoming NIDCR's director, Dr. Somerman was dean of the University of Washington School of Dentistry, Seattle, a position she held from 2002-2011. Before joining the University of Washington, she was on the faculty of the University of Michigan School of Dentistry, Ann Arbor, from 1991 to 2002, and University of Maryland, 1984-1990. An internationally known researcher and educator, Dr. Somerman's research has focused on defining the key regulators controlling development, maintenance and regeneration of dental-oral-craniofacial tissues. Further, she has been a recipient of numerous honors and awards throughout her academic career, including most recently the 2016 American Academy of Periodontology Distinguished Scientist Award. Dr. Somerman holds a D.D.S. from New York University, a certificate in Periodontology from Eastman Dental Center, Rochester, New York and a Ph.D. in Pharmacology from the University of Rochester, School of Medicine and Dentistry.

Jeremy Mao
Professor of Dentistry
Edwin Robinson Endowed Chair
Columbia University College of Dental Medicine
New York, New York USA

Jeremy J. Mao is currently professor at Columbia University and Edwin Robinson Endowed Chair. Dr. Mao's research has been at the interface between stem cell biology and biomaterials. His research group has made several seminal discoveries in endogenous stem cells that are recruited into 3D printed biomaterials for the healing of tissue and organ defects. In addition, Dr. Mao's work has been published in Nature Medicine, Lancet, Science Translational Medicine, Cell Stem Cell, and Nature Communications etc. Dr. Mao has published over 260 scientific papers and proceedings, and written 2 books. Dr. Mao's research has led to over 70 patents and establishment of 2 biotechnology companies. Dr. Mao has received a number of prestigious awards including Yasuda award, IADR Distinguished Scientist Award and Spenadel Award. Dr. Mao is consultant to funding agencies in the United States (NIH, NSF, DARPA), and over 18 other countries.

Steven Csorba
Artist
Throat and Neck Cancer Survivor
Edmonton, Alberta CA

Steven Csorba was born in Edmonton in 1964. During a ten-year span (2004-2014) he used visual art therapy, community building and exercise as tools to help survive cancer. Steven has devoted countless hours of community service and encourages others to give back and make community strong. If he has a chance to help others, he does so with all his energy – like it's the last day of his life. In a nutshell, he's an artist who grew stronger as a result of battling cancer and believes the idea of "community" should be redefined as "the abundance we all have inside ourselves to help others". He led and convinced countless corporate sponsors to come together to build a safe place for endangered traumatized youth at iHuman to turn their life around through creativity and community building. As a dedicated savvy do-gooder and through art donations, he has helped raise over $5 Million for a variety of charities in Alberta.

Heather M. Starmer, MA CCC-SLP, BCS-S
Clinical Assistant Professor
Department of Otolaryngology,
Head and Neck Surgery
Director, Head and Neck Cancer Speech and
Swallowing Rehabilitation
Stanford Cancer Center
Stanford, California USA

Heather Starmer, MA CCC-SLP, BCS-S is the Director of Head and Neck Speech and Swallowing Rehabilitation at the Stanford Cancer Center and an Assistant Professor in the Department of Otolaryngology – Head and Neck Surgery at Stanford University. She is a Board Certified Specialist in Swallowing Disorders. Her clinical interests involve the prevention and treatment of communication and swallowing disorders associated with head and neck cancers. She has particular interest in the prevention of swallowing disorders related to radiation based therapy for head and neck tumors and in finding ways to help patients adhere to their rehabilitative treatment plans. Additionally, she focuses on restoration of communication and swallow function after both minimally invasive and more radical surgical procedures. She has particular interest in rehabilitation after total laryngectomy and transoral robotic surgery. Heather is actively involved in research investigating new interventions to optimize communication and swallowing outcomes and quality of life following head and neck cancer treatment. Current efforts involve use of technological aids to assist patients in their rehabilitation. Heather collaborates in several multi-institutional studies including a project to standardize reporting of swallowing outcomes for large, multi-institutional clinical trials.

Hadi Seikaly

Professor, Depts. of Surgery & Oncology
University of Alberta in Edmonton
Director, Division of Otolaryngology-
Head and Neck Surgery
Edmonton Zone Clinical Section Head for Alberta Health Services
Co-Editor of the Journal of Otolaryngology Head & Neck Surgery
Edmonton, Alberta CA

Dr. Hadi Seikaly is a professor of the departments of Surgery and Oncology at the University of Alberta in Edmonton. He is the Director of the division of Otolaryngology – Head and Neck Surgery and the Edmonton Zone Clinical Section Head for Alberta Health Services. Dr. Seikaly is the Co-editor of the Journal of Otolaryngology Head and Neck Surgery. Dr. Seikaly graduated from the University of Toronto medical school and completed his residency training at the University of Alberta in Otolaryngology Head and Neck Surgery. He then obtained fellowship training at the University of Texas Medical Branch in advanced head and neck oncology, and microvascular reconstruction. Dr. Seikaly returned to the University of Alberta as an attending in the division of Otolaryngology Head and Neck Surgery, department of surgery in 1996. Dr. Seikaly completed a Masters of the Arts in Leadership from the Royal Roads University in 2014. Dr. Seikaly has a large practice dedicated to head, neck, and skull base oncology and reconstruction. His research interests include functional surgical and reconstructive outcomes, microvascular head and neck reconstruction, submandibular gland transfer medical modeling and digital surgical planning as it applies to the head and neck region. Dr. Seikaly is the Director of Head and Neck Surgery Functional Assessment Laboratory (HNSFAL) at the Institute of Reconstructive Sciences in Medicine and is the director of the Head and neck Research Network. He has been a PI or collaborator on numerous research grants receiving funding from various agencies, including CIHR, Terry Fox Foundation and Alberta Cancer Foundation. He has published over 160 peer reviewed papers and book chapters. Dr. Seikaly is the recipient of the many prestigious awards including the Edmonton Zone Medical Staff Association researcher of the year, the Canadian Society of Otolaryngology Head and Neck Surgery award for national educational excellence and the Mentor of the year. He is a member of numerous surgical societies, nationally/internationally and has been invited as a visiting professor to over 70 institutions lecturing on all aspects of Head and Neck Oncology and reconstruction.

Tuesday, October 31tt

Adam Jakus, PhD
Chief Technology Officer
Dimension Inx LLC
Chicago, Illinois USA

Adam Jakus, PhD is co-founder and current Chief Technology of Dimension Inx LLC, a start-up developing transformative advanced manufacturing materials and processes for medical and non-medical spaces. Prior to his current position, Adam was a postdoctoral fellow at Northwestern University (NU) in Materials Science & Engineering and a founding and a founding member of Prof. Ramille Shah's Tissue Engineering and Additive Manufacturing (TEAM) Laboratory. He received his BS and MS degrees in Materials Science and Engineering from the Georgia Institute Technology and completed his Ph.D. in Materials Science & Engineering at NU in the Shah TEAM Laboratory in 2014, culminating in a dissertation entitled "Development and Implementation of Functional 3D-Printed Material Systems for Tissue Engineering, Energy, and Structural Applications", spanning materials as diverse as ovarian tissues, Hyperelastic Bone, 3D-Graphene, ceramics, alloys, and extraterrestrial regoliths. He is the author of numerous patents, publications, and editorials related to 3D-printing and biomaterials.

Adrian Mendez, MD
PGY-5 Otolaryngology-Head & Neck Surgery,
PhD Candidate (Experimental Surgery),
University of Alberta
Edmonton, Alberta CA

Dr. Adrian Mendez is a 5th year post-graduate trainee in Otolaryngology-Head and Neck Surgery at the University of Alberta. He completed his medical degree at Dalhousie University. During his surgical training, Dr. Mendez completed a PhD in Experimental Surgery at the University of Alberta. His thesis centered around developing patient centered outcomes in Head and Neck Surgery. He has been the recipient of several research awards including the Canadian Poliquin competition. Currently, Dr. Mendez' research endeavors and interests include facial nerve regeneration, head and neck oncology, and expanding the field of patient centered outcomes. He has a keen interest in global health and co-founded a yearly surgical mission in Bolivia through the University of Alberta Otolaryngology training program. Next year, Dr. Mendez will pursue a fellowship in head and neck surgery and microvascular reconstruction.

Rosemary Seelaus, MAMS, CCA
Senior Anaplastoligist, Department of Surgery
The Craniofacial Center, University of Illinois
Hospital & Health Sciences System
Chicago, Illinois USA

Rosemary Seelaus is a Certified Clinical Anaplastologist, and Senior Anaplastologist at The Craniofacial Center in the Department of Surgery at the University of Illinois Hospital & Health Sciences System in Chicago, Illinois. She has been practicing clinically for twenty years. Prior to her current position of twelve years, Ms. Seelaus was a Clinical Anaplastologist and Research Fellow at the Institute for Reconstructive Sciences in Medicine (iRSM) in Edmonton, Canada, where she was instrumental in the team development of a first in-hospital Medical Modeling Research Laboratory (MMRL). Ms. Seelaus is a clinician, researcher, developer and mentor of advanced technology processes in anaplastology – an area of study she has engaged with the entirety of her career. She has a particular interest in the contribution of digital technologies toward improving surgical and prosthetic outcomes globally, and in demonstrating improved clinical efficiencies and operational workflow. Ms. Seelaus received a Master of Associated Medical Sciences in 1997 from the University of Illlinois at Chicago (UIC), and a Bachelor of Science degree in 1989 from Northwestern University, Evanston, IL. Ms. Seelaus maintains a clinical focus on the use of osseointegrated implants and technology in facial prosthetic rehabilitation. She is past President of the International Anaplastology Association (IAA); served on the Board for Certification in Clinical Anaplastology (BCCA). Currently, Ms Seelaus serves as Co-Chair for the Special Interest Group in Facial Prosthetic Rehabilitation (SIGFPR) for ISMR; Chairs the Education Committee for the Advanced Technology in Head & Neck Reconstruction North American Leadership Group (ADT N.A.), and is an Honorary Member of the Sociedad Latinoamericana de Rehabilitación de la Cara y Prótesis Bucomaxillofacial. She serves on multiple international editorial review boards, has contributed to the peer-reviewed literature, and has lectured and instructed extensively worldwide. She enjoys dancing and the outdoors.

Eduardo Arias
Clinical Anaplastologist and Ocularist
The Craniofacial Center, University of Illinois
Hospital & Health Sciences System
Chicago, Illinois USA

Eduardo Arias is a Clinical Anaplastologist and Ocularist for The Craniofacial Center, University of Illinois Hospital & Health Sciences System. He combines both artistic skills and medical knowledge to specialize in facial and ocular prosthetics. He concentrates in the incorporation of digital technology in craniofacial restoration, surgical planning in maxillofacial surgery and manufacturing appliances for autogenous auricular reconstruction. Most recently, he conceptualized an apparatus and developed a procedure that predicts and assist fat grafting techniques applied to facial asymmetry, acquired disfigurements and congenital deformities. Eduardo gained advanced clinical experience at the JHU Facial Prosthetics Clinic and at The Johns Hopkins Hospital. He went on working in private practice in the field of Orthotics and Prosthetics at Westcoast Brace & Limbs, where he established a Facial and Ocular Prosthetics service for the city of Tampa, FL, with the collaboration of leading healthcare organizations such as Moffit Cancer Center, USF Eye Institute and the VA Eye Clinic. Earned his Bachelor of Fine Arts degree from the Pontifical Xavierian University in Bogota, Colombia. His education was followed by specialty training in facial prosthetics at The Johns Hopkins University School of Medicine, Department of Art as Applied to Medicine in Baltimore, Maryland. Eduardo is a member of the International Anaplastology Association (IAA) since 2013.

Johan Wolfaardt, BDS, MDent (Prosthodontics), PhD
Professor, Division of Otolaryngology-Head and Neck Surgery,
Department of Surgery
Faculty of Medicine and Dentistry,
University of Alberta
Institute for Reconstructive Sciences in Medicine (iRSM)
Edmonton, Alberta CA

Dr. Wolfaardt is a Full Professor, Division of Otolaryngology-Head and Neck Surgery, Department of Surgery, Faculty of Medicine and Dentistry, University of Alberta. Dr. Wolfaardt is a co-founder of iRSM. His clinical and research interests are in the area of Maxillofacial Prosthodontics with particular emphasis in the area of head and neck reconstruction, osseointegration and advanced digital technologies in surgical design and simulation. Dr. Wolfaardt has a special interest in quality management and he initiated the interest and process that led to iRSM registering an ISO9000 quality system for the clinical and research aspects of osseointegration care. Dr. Wolfaardt has published over 110 papers in refereed journals and contributed to a variety of texts. He has lectured both nationally and internationally on maxillofacial prosthodontic care, head and neck reconstruction, osseointegration, and advanced digital technology. Dr. Wolfaardt has served on Boards of the International College of Prosthodontists, the American Academy of Maxillofacial Prosthetics, the International Society for Maxillofacial Rehabilitation, and the Advanced Digital Technology Foundation (ADT) for Head and Neck Reconstruction. Dr. Wolfaardt is past President of the International Society for Maxillofacial Rehabilitation and the ADT Foundation. Dr. Wolfaardt was awarded Honorary Membership by the Canadian Dental Association in 2011. The Alberta Dental Association and College presented the Award of Excellence to Dr. Wolfaardt in 2013. In 2014, the American Academy of Maxillofacial Prosthetics honored Dr. Wolfaardt with the Andrew J. Ackerman Memorial Award. In 2016, the British Prosthodontic Society awarded Honorary Membership to Dr. Wolfaardt and in 2017 Dr Wolfaardt received the Life Achievement Award of the Edmonton Zone Medical Staff Association.

Thomas J. Salinas, DDS
Mayo Clinic
Department of Dental Specialties
Rochester, Minnesota USA

Maxillofacial Reconstruction: From Intuitive Two-Dimensional Planning to Modern Day Approach and Application

The problem posed of surgical and prosthetic reconstruction of complex maxillofacial defects has undergone evolution over the last three decades. Starting with advances made in microvascular surgery, autotransplant of composite tissues became feasible and was the pilot concept used to advance reconstruction of mandibular defects. Increasing awareness of predictability and the demand for repair of simple and multi-planar defects of the orofacial region made an indelible footprint in the approach made with these patients. Concurrent technology capabilities have increased the scope of this unique application such that preoperative planning has afforded less operative time and fewer sequential procedures to traverse traditional healthcare barriers. Assessments of this approach will relate to convalescent, psychologic, and economic advantages that lend a perspective if our care for patients has improved.

Arun B. Sharma, BDS, MSc
Health Sciences Clinical Professor
Director Graduate Prosthodontics
UCSF School of Dentistry
UCSF Dental Center
San Francisco, California USA

The UCSF Experience with Zygomatic Implants for Maxillary Defects

Obturation of congenital and acquired maxillary defects in edentulous patients poses significant challenges for prosthodontists. Osseointegrated implants provide an alternative to surgical reconstruction. However, not all patients have adequate native bone for the placement of conventional implants. The zygomatic implant was introduced by P-I Branemark in 1988 and has been used with success for the appropriate patient. In 1999 an edentulous patient with an anterior maxillary defect presented to the maxillofacial prosthetic clinic at UCSF unsatisfied with the functional outcome from her conventional obturator. She had insufficient bone for placement of conventional implants and was not a candidate for extensive reconstructive surgery. She was offered the zygomatic implant as an alternative and was successfully treated. We proceeded to treat other patients with similar defects and published our initial findings from 9 patients in 2004. This presentation will highlight updates on our success and failures with the zygomatic implant for edentulous patients with congenital and acquired maxillary defects.

Learning Objectives:
1. Identify patients with maxillary defects who will benefit from treatment with zygoma implants as an alternative.
2. Will appreciate complications and maintenance for patients with maxillary defects who have been treated with zygoma implants.
3. Success and failures will be discussed.

The following workshops are elective events that come at an additional cost.
Please note, some workshops may overlap with scientific sessions.
Space is limited and subject to availability.

Saturday, October 28th

Workshop #1

(07:45 - 15:30)

Morning Session: Advanced Jaw Reconstruction during Head & Neck Oncologic Surgery

Instructors: Drs. Dan O'Connell, Hadi Seikaly, Martin Osswald, Dale Howes, Chris Butterworth

The anatomic constraints of the craniofacial skeleton are a challenge for finding adequate bone for sustained osseointegration particularly in the ablated maxilla, the resected mandible and the rehabilitated facial bones using the grafted fibula. Regular implant fixtures seldom satisfy both the surgeon and the Prosthodontist for sustained osseous and prosthetic retention of the rehabilitation. A range of specific fixtures have been developed and researched with world leaders in maxillofacial rehabilitation to overcome the challenges of boney and prosthetic rehabilitation. The research, development, surgical planning and applications of the Oncology implant, the Co-Axis, the MAX, and extraoral implants including the FIRST fibula reconstruction kit developed for maxillofacial rehabilitation will be highlighted and demonstrated on prototyped models of the facial skeleton.

Post-surgical radiation therapy for oncologic treatment of head and neck malignancies has direct implications for dental implant health. Standard radiation treatment protocols may negatively impact osseointegration leading to implant complications including implant loss. The combined experience of multiple high-volume treatment centers regarding special considerations in head and neck implantology in the setting of oncologic treatment will be reviewed.

Afternoon Session: Advanced Jaw Reconstruction – Hands on Workshop ***with generous support from KLS Martin***

Instructors: Drs. Vincent Biron, Hadi Seikaly, Dale Howes, Martin Osswald, Dan O'Connell

Classic mandibular and maxillary plating techniques during head and neck reconstruction with osseous free tissue often provides suboptimal bone segment positioning for dental rehabilitation. The approach to surgical planning, intraoperative decision making, reconstruction plate positioning and bone segment positioning will be reviewed by world leaders in maxillofacial reconstruction. Participants will have the opportunity to use prototyped models of facial skeletons and osseous bone grafts to plan reconstructions, place and manipulate reconstruction plates and analyze appropriate facial skeleton relationships for optimum dental rehabilitation capacity. A high yield hands on workshop not to be missed.

Monday, October 30th

Workshop #2

(15:00 - 17:00)

Cochlear Workshop: VistaFix Training Course

Instructors: John Vogrin and Patrick Hurley

Cochlear is proud to offer a hands-on training course focusing on both the surgical and prosthetic aspects of craniofacial rehabilitation utilizing osseointegrated implants. Attendees will have the opportunity to demonstrate the recommended surgical aspects on training models while using all of the tools and components necessary to complete a VistaFix system relating to auricular, orbital, nasal and mid-facial prosthetics.

Key objectives of the course are:

- Introduce and familiarize attendees with osseointegration and implant-retained prosthetic rehabilitation as a treatment option.

- Develop awareness of the multidisciplinary 'team' approach to patient care.
- Introduce and familiarize Vistafix instrumentation and technical procedures.
- Allow hands-on demonstration of surgical techniques on soft tissue models
- Provide and develop networking opportunities for prosthetic rehabilitative professionals.

Cochlear will provide all that you need to learn and use for the hands-on portion of the session. It is our goal to provide the very best information during this workshop, and we encourage any and all comments, feedback and questions during the time we spend together.

Tuesday, October 31st
Workshop #3
(13:30 - 16:00)

Factor II / Technovent Beginner Level Workshop: Silicone Elastomer Understanding
Instructor: John McFall and Diane McFall

There is much confusion and misinformation on the practical use of and choice of silicone for use in Maxillofacial devices. This afternoon workshop will include a variety of Factor 2 & Technovent silicone elastomers. The goal of this course is to openly discuss silicone elastomers and the reasons for choosing a particular silicone for creating various prosthetic and 3D devices. Participants will be able to openly address and physically see and handle various elastomers.

Two-part RTV, LSR and HCR addition cure elastomers: will all be identified and discussed.

The entire time will be devoted to an understanding of the various elastomers and exchange of knowledge and choice of materials.

Physical properties, bonding and open discussion to the choice of pigments and additives.

If time allocates participants will have the ability to mix, color and pack a mold with their choice of a variety of silicone elastomers.

Tuesday, October 31st

Workshop #4

(13:30 - 16:00)

Factor II / Technovent Advanced Level Workshop: Materials, Manipulation, Matching & Magnets

Instructors: Alan Bocca and Mark Waters

This afternoon workshop covers the integration of the Technovent/Factor 2 silicone elastomer and magnet retention systems, working from the chemistry behind silicone elastomers through the use of gels, packing of liquid silicone into the mould to the choice and integration of magnets into the final prosthesis. The course is aimed at those with some anaplastology experience who want to sharpen their skills on intrinsic colouration techniques and the use of magnets to retain prostheses. The presenters have a wealth of experience in silicone science and anaplastology and the workshop gives the opportunity for the participants to 'pick their brains' in an informal atmosphere.

- Lecture – Technovent Magnet System
- Demonstration – Impression Technique with Magnets: The demonstration will run through the procedures of taking an impression when using magnetic retention ultimately leading to the construction of the baseplate which anchors the prosthesis in place.
- Demonstration and Hands-On Session – Colour Matching and Mould Packing: Demonstration of colour matching and mould packing of a magnet retained nasal prosthesis with Technovent/Factor 2 silicone systems, explains use of

primers, intrinsic pigments, gels, anti -slumping agent and separators. Participants repeat demonstration using pre-prepared moulds.

- Demonstration – Auricular Magnet System and Spectromatch E-Skin: The final session will demonstrate the Technovent auricular magnet system giving invaluable advice on how to get the best out of the system. Finally, a demonstration will be given of the Spectromatch Eskin system which enables users to produce reproducible colour matching in any lighting conditions.

Tuesday, October 31st

Workshop #5

(13:30 - 16:00)

Nobel Biocare Workshop: Zygoma Concept- Surgical Hands-On Session

Instructor: Dr. Ed Bedrossian

This hands-on course will allow the participants to understand the armamentarium and the surgical protocol for placement of Brånemark System* Zygoma implants using the ad modum Brånemark technique. The discussion will focus on understanding the 'trajectory' of the osteotomy. The steps for placement of a single zygoma implant as well as the zygoma quad concept will be communicated in depth.

Key objectives of the course are:

- Understand the armamentarium for placement of the Brånemark System* Zygoma implant
- Understand the steps in placing the zygomatic implant
- Understand the modified steps for the placement of the zygoma quad concept

1
FABRICATION OF A FLEXIBLE SILICONE MOLD TO MINIMIZE DISTORTION FOR AN ORBITAL PROSTHESIS

Agrawal, Kaushal Kishor * Chand, Pooran
King George Medical University
Prosthodontics Department
Lucknow, Uttar Pradesh, India

Keywords: distortion, mold

Case Presentation: Repeated placement and removal of wax pattern for an orbital prosthesis with deep undercuts from a working model made of Type III gypsum product can lead to its distortion and discrepancies in the pattern adaptation may occur. This technique describes the method of fabrication and use of a flexible silicone mold. The flexible mold allows precise repositioning of orbital pattern, minimises the pattern distortion and also allows pattern fabrication with minimal need of patient appointment.

2
QUANTIFYING PATIENT CONCERN INVENTORY (PSI)© ITEMS AS A PREDICTIVE QOL TOOL

Aguilar, Maria Lucia * Psoter, Walter J.
University of Florida, College of Dentistry, Eastman Institute for Oral Health Rochester, New York USA
Restorative Dental Science Prosthodontics Division
Gainesville, Florida USA

Keywords: Patient Concern Inventory (PCI)©, quality of life, gender

Purpose/Aim: To explore the threshold of Patient Concern Inventory (PCI)© items as a predictor for quality of life (QOL) in head and neck cancer (HNC) treatment.

Materials and Methods: Consecutive HNC patients of the UF Oral Medicine and ENT clinics were invited to complete a questionnaire that included the PCI© and University of Washington Quality of Life (UW-QOLv4) instruments. The PCI ©is a clinical questionnaire developed by Dr. Rogers' group (Edge Hill University, Liverpool) and is

used in British HNC practices as recommended by the U.K. National Health Service. The number of patient reported PCI © items was dichotomized at the upper quartile. The UW-QOLv4 physical and social function domains were dichotomized by lower vs. upper 3 quartiles as outcomes. The dichotomized social and physical function domains were separately regressed (logistic model) on the dichotomized PCI© value, treatment, sex, months since radiation, and radiation or surgery of the neck. The predictive probabilities of the final models were then produced.

Results: The sample means (s.d.) were: age 61.7 (9.9), number of PCI issues 5.3 (5.8), 35% had radiation only, 70% were males. The PCI© upper quartile was ? 8 items. Statistically significant variables in the logistic regressions were: physical function: sex (females) and the PCI upper quartile of items (OR= 2.6 and 5.4, respectively); and for social function: the variables (OR) were: sex (female) (0.2), PCI upper quartile (6.9), treatment (surgery and radiation) (10.5), and neck radiation (14.6). The probability for poor Physical Function was 47% for the PCI upper quartile, 64% and 41% females and males, respectively. Poor Social Function probability was 56% for the PCI upper quartile, 36% and 63%, females and males, respectively. Approximately 70% of patients reporting 8 or more PCI problems had poor quality of life (QOL) as measured by the UW-QOL Social and Physical Function domains. Females had a higher risk (50% greater probability) for physical function deficits than men if experiencing 8 or more PCI© issues, while the obverse was true for social function, where men had a 75% higher probability if experiencing 8 or more PCI© issues

Conclusions: With the data of this study, a cut-point of eight reported PCI© issues is a useful predictor of poor QOL (71% of those with 8 or more issues vs. 24% of those having less than 8 issues). Notably, women, relative to men had less likelihood of social deficits and more for physical deficits relative to men.

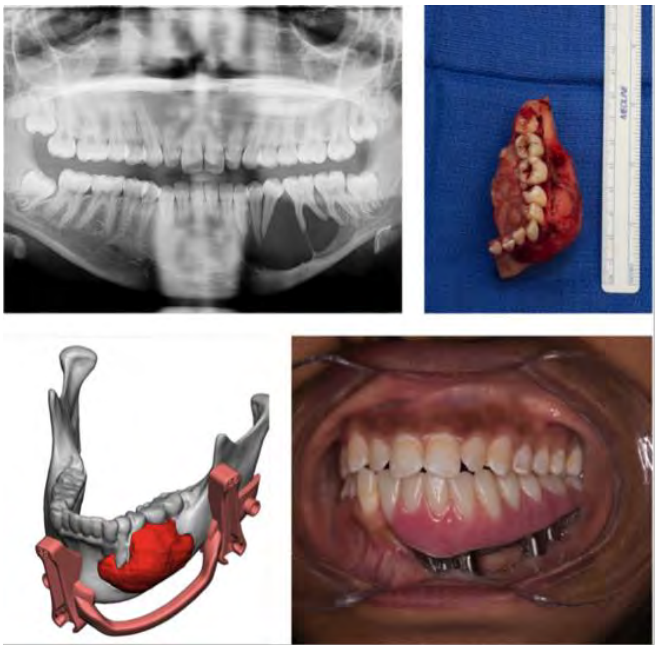
3
DIGITAL SURGICAL PLANNING FOR MANDIBULAR RECONSTRUCTION

Arwani, Noura * Sinha, Nikita; Salinas, Thomas J.
Mayo Clinic
Dental Specialities- Maxillofacial Prosthodontics and Prosthetics
Rochester, Minnesota USA

Introduction: Intuitive mandibular reconstruction using free fibula flap has traditionally relied on the surgeon's manual skills and expertise, sometimes making the results unpredictable. Digital surgical planning, on the other hand, has tremendously aided the ability to visualize the anatomical landmarks and plan precise fibular flap spatial location helping to ensure accuracy and efficacy.

Case report: A 19-year old female presented to the Mayo Clinic with expansile lesion involving the left body of the mandible. The panoramic radiograph revealed a radiolucent well-circumscribed lesion displacing the associated teeth. The pathological findings confirmed a diagnosis of granular cell odontogenic fibroma. The tumor was to be removed through segmental mandibulectomy and immediate reconstruction with fibular myo-osseous free flap utilizing Virtual Surgical Planning (VSP)®. Three-dimensional images of pre- and post-operative mandibular anatomy were created using patient CT data and VSP modeling system. Accurate cutting guides with well-fitting surgical splint were designed. A body and symphyseal segments of precise size and shape flap were created to fit the mandibular defect necessitating a total 79 mm length of fibula. This was then attached to the reconstruction bar with 9-mm locking screws fitting in intimate fashion with excellent bone-bone contact. At a later stage, 5 endosseous implants were placed into the fibular flap for support of a fixed dental prosthesis. The accuracy of the VSP planned surgery helped in proceeding with prosthodontic rehabilitation with orthogonal placement of the implant access channels, hardware and tooth position. A resin to metal fixed partial dental prosthesis supported by the implants was fabricated. Satisfactory esthetic and functional results were achieved.

Conclusion: Using virtual surgical planning assured more accurate results. VSP achieved patient's satisfaction and saved her from unnecessary complications and lengthy treatment course.



4
FROM A SMALL BONE EXPOSURE TO EXTENSIVE REHABILITATION; DIAGNOSIS, TREATMENT, AND COMPLICATIONS

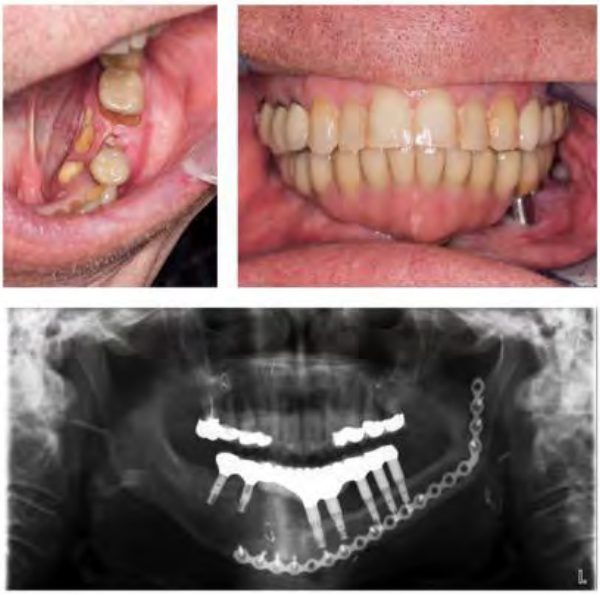
Arwani, Noura * Sinha, Nikita; Salinas, Thomas J.
Mayo Clinic
Dental Specialties- Maxillofacial Prosthodontics and Prosthetics
Rochester, Minnesota USA

Introduction: Osteoradionecrosis of the jaws, particularly of the mandible, is a serious complication of radiation therapy of head and neck cancers. The negative consequences of osteoradionecrosis are significant in that they threaten continuity and health of the mandible thereby affecting swallowing, speech, and mastication. In these cases, further consideration for complex reconstruction and rehabilitation is warranted.

Case report: A 71 male with history of adenoid cystic carcinoma of the left submandibular gland treated with excision and adjuvant radiation therapy subsequently presented with 7 mm bone exposure concerning for localized chewing trauma vs. incipient lesion of osteoradionecrosis. Treatment with chlorhexidine gluconate rinses followed by a course of amoxicillin did not have a significant impact. The patient further developed additional boney exposure and deep pain which was thought to be from osteoradionecrosis. This led to multiple debridements in attempt to remove the expanding necrotic bone. Additional efforts with peri-operative hyperbaric oxygen therapy were likewise unsuccessful in resolving healing of the lesion. Ultimately, he underwent en bloc mandibulectomy extended from the angle of the mandible to the symphysis in order to remove the necrotic bone and the associated pathological fracture. Reconstruction was performed using an intuitive designed fibula free flap, osteocutaneous micro-vascular free tissue transfer and immediate endosseous implant placement. During fixation of the fibular flap, a small gap was noticed in the posterior aspect of the flap and the mandibular bone. Consequently, the proximal segment was readjusted to provide a more intimate fit posteriorly. Although the fibula flap had a good fixation and vascularity, the adjustment had translocated the proximal mandible medially resulting in incomplete intercuspation of the remaining right posterior teeth. After fabrication of the fixed partial prosthesis, there was considerable discrepancy of the right side. The prosthesis was redesigned to include the right posterior teeth as implants were placed across the mandibular arch supporting a full arch metal-ceramic prosthesis to achieve optimal occlusal results.

Conclusion: Maxillofacial reconstruction poses a major challenge to surgeons because of the associated anatomical complexity, the sensitivity of the involved systems and the need to maintain a pleasing esthetic and functional results. Virtual surgical

planning should be considered to achieve more accurate results.



5
INTRA-OPERATIVE FACIAL SCANNING AND RAPID PROTOTYPING PROSTHETIC MOLDS FOR IMMEDIATE NASAL PROSTHETICS: TWO CASES

Bellicchi, Travis * Jacobs, Cade; Wood, Zebulun; Levon, John
Indiana University School of Dentistry
Graduate Prosthodontics
Indianapolis, Indiana USA

Keywords: Facial Scanning, Stereophotogrammetry, Rapid Prototyping

Case Presentation: Purpose: Explore the use of intra-operative facial scanning for nasal resection surgery using a LED structured light hand-held digital scanner.

Methods: Pre-operative 3DMD Face stereophotogrammetric facial scans were made on two patients planned for tumor resection surgery. These scans serve as baseline control scans to evaluate intra-operative facial scanning using a GoScan 20 LED structured light hand-held scanner from CreaForm. Reported volumetric accuracy for 3DMD Face

stereophotogrammetry is 0.200mm/m RMS. Reported volumetric accuracy for CreaForm GoScan 20 is 0.300mm/m. Pre-operative and intra-operative scans were conducted on two patients. Two data sets (each set comprised of one pre-operative scan and one intra-operative scan) were aligned using the picked-points algorithmic function in GeoMagic DesignX. A Boolean subtraction was conducted between the data sets for each patient. Virtual modeling of patients and digital design of planned prosthesis was done using ZBrush by Pixologic. Prosthetic molds were digitally designed in ZBrush. Rapid prototyping of prosthetic molds for nasal resection prosthetics was done using PreForm and a Form 2 stereolithography 3D printer. Silicone nasal prosthesis was fabricated using VST-30 from Factor2. Intrinsic and extrinsic silicone characterization was used in the fabrication process.

Results: Two immediate nasal prosthetic molds were digitally designed and rapidly prototyped using this workflow. One patient received an immediate silicone nasal prosthesis. The other patient elected to undergo facial reconstruction surgery rather than silicone prosthetic rehabilitation.

Conclusions: Intra-operative scanning using CreaForm GoScan 20 is a reasonable and reliable component in a digital workflow for immediate nasal prosthesic design and fabrication. The intra-operative scanning was fast, efficient, and completed within acceptable limits in the operating room. The two data sets aligned well and were within acceptable limits for virtual modeling, prosthetic design and rapid prototyping immediate nasal prosthetic molds.

6
NON-SURGICAL MANAGEMENT OF AN ODONTOGENIC MAXILLARY SINUSITIS WITH ORO-ANTRAL COMMUNICATION

Boreak, Nezar * Suziki, Takanori; Froum, Stuart J; Cho, Sang-Choon
New York University College of Dentistry
Ashman Department of Periodontology and Implant Dentistry
New York, New York USA

Keywords: Odontogenic Maxillary Sinusitis, Antibiotic therapy, Sinus augmentation

Case Presentation: Maxillary sinusitis is an acute or chronic inflammation of the maxillary sinus mucosa. Common causes include bacterial or viral infections, allergies, or may be odontogenically related. Among the most common symptoms of sinusitis are feelings of pressure and weight in the region of the sinus, facial tumefaction and erythema. Diagnosis is usually made by clinical signs and symptoms. In addition, trans-illumination, sinus ultrasonography, film radiography and Computed Tomography scans are useful aids and techniques to verify the diagnosis. The purpose of this case report is

to document a non-surgical management of an odontogenic maxillary sinusitis with antibiotic therapy and subsequent sinus augmentation with simultaneous implant placement.

7
AURICULAR PROSTHESIS COMPLICATED BY AGGRESSIVE CANCER ABLATION RESULTING IN SUPERIOR IMPLANT PLACEMENT

Canallatos, Paul * Jayanetti, Jay
University of California Los Angeles
Maxillofacial Prosthetics
Los Angeles, California USA

Keywords: Auricular, Prosthesis, Craniofacial

Case Presentation: Abstract: Pre-surgical planning has resulted in better placement of auricular implants leading to ideal final prostheses. Understanding the final contours of the restoration has enabled a surgical map to be drawn that can guide surgeons during time of cancer removal to aid in the placement of craniofacial implants. Unfortunately, in the oncology patient, the amount of adequate osseous foundation for craniofacial implants is not known until tumor resection is completed, verified by negative surgical margins. This unpredictability can make pre-surgical planning impossible to execute, resulting in non-ideal placement of craniofacial implants. Sequentially, this leads to non-conventional bar fabrication to accommodate the retentive features for the prosthesis. This case report demonstrates a patient who underwent cancer removal of right auricle with wide surgical margins leading to non-ideal implant placement secondary to minimal remaining bone after osseous resection.

The patient is a 60-year-old caucasian female who underwent bilateral anteriorly displaced meniscae without reduction treatment by bilateral TMJ arthroscopy. She then developed sebaceous carcinoma of right external ear which was treated by resection and free-flap reconstruction by the Head and Neck team at UCLA. Due to the extent of temporal bone resection it was decided to abandon the pre-surgical plan for implants. New imaging was acquired to assess new possible implant sites. A subsequent surgery was performed and two Vistafix (4.5mm x 3mm) implants being placed in temporal bone in a non-ideal, superior site, according to proper contours for final auricular prosthesis. Bar fabrication was performed using NobelProcera by scanning the master cast and diagnostic sculpting of auricular prosthesis. Esthetic complications came about due to the need of disguising the connection between fixture location and the superior border of the helix.

The purpose of this presentation is to discuss a clinical situation that is non-ideal placement of craniofacial implants, nonetheless, successfully restored using a milled-bar and hader-clip retained prosthesis. This presentation demonstrates a case that was successfully completed using basic fundamentals of prosthodontics, despite obstacles from cancer treatment.

8
COMPARISON OF SURGICAL-DRIVEN VERSUS OCCLUSION-DRIVEN SURGICAL PROSTHETIC DESIGN OF JAW RECONSTRUCTION REHABILITATION

Chuka, Richelle * Rieger, Jana; Seikaly, Hadi; Nayar, Suresh; Osswald, Martin; Wolfaardt, Johan
Institute for Reconstructive Sciences in Medicine
Edmonton, Alberta CA

Keywords: Head and neck tumor, advanced jaw reconstruction rehabilitation, implant survival

Purpose/Aim: Over the past decade, there has been a shift in the Surgical and Prosthetic Design (SPD) of the advanced Jaw Reconstruction Rehabilitation (JRR) used to treat head and neck tumors (HNT). The purpose of this observational study was to assess implant and fibular bone survival outcomes in the Alberta Reconstructive Technique (ART). The SPD utilized an Occlusion-Driven (OD) or Surgical-Driven (SD) Paradigm for the ART.

Materials and Methods: Ethics approval was obtained for this retrospective analysis of adult head and neck tumor (HNT) participants treated at the Institute for Reconstructive Sciences in Medicine (iRSM). A chart review was conducted on ART cases that underwent a microvascular fibular free flap reconstruction involving the primary installation of implants (+/- chemoradiation). All treatment planning involved 3-dimensional surgical design and simulation and additive manufacturing guides for advanced JRR. The study assessed osseointegrated implant and fibular flap survival outcomes between ART participants utilizing a OD or SD paradigm. The OD paradigm utilized regular diameter (4.3 mm) implants, without Bone-Impacted Fibula BIFF (BIFF), without hyperbaric oxygen (HBO). The SD paradigm utilized narrow diameter (3.5 mm) implants, BIFF and HBO. Data were collected between January 1, 2009 and March 1, 2016. Descriptive statistics were used to determine trends in the implant and fibular flap survival outcomes between the two paradigms. Spatial measurements of the distances between implants were compared between paradigms.

Results: Outcomes measures will be recorded to show trends in the data of implant-

related survival data, as well as spatial measurements between the OD and SD paradigms. Outcome data will be illustrated in graphs and tables to present the descriptive statistics data between groups.

Conclusions: This study observed trends in the implant-related data between treatment approaches in the ART participants. Further investigation is needed to study the biological factors that impact the integrity of the osseos and vascular supply of the irradiated fibular bone after advanced JRR. This observational study is a starting point to assess trends in the data to support protocols for the successful completion of the advanced JRR.

9
SPEECH RECOVERY FOR AN OBTURATOR PATIENT FOLLOWING DISEASE RECURRENCE IN THE VELOPHARYNGEAL MECHANISM: CASE STUDY

Colburn, Hannah * Villalobos, Jose
Air Force Postgraduate Dental School
Maxillofacial Prosthetics
Jbsa Lackland, Texas USA

Keywords: speech bulb, velopharyngeal dysfunction (insufficiency), obturator

Purpose: Sequelae resulting from surgical intervention and radiation therapy along with the possibility of disease recurrence, affect the head and neck cancer patient for life. Interdepartmental teamwork is essential for monitoring and treatment of these patients. Consequences of radiation and surgical therapy may include xerostomia, trismus, mucositis, fungal infections, and soft tissue necrosis. Functional deficits, including the velopharyngeal mechanism, may develop years after completing treatment.

Case Study: An 82-year-old completely edentulous female with a history of nasopharyngeal cancer, treated successfully with a maxillary obturator, presented with the chief concern of incoherent speech and nasal regurgitation. She had a history of squamous cell carcinoma of the right nasal cavity in 2010, which resulted in surgical resection of the right anterior maxilla and radiation therapy. In 2016, a wide local excision was accomplished due to a recurrence of squamous cell carcinoma. She has experienced severe xerostomia, trismus, and fungal infections. Following wide local excision, speech became incoherent and nasal regurgitation developed despite wearing an obturator that met anatomic expectations for support, stability and retention. Nasoendoscopy revealed sufficient obturator seal of the anterior palatal defect during speech and swallowing. Vocal fold insufficiency was also noted incidentally. Velopharyngeal closure pattern during a swallow study showed compensation of the

superior constrictor during swallowing, limited movement of the epiglottis and nasal regurgitation due to velopharyngeal insufficiency. Compensatory closure movements, resulting from post-surgical tissue contracture along with the consequences of radiation resulted in insufficient function for adequate speech and swallowing. The proposed treatment planned in conjunction with the speech pathologist was to add a speech bulb to the existing obturator and initiate speech therapy to strengthen the associated muscles. A metal wire tang was contoured from the posterior aspect of the obturator and extended around the remaining uvula, providing support for the speech bulb, while leaving the residual soft palate unaffected. The speech bulb was obtained incrementally using Modeling Plastic Impression Compound, then cutback and finalized with Korecta wax. Simultaneous nasoendoscopy and speech assessment was provided by the speech pathologist. Once patient and providers were satisfied with resultant speech and swallowing, the bulb was taken to the lab and converted into acrylic resin.

Conclusion: Successful prosthodontic rehabilitation depended on an interdisciplinary team approach to accurately diagnose and formulate an appropriate treatment plan. Through modification of the existing obturator with a speech bulb component, the team was able to address the patient's chief concern.

10
OBTURATOR: TREATMENT FOR MAXILLARY DEFECT DUE TO ADENOCYSTIC CARCINOMA

Diaz Rubayo, David * Levon, John
Indiana University School of Dentistry
Prosthodontics
Indianapolis, Indiana USA

Keywords: Obturator, Maxillary defect, Adenocystic carcinoma

Case Presentation: A patient presented with less than ideal obturator she needed for a maxillary defect due to surgery of an adenocystic carcinoma. A hollow obturator was fabricated for the patient. functions and esthetics were restored.

11
FABRICATION OF A CUSTOM BRACHYTHERAPY IMPLANT DEVICE

Drew, Alexander * Golden, Marjorie; Randazzo, Joseph
Memorial Sloan Kettering Cancer Center
Maxillofacial Prosthetics
New York, New York USA

Case Presentation: The purpose of this poster presentation is to review the prosthodontic and laboratory steps in the fabrication of a custom brachytherapy implant device. This technique will be described through a case report for the treatment of recurrent orbital rhabdomyosarcoma. Following a post non-eyelid sparing orbital exenteration of a seven-year-old boy, an impression of the orbital defect was captured to fabricate a custom orbital implant prosthesis with mock catheters. One week later, the prosthesis was placed in the orbit and the device was loaded with radiation catheters to deliver targeted radiation. The prosthesis was secured with Velcro straps fitted into slots made in the prosthesis and wrapped around the back of the head.

In this case, brachytherapy required interdisciplinary care from the ophthalmologists, radiation oncologists, and maxillofacial prosthodontists. Brachytherapy is adjuvant cancer treatment where a high radiation dose is given in close proximity to or within the tumor, while reducing the radiation exposure in the adjacent healthy tissues. Rhabdomyosarcoma is the most common soft tissue sarcoma of childhood, constituting 3% to 5% of all malignancies. The mean age of diagnosis is 6.8 years of age, with rare but possible diagnosis in early adulthood. The head and neck site accounts for 35% of all tumors and 10% of rhabdomyosarcomas develop in the orbit. The prognosis for this malignant tumor is excellent, with greater than an 85% overall survival. In patients who have recurrent orbital rhabdomyosarcoma and have received radiation and chemotherapy, additional surgery is necessary. However, operations can result in the inability to completely remove microscopic remnants of the tumor. In these situations, surgery combined with brachytherapy is a proven local treatment modality with the ability to remove disease and limit side effects.

12
RECONSTRUCTION OF A HEMI-MAXILLECTOMY WITH AN OCULOFACIAL COMMUNICATION

Fitzharris, Benjamin * Abdolazadeh, Laleh
Naval Postgraduate Dental School
Maxillofacial Prosthetics
Bethesda, Maryland USA

Keywords: digital, reconstruction, defect

Case Presentation: Pre- and post-operative facial models are useful diagnostic aids when planning prosthetic reconstruction of acquired or congenital defects. Fabrication of these models typically involve conventional impression techniques that can be physically and psychologically uncomfortable for the patient. In addition, traditional hand sculpting of the prosthesis prototype can be challenging and time consuming for the technician. Digital technology can provide accurate and efficient methods of reconstruction with improved patient experience. This case presentation demonstrates how three-dimensional digital stereophotogrammetry, computed tomography (CT), and additive manufacturing were used to digitally reconstruct a facial defect to the pre-trauma state by generating a mirror image of the contralateral intact anatomy. Molds of the prosthesis prototype were then additively manufactured and used for conventional silicon packing.

13
CURRENT STATUS OF DEMENTIA AND WEARABILITY OF MAXILLOFACIAL PROSTHESES AMONG PATIENTS AT MAXILLOFACIAL PROSTHETICS CLINIC

Fujita, Haruka[1] * Sumita Yuka[1], Namba Toshimitsu[2], Yanagi Ayaka[1], Ino Shuichi[3], Taniguchi Hisashi[1]
[1]Tokyo Medical and Dental University
[2]Namba Dental Clinic
[3]National Institute of Advanced Industrial Science and Technology
Tokyo, Japan

Keywords: Elderly, dementia, wearability

Purpose/Aim: The elderly population aged ? 65 years in Japan is approaching 35 million and accounts for over 21% of the total population. This super-aging society has altered the situation surrounding dental care. In response, various changes in the Japanese

dental care system are needed now or in the near future, including changes in reception, checkup methods, explanations provided to patients and their family for obtaining informed consent, prostheses, and treatment planning. This study aimed to reveal the status of the patients with dementia in our clinic and their level of difficulty in wearing maxillofacial prostheses.

Materials and Methods: Forty-three participants (mean age 78.5 years) were selected who were over 65 years old from patients who visited the maxillofacial prosthetics clinic of the Faculty of Dentistry, Tokyo Medical and Dental University Hospital, between August 2016 and June 2017. Dementia status was evaluated using the Hasegawa Dementia Rating Scale. Patients rated the difficulty of wearing their prosthesis on a visual analogue scale and reported the success rate of wearing their prosthesis. Doctors also reported the success rate of patients wearing their prothesis. This study was approved by the Ethics Committee of Tokyo Medical and Dental University (approval no. D2016-012).

Results: There was a possibility of dementia in 3 of the 43 patients (7.0%). The success rate of wearing a prosthesis differed between patients and doctors. Seven of the 43 patients reported a success rate that was higher than the rate reported by doctors. Among these 7 patients, 1 patient had dementia.

Conclusions: Among visitors to our clinic, the rate of patients with dementia was 4.7%. This is lower than the average prevalence of 10.9% in Japan overall. Nonetheless, it is important to assess patients' dementia status during routine examinations. The discrepancy in the success rate between patients and doctors was due to some patients not understanding whether they wore their prothesis correctly. Topics for further study include factors affecting the wearability of maxillofacial prosthesis such as dementia status and feedback of the findings into the dental care system. This work was partially supported by JSPS KAKENHI Grant Number JP17H00755.

14
IMMEDIATE ENDOSSEOUS IMPLANTS DURING PARTIAL MAXILLECTOMY FOR EDENTULOUS PATIENTS: A GUIDED APPROACH

Gazdeck, Kyle * Huryn, Joseph M.; Rosen, Evan B.
Memorial Sloan Kettering Cancer Center
Department of Surgery
New York, New York USA

Keywords: Endosseous Implants, Maxillectomy, Guided Surgery

Case Presentation: A technique for placing guided endosseous implants at the time of tumor resection of the maxilla is described. This technique is useful in edentulous patients to improve retention and/or stability of the maxillary resection/obturator prosthesis. A preoperative maxillary cast of the maxillary arch is fabricated and planned surgical margins are defined by the Head and Neck surgeon. A cone beam computed tomography (CBCT) is obtained of the maxillary arch and overlaid with the preoperative cast for digital planning of endosseous implants and surgical guide fabrication. Additionally, a surgical obturator prosthesis is fabricated. At the time of ablative surgery, endosseous implants are placed and the surgical obturator prosthesis is fixated to the remaining maxillary alveolus. Following completion of oncologic treatment, definitive maxillary reconstruction benefiting from endosseous implants can be completed. This technique has been found to greatly improve the retention and stability of maxillary resection/obturator prostheses, as well as oral function, in patients receiving care from the Dental Service at Memorial Sloan Kettering Cancer Center.

15
IMMUNOSUPPRESSION FOR COMPOSITE TISSUE ALLOGRAFTS: STRATEGIES FOR ORAL HEALTH

Greenland, Robert * Salinas, Thomas
Mayo Clinic School of Graduate Medical Education
Department of Dental Specialties
Rochester, Minnesota USA

Keywords: allograft, immunosuppression

Case Presentation: Composite Tissue Allografts (CTAs) have introduced a means for reconstruction of extensive soft tissue defects related of the face. After its first use in 2005, each case has been monitored for immune suppression, immune-mediated graft rejection, systemic complications, psychological and physical health. With improved understanding for the rejection and complications encountered by these patients there is increased need to monitor the oral health and related structures for patients receiving donor tooth bearing tissue segments. Complications related to occlusion, periodontitis, mucosal tissues, muscular control and caries have been encountered with these patients so far. Review of the current published literature highlights conditions to consider during patient selection and post-surgical monitoring to help improve overall systemic and oral health.

16
THE PROSPECTIVE STUDY OF MASTICATORY FUNCTION AND QOL IN SEGMENTAL MANDIBULECTOMY PATIENTS

Haraguchi, Mihoko * Shibata, Mari[2]; Ohyama, Yoshio[2,5]; Norime, Akiyo[2,5]; Michi, Yasuyuki[2]; Harada, Hiroyuki[3]; Tachikawa, Noriko[4]; Sumita, I. Yuka[1]; Taniguchi, Hisashi[1]
Tokyo Medical and Dental University (TMDU), Graduate School
[1]Department of Maxillofacial Prosthetics
[2]Department of Maxillofacial Surgery
[3]Department of Oral and Maxillofacial Surgery
[4]Department of Oral Implantology and Regenerative Dental Medicine
[5]Oral and Maxillofacial Surgery, Shizuoka City Shizuoka Hospital
Tokyo, Japan

Keywords: prospective study, masticatory function and QOL, segmental mandibulectomy patients

Purpose/Aim: Eating, which includes chewing and swallowing, is an oral function that influences quality of life (QOL). However, there have so far been few reports that evaluated the masticatory function and QOL in segmental mandibulectomy patients from before surgery sequentially as prospective study. The purpose of this study is to evaluate prospectively the masticatory function and QOL in segmental mandibulectomy patients.

Materials and Methods: Ten preoperative mandible tumor patients (6 males and 4 females, mean age 54.6 years) participated as the subjects in this study. The ratio of benign tumor to malignant tumor was three to seven. All patients underwent segmental mandibulectomy, and 2 of them underwent both of mandibulectomy and glossectomy. The methods of the reconstruction included 5 scapular osteocutaneous flaps, 1 fibula osteocutaneous flap and 4 titanium plate and rectus abdominis musculocutaneous ?RAMC? flaps. The timings of evaluation were before surgery and 3, 6 and 12 months after surgery. Masticatory performance was measured by Hirai's food intake questionnaire with 35 food listing with masticatory score from 0 to 100 as the subjective assessment. Satisfaction levels for eating, chewing, appearance and speech were investigated by VAS from 0 to 100. QOL for function and general were evaluated by UW-QOL questionnaire specialized in head and neck cancer patients from 0 to 100. This study was approved by the Ethics Committee of Tokyo Medical and Dental University (Approval No. D2014-008 and D2015-628).

Results: Two benign tumor patients dropped out at 6 and 12 months after surgery, respectively. Two malignant tumor patients had troubles. One patient was removed the

titanium plate for infection, another patient metastasized the opposite side in the maxilla. The masticatory performance, the satisfaction levels for eating, chewing, appearance and speech, and QOL for function and general decreased once at 3 months after surgery, then increased at 6 and 12 months after surgery with the passage of time. However, these data of 2 patients had troubles became worse with the passage of time.

Conclusions: The results suggested that the masticatory function and QOL in segmental mandibulectomy patients decreased once until 3 months after surgery, then recovered with the passage of time. They needed at least 6 months after surgery to recover their masticatory function and QOL in the process of healing.

17
EFFECTS OF DENTAL PULP STEM CELLS ON MAXILLOFACIAL BONE REGENERATION

Hata, Masaki * Matsukawa, Ryohei[1]; Aoyagi, Atsushi[1]; Omi, Maiko[1]; Matsuoka, Ayumi[1]; Ozawa, Shogo[1]; Naruse, Keiko[2]; Matsubara, Tatsuaki[2]; Takebe, Jun[1]
School of Dentistry, Aichi Gakuin University
[1]Department of Removable Prosthodontics
[2]Department of Internal Medicine
Nagoya, Aichi, Japan

Keywords: dental pulp stem cell, scaffold, bone regeneration

Purpose/Aim: Dental pulp stem cells (DPSCs) are located in dental pulp and DPSCs can differentiate into several type of cells including odontoblasts and osteoblasts. Since DPSCs can be isolated from teeth extracted from young adults and maintain the proliferative and differential potential after cryopreservation, DPSCs are thought to be an excellent source for regenerative therapy. In this study, we have investigated the possibility of bone regeneration therapy using DPSCs.

Materials and Methods: DPSCs were isolated and cultured from 6-week-old male Sprague-Dawley rats. The identification of DPSCs was analyzed by a fluorescence activated cell sorter (FACS) analysis. Cells were differentiated into adipocytes or osteoblasts using differentiation medium and were stained with ALP, osteocalcin, Oil red O and FABP-4. DPSCs were seeded on beta-tricalcium phosphate (?-TCP), hydroxyapatite (HA) and Collagen type I. The proliferation and osteogenic differentiation of DPSCs were assessed on CCK-8 at 120 hours and ALP assay kit at 14days culture respectively. To analyze a bone regeneration capacity of DPSCs, a critical-sized bone defect (4.6 mm in diameter) was created on each side of the skull of 11-week-old male SD rats. After placement of the scaffold, DPSCs were injected into left side, whereas the opposite side

was blank. After 4 weeks the experimental defects were analyzed by microcomputer tomography.

Results: DPSCs expressed the positive staining of CD29, CD49d, and CD90 and negative staining of CD34 and CD45 and differentiated into osteoblasts and adipocytes. CCK-8 assay showed that proliferative potential was decreased on ?-TCP and HA compared with control and no difference on the Collagen. ALP assay revealed that there were no significant differences in osteogenic differentiation. The DPSCs transplanted sites showed bone formation starting from the edges as well as from the center of the defect. No bone regeneration was observed on the control sites

Conclusions: We demonstrated the efficacy of DPSCs transplantation for bone defect, suggesting that DPSCs may be an effective tool for the maxillofacial bone regeneration.

18
AN APPLICATION OF MAXILLOFACIAL PROSTHESIS IN A MAXILLECTOMY PATIENT WITH ANTERIOR ALVEOLAR BONE FRACTURE

Hatano, Noriko * Sumita, Yuka; Otomaru, Takahumi; Yamakoshi, Norimasa; Taniguchi, Hisashi
[1]Tokyo Medical and Dental University (TMDU)
[2]The Tokyo University Hospital
[1]Department of Maxillofacial Prosthesis, Graduate School of Medical and Dental Sciences
[2]Department Oral-Maxillofacial Surgery, Dentistry and Orthodontics
Tokyo, Japan

Keywords: maxillofacial prosthesis, maxillectomy, radiotherapy

Introduction: Adenoid cystic carcinoma is characterized by slow-growing, invasive and high rate of recurrence tumor. After the tumor resection, radiotherapy is often selected. When the bone fracture happens after radiotherapy, it is hard to heal. Here we report an application of a maxillofacial prosthesis maxillectomy patients with anterior alveolar bone fracture and with the reconstruction using anterolateral thigh (ALT) flap for the defect area. In addition, in case of the reconstruction using ALT flap for the defect area, the stability of the prosthesis would become difficult because of moving the flap.

Case Report: A 65-year-old woman had undergo partial maxillectomy of the left side 10 years ago. As the tumor recurred postoperative 5 years after, the radiotherapy was carried out 60Gy at maxillary left sinus. And the tumor relapsed again, the patient had undergo the subtotal maxillectomy of right side and with the reconstruction using ALT

flap for the defect area. After the second operation, she had severe trismus and started to train for opening her mouth using mouth opener. The anterior alveolar bone was very weak because of the radiotherapy and broken by mouth opener only once using. There are no clasp-anchored teeth without anterior alveolar fracture bone. We started the fabrication of the prosthesis. It was thought that it is difficult to fabricate based on the design of conventional bilaterally cantilever dentures because the flap was very wide and flabby and even the clasp-anchored teeth with bone was moving. The prosthesis using wire clasp and with soft relining material was applied. After that, the tumor was forth recurrence and it couldn't resection. Two years passed after the first delivery, the bone condition was getting worth and distance of mouth-opening was decrease. We delivered the new design of the prosthesis which was thin and covered the surface of the incisal of the teeth. She used the old prosthesis for eating and the new one for other things.

Conclusion: We report an application of a maxillofacial prosthesis maxillectomy patients with anterior alveolar bone fracture and with the reconstruction using anterolateral thigh (ALT) flap for the defect area.

19
USE OF AN INTRAORAL SCANNER FOR DIGITIZING AN EAR MODEL

Hattori, Mariko * Patzelt, Sebastian B.M.[1],[2], Kohal, Ralf J.[1], Vach, Kirstin[3], Elbashti, Mahmoud E., Sumita, Yuka I., Taniguchi, Hisashi
[1]Department of Prosthetic Dentistry, Center for Dental Medicine, Medical Center - University of Freiburg, Freiburg, Germany.
[2]Dental Practice, Zimmern O.R., Germany.
[3]Institute for Medical Biometry and Statistics, Medical Center, University of Freiburg, Freiburg, Germany. Tokyo Medical and Dental University Department of Maxillofacial Prosthetics
Tokyo, Japan

Keywords: facial prosthesis, digital dentistry

Purpose/Aim: Making conventional facial impressions can be an uncomfortable and complicated process. Digitizing faces by using facial scanners is an alternative approach, however, the acquisition costs of equipment prevent a wide spread use in dental practices. The purpose of this study was to investigate the application of an intraoral scanner for digitizing an ear in an in-vitro model.

Materials and Methods: For reference, a silicon model of an ear was scanned using an industrial scanner (Atos III Triple Scan 8MP, GOM, Braunschweig, Germany). Then, the model was sprayed with titanium dioxide and zirconium oxide powder and scanned with

an intraoral scanner (3M True Definition Scanner, 3M ESPE, St. Pauls, Minnesota, USA) five times. Five conventional impressions of the model were made using a hydrocolloid impression material (Algiace Z, Dentsply-Sankin K.K, Tokyo, Japan). Impressions were poured with type 3 dental stone. The retrieved stone models were digitized using a desktop scanner (i/s/can, Organical CAD/CAM, Berlin Germany). The acquired datasets from the reference scanner, the intraoral scanner and the conventional approach were analyzed using 3D evaluation software. Trueness and precision values were calculated for each approach and statistical analyses were performed using linear mixed models.

Results: The mean ± standard deviation of trueness and precision for the digital impression were 97.4 ± 11.9 ?m and 33.1 ± 14.6 ?m, while for the conventional impression, they were 92.0 ± 21.7 ?m and 81.3 ± 24.2 ?m, respectively. Statistically significant differences were shown for precision values between conventional and digital impressions ($p<0.0001$). Both approaches, however, showed a clinically acceptable accuracy.

Conclusions: The investigated intraoral scanner was feasible to capture an ear model sufficiently. The scans were accurate enough to allow further investigations in an in vivo setting.

20
MAXILLOFACIAL BRACHYTHERAPY APPLIANCE UTILIZING 3-D PRINTED FIXTURES FOR EXTRA-ORAL LIGATION: CASE REPORT

Heckenbach, Eric * Jayanetti, Jay; Demanes Jeffery
University of California, Los Angeles
Maxillofacial Prosthodontics
Los Angeles, California USA

Keywords: brachytherapy, squamous cell carcinoma, high dose rate

Introduction: Brachytherapy is a form of internal radiation treatment where radioactive sources are placed on or into cancer tissues. Brachytherapy allows doctors to deliver higher doses of radiation to more specific areas of the body, compared with the conventional form of radiation therapy (external beam radiation) that projects radiation from a machine outside of the body. Brachytherapy can be administered at low dose rates (LDR) or high dose rates (HDR). LDR brachytherapy radiation stays in place for one to seven days while the patient is hospitalized. HDR brachytherapy radiation is in place for 10 to 20-minute periods then removed. HDR treatments may occur once or twice a day for two to five days or once a week for two to five weeks. Maxillofacial prosthetic brachytherapy provides a reproducible maxillomandibular relation for the catheters to

deliver localized radiation via the fabrication of an intra-oral and extra-oral appliance in which the patient wears during brachytherapy sessions.

Case: The patient in this case presentation is a 77-year-old male diagnosed with stage 1 squamous cell carcinoma of the lower lip vermillion. An HDR brachytherapy regimen was prescribed with curative intention and comprised 10 fractions twice daily at 4.25 Gy/fraction for a total of 42.5 Gy. A mandibular stock tray was trimmed and modified to index the patient's existing implant connecting bar. A preliminary impression of the anterior mandible was captured with Rim Seal®, and the bar was further indexed with GC pattern resin. Three catheters were luted to the modified stock tray to comprise the intra-oral component of the brachytherapy appliance. A thin malleable sheet of Rim Seal® was overlayed onto the patient's lower lip and labiomental fold to index the extra-oral landmarks. Pilot holes were prepared with a high-speed handpiece to orient the intra-oral component with its extra-oral counterpart. Rapid prototyped fixtures were aligned and verified to facilitate passive insertion and removal with the matrix component subsequently luted in place with GC pattern resin. Six catheters were luted to the extra-oral component.

Discussion: Maximizing the sensitivity and specificity of controlled delivery of radiation through brachytherapy is paramount for the clinical efficacy of treating head and neck malignancies. This case report describes a routine oncologic treatment modality with novel prosthodontic amenities to simplify the approach for the radiation oncologist while expediting treatment time for the patient.

21
INTRAORAL AIR PRESSURE OF MAXILLECTOMY PATIENTS DURING PRONUNCIATION

Hori, Kazuhiro * Koizuka, Hitomi; Ono, Takahiro
Niigata University Graduate School of Medical and Dental Sciences
Division of Comprehensive Prosthodontics
Niigata, Japan

Keywords: Obturator, Intra oral pressure, Pronunciation

Purpose/Aim: Maxillectomy patients experience substantial defect that leads through to the nasal and paranasal cavities, causing mastication, swallowing, and articulatory disorders. Nasal air leakage during pronunciation reduces their quality of life. Thus, the sealing by obturator is essential for functional recovery. We aimed to verify the sealing effect of obturator by comparing intraoral air pressure between healthy people and patients with maxillary defect.

Materials and Methods: The participants were 7 maxillectomy patients with obturators (6 male and 1 female, mean age 69.0 years) and 15 healthy young volunteers (8 male and 7 female, mean age 31.8 years) as a control. Intraoral air pressure was measured by fixing miniature digital atmospheric pressure sensors (MPL1151A1, Freescale Inc., 5.0x3.0x1.2mm?to their palates using denture adhesive. The sound pressure was also measured using sound level meter (NL-26?RION Co., ltd.) at the same time. The task was pronunciation of the sound “pa” 10 times by each participant.

Results: The mean maximum intraoral air pressure in maxillectomy patients with obturators during pronunciation was significantly higher than that in the same patients without obturators. Wearing obturators significantly increased intraoral air pressure, confirming the sealing effect of obturators. No differences in mean maximum sound pressure were observed between the maxillectomy patient with / without obturator and control groups, indicating no differences in voice level. A positive correlation between intraoral air pressure and sound pressure was observed for all participants. Further, moderate to strong correlation coefficients were observed in the healthy participants and maxillectomy patients with obturators, which indicates that intraoral air pressure is affected by sound pressure. However, the correlation coefficient was weaker in the maxillectomy patients without obturators.

Conclusions: Sound pressure during pronunciation correlated with intraoral air pressure, and obturators contribute to the maintenance of intraoral air pressure in patients with maxillary defects.

22
3D-PRINTED HYPERELASTIC BIOACTIVE BONE SUBSTITUTES FOR CRANIOFACIAL REGENERATION

Huang, Yu-Hui * Jakus, Adam; Jordan, Sumanas; Zhao, Linping; Shah, Ramille; Patel, Pravin
University of Illinois at Chicago, Northwestern University
Department of Surgery
Chicago, Illinois USA

Keywords: Hyperelastic Bone, 3D printing, bone regeneration

Purpose/Aim: Autogenous bone grafts, allografts, or alloplastic implants are used to repair craniofacial defects. However, surgical outcome is limited by donor site availability for autogenous grafts and allograft biocompatibility. Synthetic grafts are an alternative but often lack osteoinductivity or osteoconductivity, limiting utility and the necessary malleability for efficacious use in irregularly shaped defects. 3D-printable synthetic graft material, Hyperelastic Bone (HB) is more ideal as HB is composed of FDA-approved materials with mechanical, physical, structural, surgical handling, and bioactive properties. These characteristics make HB a valuable new biomaterial with improved economical and fabrication burden. Preliminary studies of HB subcutaneous implant using in vivo mouse model demonstrate that HB does not illicit an immune response that could be detrimental to implant success due to the nature of the comprising materials which rapidly vascularizes and integrates with host tissue.

Materials and Methods: Adult male Sprague Dawley rats had critical-sized calvarial defects which were left either unfilled as control defects or filled with a single full-thickness piece of autogenous bone, HB scaffold, or empty scaffold. The defects were left to heal for 8 weeks postoperatively before terminal perfusion with Microfil. CT scans of the calvarial specimens were performed. Histomorphometric assessment of hematoxylin-eosin stained specimens was used to analyze the proportion of new bone and blood vessels in the calvarial defects.

Results: Our ongoing study using in vivo rat calvarial model showed higher new bone volume/total volume (BV/TV) % in calvarial defects treated with the HB scaffolds following 8 weeks of implantation when compared to empty defects or empty scaffolds. We hypothesize that regeneration induced by HB will facilitate calvarial reconstruction.

Conclusions: Our ongoing study suggests that HB grafts are effective for bone regeneration with significant potential for clinical translation.

23
EFFECTS OF MAXILLARY DEFECTS ON RECORD BASE STABILITY FOR EDENTULOUS CASES: A FINITE ELEMENT ANALYSIS

Ino, Teruo * Daisuke, Teshigawara; Masanori, Fuhisawa
Meikai University School of Dentistry
Division of Fixed Prosthodontics, Department of Restorative & Biomaterials Department of Sciences
Sakado, Saitama, Japan

Purpose/Aim: Record base displacement in edentulous patients with various maxillary defects was analyzed by a three-dimensional finite element method.

Materials and Methods: The analyzed models consisted of a lining mucosa, maxillary record base, and Gothic arch tracing on a metal plate positioned on the mandibular occlusion rim. The interface between the record base and mucosa was not connected and able to slide. The thickness of the mucosa was 2.0 mm in the middle, 3.0–5.0 mm at the bilateral sides of the palate, and 3.0 mm at the residual ridge. The nodes corresponding to the surface of the alveolar bone were constrained in all directions. Analysis of a non-resected maxilla and three types of palatal defects was conducted: a type A defect limited to the unilateral posterior ridge, a type B defect at the maxilla midline, and a type C defect at the maxilla midline and the bilateral sides of the anterior ridge.

Results: The type A defect showed similar displacement of the record base to that of the non-resected maxilla model under a load at the center of the maxilla. On the other hand, models of type B and C defects showed greater displacement than that of the non-resected maxilla or type A defect, and the displacement was greater than the size of the defect.

Conclusions: The deviation of the loading point from the center to the non-resected side decreased displacement of the record base, while greater deviation than the size of the maxillary defect was needed to lessen the displacement of the record base.

24
EVALUATION OF COLOR CHANGES ON SANDBLASTED ACRYLIC SURFACES FOR PALATOGRAM

Kelimu, Shajidan * Hattori, Mariko; Awuti, Shataer; Elbashti, Mahmoud; Sumita, Yuka; Hisashi, Taniguchi
Tokyo Medical and Dental University
Maxillofacial Prosthetics
Tokyo, Chiba, Japan

Keywords: speech, colorimetry, denture base

Purpose/Aim: Palatogram which is defined as a diagram obtained through a record of the tongue and palate in the articulation of sounds. It aids prosthodontist or speech pathologist in evaluating the precise prosthetic treatment needed and the effectiveness of such treatment to improve speech intelligibility. Conventionally, alginate powder is commonly used to visualize the tongue-palate contact where wetted areas of powder in the oral cavity reveal such contact during palatogram. However, this method may have the risk of aspiration or discomfort. Alternatively, sandblasted acrylic surface method can be used to visualize and differentiate the color change between the wet and dry surfaces. This in vitro study aimed to examine the feasibility of using a sandblasted acrylic surface for palatogram.

Materials and Methods: Seventy-two specimens of heat cured acrylic resin with the thickness of 2 mm were prepared according to the manufacturer instructions. These specimens were grouped according to the 6 resin-color used (dark pink, live pink, clear pink, pink, light pink and pale pink). After the surfaces of the specimens were sandblasted, the color of each specimen was measured under two conditions dry and wet. Artificial saliva was used to wet the acrylic resin surfaces. The average level of L* a* b* were calculated by the colorimeter and recorded. The color difference (?E *) was then computed and statistical analyses were applied.

Results: Significant differences of L* a* b* were found between dry and wet conditions in all the acrylic groups. The mean ?E ranged from 5.58 to 6.76. There was significant difference among ?E in the pairs of live pink and light pink, live pink and pale pink, clear pink and pale pink ,pink and pale pink. In addition, pale pink and light pink were indicated the more preferred acrylic resin materials for palatogram.

Conclusions: All color differences caused by sandblasted surface before and after wetted by artificial saliva were in the categories of ‘appreciable ‘and ‘much’ according to the National Bureau of Standards System. The result suggested that sandblasted acrylic surface can perform visible color differences by wetting and it can be used as a new method for palatogram.

25
POSITION OF THE ARTIFICIAL TOOTH ON THE MORPHOLOGY OF DENTURE SPACE IN GLOSSECTOMY

Kelimu, Shajidan * Awuti, Shataer; Shigen, Yoshi; Yuka, Sumita; Hisashi, Taniguchi
Tokyo Medical and Dental University
Maxillofacial Prosthetics
Tokyo, Chiba, Japan

Keywords: piezography, glossectomy, tooth position

Purpose/Aim: Tongue defect and resected mandible affects the stability of lower denture. Conventional arrangement of artificial teeth for glossectomy patient may disturb tongue activity and cause instability. To achieve suitable retention, it is necessary to set up the appropriate tooth position and denture form for such patients. Piezography is one of the functional approaches to build the proper physiological denture structure. This study was aimed to reveal the position of the artificial tooth on the denture space in glossectomy patient

Materials and Methods: Six glossectomy edentulous patients range from 73-83 years will participate in the study. Maxillary and mandibular working cast will be prepared from dental plaster. The vertical dimension of occlusion and centric relation position were recorded. A base plate were prepared for taking piezographic record. The mandibular base were inserted in the oral cavity. The impression material were injected onto the base plate. The patient was asked to pronounce selected syllable with the pronounced instruction following Nokub`sway until the impression material was set. The piezographic impression was trimmed and the vertical dimension will be checked on the articulator. Computed tomography (CBCT) scanning system will be used to digitize

the impression models. Three –dimensional surface of morphology for each impression will be obtained and will be converted to the Standard Tessellation Language (STL) file. 3-D images of piezographic impression will be constructed. Bucco-lingual widths of mandibular occlusal plane was drawn and midline of the bucco-ligual edge was set automatically.

Results: Visible tooth position and piezographic structure were shown on the midline of occlusal plane. Asymmetrical morphology of denture was displayed.

Conclusions: The result suggesting that artificial teeth position on occlusal plane tend to be asymmetric. It is necessary to set the artificial teeth using piezography for glossectomy patients in order to reach the more comfortable longer lasting prosthesis.

26
DIGITAL DESIGN OF CUSTOM ABUTMENTS FOR THE RETENTION OF OSSEOINTEGRATED IMPLANT-RETAINED PROSTHESES

Kincade, Carolyn * Mchutchion, Lindsay; Wolfaardt, Johan
Institute for Reconstructive Sciences in Medicine University of Alberta
Edmonton, Alberta CA
iRSM
Edmonton, Alberta CA

Keywords: Facial Prostheses, Digital design

Case Presentation: Midfacial and orbital defects pose challenges in the creation of implant retained facial prosthetics. Stock abutment designs have been developed for use in this type of treatment but are only compatible with certain implant interfaces and present limited options for the angulation of offset. Stock abutment designs also constrain choice of tissue emergence profile to off-the-shelf options. Custom abutments allow for the design of optimized abutment angulation, contour, and emergence profile, and improve the esthetic outcomes of the prosthesis. Milling offers improved accuracy and precision, reduced labour, and the preferred material properties of homogeneous titanium in comparison to other methods of custom abutment fabrication. A process to digitally design and mill custom extra-oral abutments has been shown to overcome many of the challenges associated with facial prosthetic treatment. A digital prototype of the prosthesis is designed digitally using laser scans of the patient's master cast and surface scans of the patients face. Components required for prosthetic retention, such as keeper platforms, keepers, and magnets are digitally modeled. These CAD generated components are positioned relative to the prosthetic prototype, tissue contour and implants to simulate the configuration of the prosthesis and the retentive componentry.

Once an acceptable arrangement is achieved an emergence profile bridging the implant and keeper interfaces is sculpted and these elements are combined to form the abutment. The completed digital abutment models are then 3D printed. These printed prototypes are acrylized to implant fitting interfaces and the definitive abutments are copy milled in titanium. Digital abutment design enables the creation of a clear path of insertion regardless of implant angulation and proximity. The model of the prosthesis prototype is used to place the retentive components such that they do not compromise the shape of the prosthesis. The contour of the abutment can be designed to promote periabutment hygiene and an angle of emergence conducive to healthy tissue. The ability to customize each abutment accommodates the use of any implant interface with any retentive component, enabling combinations of implants and magnet systems that have traditionally been incompatible through off-the-shelf components alone. The process of digitally designing custom abutments and prototypes for the prosthesis and retentive elements creates a highly predictable prosthetic outcome. Through all these advantages the digital design and manufacture of custom abutments produce treatment outcomes exceeding those achievable through traditional techniques alone.

27
VIRTUAL SIMULATION OF OCCLUSAL CONTACTS ON EDENTULOUS TOOTH ARRANGEMENTS

Kincade, Carolyn * Karimi-Boushehri, Fari; Armstrong, Kieran; Stavness, Ian; Osswald, Martin; Nayar, Suresh; Aalto, Daniel
iRSM
Edmonton, Alberta CA

Purpose/Aim: Dental prosthesis design and fabrication has seen significant advancements due to the integration of a digital workflow (Bidra et al. 2016; Karimi-Boushehri & Cable 2010). To advance and fully integrate the digital workflow for the treatment and rehabilitation edentulous patients the analog articulator must be replaced with a virtual counterpart. The goal of the present work is to evaluate and compare occlusal contact points of the virtual and conventional articulator.

Materials and Methods: A radiographic diagnostic trial denture was constructed for a patient as part of their oral rehabilitation. The completed photopolymer diagnostic trial dentures (VeroWhitePlus: Stratasys, MN USA) were equilibrated on a conventional semi adjustable articulator (Hanau™ Modular Articulator: Whip Mix Corp Louisville, KY USA). The mounted casts and completed trial radiographic dentures were 3D surface scanned (ShapeGrabberInc, Ottawa ON). The occlusal contacts between the artificial teeth were evaluated using conventional occlusal ribbon (0.01 mm thick, Bausch Articulating Papers Inc: NH, USA). The analog occlusal markings were then compared against results achieved using the virtual articulator.

Results: Conventional occlusal contacts points and those obtained with the virtual articulator were visually compared. Occlusal contacts were identified by the number of individual contact points. The analog articulator identified a total of 65 contact points while the virtual articulator identified 86 contact points. Of the analog contact points identified, none were missed by the virtual articulator. However, the virtual articulator overestimated the number of contact points as compared to the conventional articulator. There were false contacts identified by the virtual articulator, which were not represented in the analog. These extra contact points decompose to two virtual split contacts, six contacts on adjacent teeth, eight additional contacts on the same cusp, and thirteen additional cusps of the same tooth.

Conclusions: The virtual articulator identified most of the contacts points identified by a conventional articulator. This suggest a virtual articulator is a viable tool to be added to the rehabilitation process for edentulous patients. The virtual articulator has the potential to eliminate yet another analog step in prosthetic design. Further research, development and evaluation will be required to achieve full integration of the described virtual articulator to the prosthetic elements of the digital workflow.

28
FACIAL PROSTHESES RETAINED ON BASALLY OSSEOINTEGRATED IMPLANTS IN IRRADIATED PATIENTS

Lazic, Vojkan * Konstantinovic Vitomir; Vukadinovic Miroslav; Markovic Aleksa; Lazic Marko
University of Belgrade School of Dental Medicine Faculty of Medicine Prosthodontics Head and Neck Surgery Oral Surgery
Belgrade, Serbia

Keywords: Irradiated bone, BOI implants, facial prostheses

Case Presentation: Malignant tumors can result to serious facial disfigurement and dysfunction. The use of osseointegrated implants for retaining the maxillofacial prostheses revolutionary improves their stability and thus increases the quality of life of the patients. However, some specifics of maxillofacial implantology could tempt some problems in everyday practice. They are: close anatomical relation to the intracranial structures; less bone quality and quantity; mainly compact bone; irradiated tissue. The radiation therapy in the treatment of malignant tumors commonly compromises bone quality and produces significant morbidity, and its consequences are unique tissue management problems. All of that sometimes limits usage of conventional screw like implants especially in lack of bone. Basal osseointegrated implants (BOI) for craniofacial use contain two discs and they were placed in resorption resistant basal/ cortical bone.

In this matter more bone width is used instead of height. With BOI craniofacial implant the dual integration modus and placement is achieved and they are more infection resistant because of thin polished mucosal/cutaneous penetration area. The goal of this report is to present our experiences with facial prostheses retained on basally osseointegrated implants (BOI). Several patients with BOI implant retained facial RTV silicone prosthesis will be presented. The male patients with orbital defects (exenteration for squamous cell carcinoma invading the orbital content) and the female patient underwent nose ablation also for squamous cell carcinoma. The insertion of implants was at least six months delayed because ablation of tumors has been followed by radiation therapy (at least 60 Gy). After an unloaded osseointegration phase of 3 months, all implants appeared well integrated in the irradiated bone according to radiologic criteria and clinical stability. At the control examinations after 6 and 12 months, respectively, there were no signs of recurrence of the tumor or any complications related to the implants. After osseintegration period RTV silicone prostheses were fabricated and retaind on BOI implants through Magnacap Multi-purpose magnet and bar clip system. In the meanwhile, the patients were using PMM acrylic color resin facial prostheses retained on eye glasses.

Conclusion: The use of osseointegrated BOI implants has made it possible to produce effective bone – anchored facial prostheses and a satisfied cosmetic result and excellent stability and retention in all patients was achieved.

29
EARLY IMPLANT RETAINED INTERIM OBTURATORS USING ZYGOMATIC FIXTURES: THE UCLA EXPERIENCE

Le, Jenny * Jayanetti, Jay
University of California, School of Dentistry, Los Angeles
Maxillofacial Prosthetics
Los Angeles, California USA

Case Presentation: Maxillary defects are successfully rehabilitated with obturators when sufficient residual anatomy and dentition can provide retention stability and support. A skin lined and well tailored defect will further improve obturator function. Large defects that leave no normal denture bearing structures, and no conventional implants sites are challenging to rehabilitate; mastication is rarely restored to normal. The purpose of this presentation is to report a series of patients with maxillary defects treated with zygomatic implants and early placement of an implant-connecting bar to retain an interim prosthesis. Five consecutive patients determined to benefit from osseointegration but for whom convention implants were not an option were planned with Noble Clinician for zygomatic implants. Nineteen zygomatic implants were placed by two surgeons; one 10 mm implant was placed in the piriform rim. Twenty-one days postoperatively, indexing of the implants was performed and a cast gold bar deliver the same day. All other implants, in the subsequent 4 patients, were indexed

intraoperatively and a milled bar delivered between 9 and 12 days after. All 5 interim prosthesis were retained by Hader clip. Osseointegration has been confirmed for three patient: 11 zygomatic and one piriform rim implant. Two patients are currently wearing interim obturators retained with only one Hader clip. The following variables are also examined: initial diagnosis, classification and quality of the defect, time of delivery interim prosthesis, planning and loading protocol. Other factors related to outcome of the implants and prosthesis such as skin graft, post radiation therapy, opposing dentition, diabetes and smoking status was also documented. Based on our experience, the use of zygomatic implants to retain interim obturator prostheses proved functionally beneficial for the 5 patients treated with this protocol. Complications with screw-retained bar do occur, however the interim obturators are retained adequately with only 1 Hader clip to permit normal swallowing and normal speech. The three patients who receive definitive prosthesis have resumed a normal diet.

30
OUTCOMES OF DIGITAL SURGICAL TREATMENT PLANNING VERSUS INTUITIVE SURGERY IN MANDIBULAR RECONSTRUCTION: AN UPDATE

Limchoa, Jenny * Muller, Olivia; Carr, Alan B.
Mayo Clinic
Maxillofacial Prosthetics and Dental Oncology
Rochester, Minnesota USA

Keywords: Fibula, virtual

Purpose/Aim: The purpose of this retrospective study is to evaluate how virtually planning free fibula flap mandibular reconstructions compare to conventionally or intuitively planned free fibula mandibular reconstructions.

Materials and Methods: Through a retrospective study of Mayo Clinic database, cases pertaining to free fibula flap reconstructions of the mandible were identified. The cases were separated by pre-surgical planning type: conventional versus virtually planned. From these cases: complications, amount of time in the operating room overall, time from surgery to provisionalization, time from surgery to completed restoration, implant utilization, and differences between benign and malignant cases were compared.

Results: Results to be deferred until final presentation.

Conclusions: Virtual surgical planning is an useful modality to promote multi-disciplinary care. It allows surgeons and the restorative team to plan reconstructions with improved esthetic results and minimal complications. For the patient, it may mean shorter

operating room time and surgeries, reduce dental visits, and shorten time to provisional prosthesis and/or the final prosthesis.

31
THE LONG-TERM FOLLOW UP MAXILLECTOMY PATIENTS WITH O-RING ATTACHMENT: CASE REPORT

Liu, Rongguang * Sumita, Yuka; Zhang, Manjin; Hattori, Mariko; Taniguchi, Hisashi
Tokyo Medical and Dental University (TMDU)
Department of Maxillofacial Prosthetics
Tokyo, Japan

Keywords: Long term follow up, Attachments, Maxillectomy

Introduction: For the maxillofacial prosthodontist, morphological change including soft tissue and hard tissue are important consideration in order to avoid the situation that the patient can't use the prosthesis. In order to reveal the optimal treatment planning such as denture design, check-up schedule, long-term follow up observation case is useful. In this case report, 30 years long-term follow up two maxillectomy cases are introduced and are discussed the differences point and common point between two cases in order to reveal the further guidance of treatment planning.

Case: A 61-year-old female patient with maxillary defects. In 1977 Surgical operation (Mucoepidermoid tumor). In 1985 first visit, 1986 preparation was started, 1987 Metal flame obturator and OPA set. In 2002, second prosthesis was fabricate because of poor fitness between denture metal base and remaining bone. Visiting for checking once / month.
An 87-year-old male patient with maxillary defects. In 1987 July- first visit, December obturator set. In 1988.March OPA set. During the 1990-1998 3 times O-ring exchange. 1999 rebase. 2014, new designed denture set, because of the movement of the OPA abutment teeth. Visiting for checking twice / year.

Discussion: Both of them was followed up about 30 years. During 30 years, both patients successfully keep to use the prosthesis without any break under the continuous observation. The difference between two cases are as follows. OPA abutment teeth position is different, follow up frequency is different. Keeping continuous observation will help patients to save the existing teeth, to prevent the occurrence situations and predict the next situation.

32
CLINICAL TRIAL TO MANUFACTURE FACIAL PROSTHESES BY USING 3D FACIAL EXPRESSION MODELS

Matsuoka, Ayumi * Yoshioka, Fumi; Ozawa, Shogo; Miyamae, Shin; Hata, Masaki; Takebe, Jun
Aichi Gakuin University
Department of Removable Prosthodontics, Department of Gerodontolgy, School of Dentistry, Nagoya, Japan
Nagoya, Aichi-Ken, Japan

Keywords: Facial prosthesis, Facial expression model, Digital design

Purpose/Aim: It is important that marginal fitting of a facial prosthesis is successfully acquired. However, it is difficult for a facial prosthesis to keep its position in place especially around marginal areas because a face moves during facial expression. Currently facial prostheses are designed on models which are acquired by either conventional or digital impressions. In order to fabricate well-fitted facial prostheses, we tried to manufacture "3D facial expression models" which include the movement involved with facial expression by using a process known as morphing and tried to fabricate facial prostheses based on the 3D facial expression models.

Materials and Methods: Two patients with nasal defects participated in this study. First, scanned facial data were acquired using 3dMDface System. We scanned their faces with two different facial expression (absence of expression and smile). We made scanned models by trimming the scanned data. In order to achieve morphing technique, all vertexes on each expression models need to correspond with each other. Next, we made two homologous models with two facial expression from a template model using software Markerless Homologous Body Modeling and software HBM-Rugle so that their vertexes could correspond and the morphing technique could be applied to the homologous models. Furthermore, several kinds of 3D facial expression models involved with smiling were printed on a Z 650 printer 3D printer. Finally, facial prostheses were manufactured on several kinds of 3D facial expression models respectively. This study was approved by the ethics committee at Aichi Gakuin University (No. 479).

Results: 3D facial expression models were generated. Using the morphing method, movement of facial skin was simulated from absence of expression to smiling. The differences between a homologous model and an original scanned model were within 0.2mm. Facial prostheses were fabricated on 3D facial expression models. The facial prostheses were successfully delivered to patients and their fits were better than prostheses fabricated by using conventional method.

Conclusions: We applied this method to patients who have facial defects, and also simulate marginal skin movement around the facial defect. That could change the

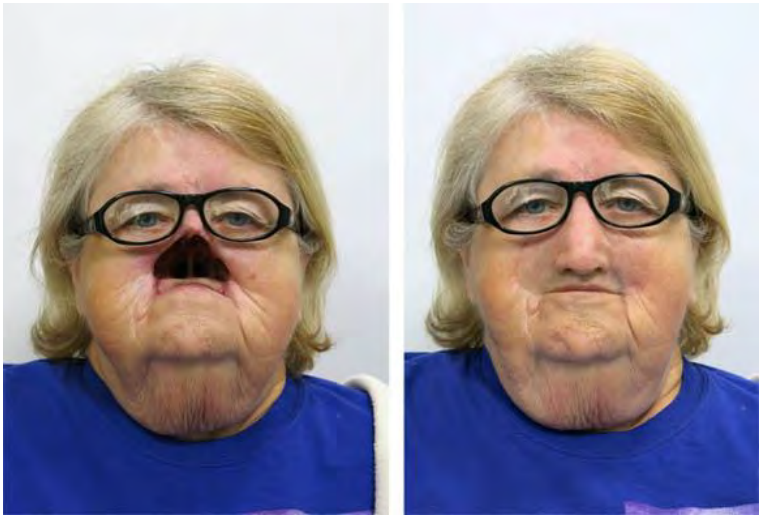
design of facial prostheses from three to four dimensions by adding a time factor. If facial prostheses could be designed using 3D facial expression models, highly precise facial prostheses that follow skin movement will be manufactured.

33
A SILICONE SOLUTION TO A LARGE MID-FACIAL DEFECT – A CASE REPORT

McClennen, Jay * Minsley, Glenn
The Anaplastology Clinic, Durham NC
University of North Carolina School of Dentistry, Chapel Hill, NC
Anaplastology & Prosthodontics
Durham, North Carolina USA

Case Presentation: This clinical case reports on the construction of an anatomically retained silicone midfacial intraoral/extraoral prosthesis to rehabilitate a head and neck cancer patient with a large mid-facial defect. Patient has a history of diagnosis of nodular basal cell carcinoma bilaterally of the nose with invasion into the hard palate. She underwent a maxillectomy involving resection of the anterior and middle 1/3's of the hard palate leaving just the posterior 1/3 and tuberosities. This was combined with a rhinectomy of the majority of the nose leaving just a portion of the bridge of the nose. She had subsequent radiotherapy of 60GY. ENT surgeons then did a surgical reconstruction of the palate and nasal region with microvascular free grafts including bone and soft tissue. Unfortunately, the grafts failed with resultant necrosis of the entire graft. An earlier plan of dental implant placement in the tuberosities, the glabellar region and the zygomatic regions to support a combined obturator and nasal prosthesis was not possible due to a lack of sufficient viable bone mass. The patient had no remaining maxilla to support zygomatic implants at their proximal ends. Patient was then sent to The Anaplastology Clinic for mid-facial prosthetic reconstruction. Retention of a mid-facial prosthesis was a challenge for this patient. Patient had sensitivities to prosthetic adhesives and the prosthetic margins would all be exposed to saliva. Retention with glasses would help but not be sufficient retention on their own. A silicone prosthesis was made using a combination of several durometers. A soft silicone was used to fill the intra-nasal cavity and reconstruct the hard palette. Air channels connect the nostrils through the silicone to the nasopharynx. A thin silicone wall was created to block the entry of fluids into the nasopharynx.

Conclusion: This solution of a complete anatomically retained silicone midfacial intraoral/extraoral prosthesis restored the patient to a more normal appearance and allowed the patient to drink and swallow with a straw. In addition, by reconstructing the upper lip with a gel filled prosthesis as well as reconstructing her hard palate with silicone allowed her to change the nature of sounds produced by the position of the tongue and lips greatly improving the patient's ability to speak.



34
PALATAL AUGMENTATION PROSTHESIS COMPARING HOLLOWING TECHNIQUES FOR WEIGHT REDUCTION

Medina, Jacqueline * Chambers, Mark; Cardoso, Richard; Otun, Adegbenga; Aponte Wesson, Ruth
MD Anderson Cancer Center
Head and Neck Surgery
Houston, Texas USA

Keywords: Prosthesis, weight, speech

Purpose/Aim: The purpose of this evaluation was to compare two different techniques when hollowing a palatal augmentation prosthesis (PAP) for weight reduction.

Materials and Methods: A palatal augmentation prosthesis was fabricated with heat polymerizing acrylic resin.in the conventional manner. Following the evaluation of fit, Bosworth Trusoft tissue conditioning material was applied to the cameo surface and a palatogram tracing was obtained utilizing speech and swallow techniques. Pressure areas were adjusted accordingly to even contours. The newly contoured cameo surface was transformed with auto polymerizing acrylic resin in the dental laboratory and duplicated. Two different techniques were used to hollow the prosthesis for

comparison. Two laboratory techniques were developed and executed in a control setting, 4-point reference to standardized thickness to a 2 mm was established. Weight of the solid prosthesis was recorded as 21.55 gr.

Results: The results demonstrated significant weight reduction within both techniques (T#1. 15.86gr TW and T#2. 12.80 gr TW) respectively after weight reduction, the technique # 2 demonstrated the greatest weight reduction out of the two. The mean difference among the control and the Technique #2 was 8.75gr.

Conclusions: The result of our small controlled laboratory study infers that the processing environment can influence the clinical outcome. The flacking technique proved to reduce the most weight out of the two techniques tried.

35
TREATMENT WITH IMPLANT-SUPPORTED OVERDENTURE FOR MANDIBULECTOMY PATIENT: A CASE REPORT

Miyamae, Shin * Ozawa, Shogo; Kato, Daisuke; Murakami, Hiroshi; Hattori, Masami
Aichi-Gakuin University, School of Dentistry
Department of Gerodontology, Department of Removable Prosthodontics
Nagoya, Aichi, Japan

Purpose: The dento-maxillary prosthesis is generally difficult to obtain the retention and stability, although those are essential to oral functional rehabilitation for the maxillofacial patients. The dental implant treatment has shown remarkable progresses especially for this kind of patients. On the other hand, in Japan, dental implant treatment become covered by the Japanese health insurance for the patients with large bone defect from 2012. We experienced a case of implant-supported overdenture for the mandibulectomy patient using this insurance system.

Methods and Materials: The patient is 71-year-old male who had undergone partial manbibular resection due to gingival squamous cell carcinoma. The remaining teeth was only canine of the right side on his lower jaw and the denture space was reduced after the resection. We considered that to improve his oral functions were difficult by conventional prosthesis. Therefore, we made the plan of the prosthetic treatment with dental implant. At first, we extracted the canine, and then the examinations of CT and X ray were performed for the proper implant position. We fabricated the implant-supported overdenture after a year from four dental implants placement in the region of anterior mandible. The implant-supported overdenture obtained the enough

retention by using Locator® abutments though we could use three implants due to the implants position.

Results: We confirmed the patient's satisfaction and this case was followed up 2years and 7months after the implant-supported overdenture insertion. So far it was obtained the remarkable functional rehabilitation compare with his old denture through the food intake questionnaire, measuring the occlusal force and the ability of mastication by using gummy jelly as a test food.

Conclusion: The implant treatment is effective on improvement of the oral function for the edentulous mandibulectomy patients and this Japanese insurance system helps them to reduce their rehabilitation cost.

36
SPONTANEOS HEALING OF BISPHOSPHONATE RELATED INTRAORAL FISTULA

Muchhala, Stuti * Yung Cheng, Paul, Froum, Stuart J., Cho, Sang-Choon
New York University College of Dentistry
Ashman Department of Periodontology and Implant Dentistry
New York, New York USA

Keywords: Bisphosphonate, osteoporosis, bone-sequestration

Case Presentation: Bone modifying agents such as bisphosphonates are known inhibitors of bone resorption. They are used to treat various medical conditions including osteoporosis, metastatic cancer, multiple myeloma, and hypercalcemia associated with malignancy. Although bisphosphonates are beneficial in many ways, they pose a risk to patients taking these medications. Complications of bisphosphonate therapy have received increasing attention in the field of dentistry as these drugs can potentially cause osteonecrosis of the maxilla and mandible. The purpose of this case report is to document the sequence of treatment of a 64 years old female patient who underwent right maxillary sinus augmentation with three simultaneous implants placed and restored in 2004. The following year she started taking oral bisphosphonates to treat osteoporosis. The patient presented at the Ashman Department of Periodontology and Implant Dentistry (NYUCD) ten years later with peri-implantitis of the three previously placed implants and had them explanted. She returned in 2016 with a fistula formation in the right maxillary 2nd molar region, the site was drained, irrigated, and debrided multiple times along with a course of oral antibiotics. Three months later a sequestrated bony segment was observed radiographically. Under local anesthesia the flap was reflected and the bony segment was removed from the resorbed residual ridge following which the patient healed uneventfully.

37
AN IMMEDIATE OBTURATOR PROSTHESIS WITH A FLEXIBLE MEMBRANE FOR SOFT PALATE DEFECTS: A CASE REPORT

Naveau, Adrien * Bou, Christophe
Bordeaux University Hospital Center
Odontology and Oral Health Dept
Bordeaux, France

Keywords: palatal obturator, case report, soft palate

Background: Palatal insufficiency may result in hypernasality and poor intelligibility of speech. When the velopharyngeal function cannot be restored by immediate surgical reconstruction, patients will benefit from placement of a rigid obturator prosthesis. This obturator aims to control nasal emission during speech and to prevent the leakage of food into the nasal airways during deglutition. Unfortunately, some remaining velopharyngeal structures do not move enough for the patient to achieve complete normal speech. The objective of this study was to evaluate an immediate obturator prosthesis that attempted to duplicate the movements of the soft palate.

Material & Methods: A female patient with soft palate defect was referred to the 'Odontology and Oral health Dept' of Bordeaux University Hospital Center (France) for rehabilitation. She had had the week before a surgical resection of the whole soft palate following a neoplastic diagnostic. A provisional RPD was realized with a flexible obturator. It consisted in a central rigid part attached to the palatal plate, located in the plan of the hard palate, 5 mm away from the contracted pharyngeal walls, with a 4 mm thickness and a circular retention groove. A linear groove was performed through the RPD at the hard and soft palate junction. A thick dental dam was perforated, clipped in the grooves and cut for allowing a 10 mm contact along the walls. The Deglutition and Voice Handicap Index questionnaires were filled out before and a week after obturator prosthesis fitting.

Results/Discussion: The improvement of the oral functions were significant. With the dental dam in continuity with the hard palate, a controlled nasal air flow during speech and a pharyngeal obturation during deglutition were obtained. The major issue was the need for replacement of the ageing dam every week. The practitioners had to prepare some personalized dams and taught the patient how to replace them.

Conclusions: The flexible obturator prosthesis improved significantly the oral functions of patients with soft palate defects. This new prosthesis was a valuable provisional solution for this patient in need of a few weeks with a normal speech. Though, this device could not be used as a definitive prosthesis yet because of the frequent need for dam replacement. However, the concept is coined and these issues need to be overcome.

38
THE TOP 10 TREATMENT AND MANAGEMENT UNCERTAINTIES IN HEAD AND NECK CANCER

Nayar, Suresh * Regunathan, Akhila; Rieger, Jana; Lechelt, Leah
University of Alberta
Maxillofacial Prosthodontist,
Institute for Reconstructive Sciences in Medicine (iRSM),
Alberta Health Services/Covenant Health/University of Alberta
Division of Otolaryngology Head and Neck Surgery, Department of Surgery,
Faculty of Medicine and Dentistry
Edmonton, Alberta CA

Case Presentation: Results of an Alberta Head and Neck Priority Setting Project

Head and neck cancer (HNC) is constantly evolving in its aetiology and epidemiology. Survival rates for head and neck cancer patients are improving; patients diagnosed with some types of HNCs are younger and living longer. However, it has been shown that research in this field does not always address the areas that matter most to patients and clinicians.

The treatment and management of HNC patients should include the perspective and input of patients, caregivers/family members and clinicians treating these patients if we are to appropriately inform future research in this area. A survey was designed, using the James Lind Alliance approach, to identify uncertainties in this area and was sent to patients, caregivers/family members and clinicians. These uncertainties were then organized into themes and ranked by the HNC Priority Setting Project Steering Committee comprised of patients, caregivers/family members and clinicians/ researchers, bringing the uncertainties from 818 to 77, and then again ranked to a short list of 27. This short list was then finalized at an all-day workshop where participants reached consensus on the top ten research priorities for HNC. These top ten priorities included research questions on prevention, screening, treatment and quality of life. The inclusion of patients and caregivers/family members was successful and vital in identifying research priorities for head and neck cancer.

39
TRANSORAL ENDOSCOPIC ASSISTED ARTICULATED SURGERY – A NOVEL COST EFFECTIVE APPROACH TO OROPHARYNGEAL CANCER SURGERY

O'Connell, Dan * Barber, Brittany; Vallance, Patrick; Seikaly, Hadi; Harris, Jeffrey; Biron, Vincent
University of Alberta
Otolaryngology - Head & Neck Surgery
Edmonton, Alberta CA

Keywords: Oropharyngeal cancer, transoral surgery, functional outcomes

Purpose/Aim: Transoral robotic surgery (TORS) has become an accepted treatment approach to the management of T1 and T2 oropharyngeal carcinomas (OPC) worldwide. Single modality surgical management of T1 and T2 OPC has been shown to provide excellent survival and functional outcomes while de-escalating therapy by reducing the adjuvant radiation therapy requirements in certain patient groups. However due to significant costs, and infrastructure needs many economic barriers exist for resource limited centers wanting to expand the surgical management of early stage OPC.

Materials and Methods: Transoral Endoscopic Assistant Articulated Surgery (TEAS) is a transoral surgical technique that utilizes a 70 degree rigid endoscope secured by a flexible tension arm and an articulating grasper (SerpENT, Smith & Nephew, Andover MA) and hand held cautery to visualize, palpate and remove T1 and T2 OPC. Surgical set-up, technique, as well as surgical results on a case series of 15 consecutive patients treated with this technique are presented. Surgical adequacy, survival, functional outcomes and cost analysis compared to TORS were examined.

Results: 15 patients presenting with T1 and T2 tumors underwent TEAS. 10 patients had tumors localized in the base of tongue (BOT) and 5 patients had tumors localized in the tonsil (TON). 14/15 patients had squamous cell carcinomas (SCC), 1/15 had adenocarcinomas (ADC). 12 of 14 SCC cases were p16 +. All patients underwent simultaneous or delayed neck dissection. 4 patients had discordant frozen section and permanent histopathology margins. 2 patients underwent revision resections (1 with TEAS, and 1 with TORS) that subsequently cleared margins. 2 patients underwent adjuvant chemoradiation therapy. 10 of 15 patients required adjuvant radiation (5 with platinum based chemotherapy given concomitantly) due to positive loco-regional metastatic disease. Follow-up ranges from 1-63 months, there were no cancer related deaths post treatment in the cohort treated with TEAS. Overall costs were significantly reduced in the TEAS cohort due to the lack of utilization of the robotic surgical system and negating the need for robotics related disposables required in TORS programs.

Conclusions: TEAS represents a potentially viable alternative to TORS for the majority of

tumors presenting in the oropharynx that meet criteria for surgical resection. Although TORS style 3D visualization is not possible with a single endoscope, many advantages of TEAS are identifiable. Direct 3D visualization enhanced with 2D endoscopy provides an excellent visualization field for surgery in the oropharynx. The tactile feedback provided to the operator via operating through the mouth with hand-held articulating instruments as well as first person positioning at the oral cavity to deal with possible complications including hemorrhage from the lingual vessels showing TEAS may enhance surgical efficiency. The reduced need for infrastructure with TEAS might prove beneficial to resource limited health care environments. Further studies with larger multi-center patient enrollment are required prior to any widespread adaptation of TEAS being feasible.

40
ADVANTAGES AND DISADVANTAGES OF PREOPERATIVE-RESTORED IMPLANT PROSTHESES AFTER ORAL TUMOR RESECTION

Ogino, Yoichiro * Koga, Sayuri; Fujikawa, Natsue; Koyano, Kiyoshi
Kyushu University
Section of Implant and Rehabilitative Dentistry,
Division of Oral Rehabilitation
Fukuoka, Japan

Keywords: preoperative-restored implant prostheses

Case Presentation: The treatment of malignant oral tumors often consists of resection and radiotherapy. The structural and functional reconstruction of the maxillofacial region after resection of an oral tumor usually requires prosthetic treatment. However, oral rehabilitations with removable prostheses are sometimes unsatisfactory from a functional and esthetic point of view. On the contrary, the beneficial roles of implant-supported prostheses in patients treated surgically for oral tumor have been reported. Although there have been a number of reports that evaluated the clinical outcome of implants and implant-supported prostheses following tumor resection, the discussions about clinical management of oral tumor patients who had been rehabilitated with implant-supported prostheses are scarce. The aim of this report is to consider advantages and disadvantages of preoperative implant-supported prostheses following oral tumor resection through our cases and discuss the clinical management of these patients and prostheses. Two patients visited our hospital for the purpose of the oral rehabilitation after oral tumor resection. Both of them had been rehabilitated with implant-supported prostheses before tumor resection and radiotherapy. Generally, patients suffer from the following problems associated with tumor therapy; loss of alveolar crest and soft tissue, caries, mucositis, osteonecrosis and xerostomia due to radiotherapy, trismus and so on. In these patients, implant-supported prostheses could

overcome caries and provide rigid occlusal supports. On the other hand, one patient showed bite wound due to incongruency between maxillary and mandibular alveolar crests. The other showed peri-implantitis in one implant and osteonecrosis in palate. Trismus also could be a leading cause of the difficulty of brushing. These disadvantages could be overcome by prosthetic and oral hygienic managements. Although trismus made insertion of obturator prosthesis more difficult, chewing function has been maintained with implant prostheses. The rehabilitation of patients affected by defects after tumor resection is very challenging. From a clinical point of view, implant-supported prostheses restored preoperatively seemed to be advantageous for patients who had undergone intraoral resections, although the implants need to be well-osseointegrated and oral hygiene has to be well-maintained. In addition, the risk management for these implants and prostheses must be understood and undergone.

41
CRANIOMAXILLOFACIAL MANIFESTATIONS OF HARTSFIELD SYNDROME AND CONSIDERATIONS FOR PLASTIC RECONSTRUCTIVE SURGEONS

Oliver, Jeremie * Menapace, Deanna; Cofer, Shelagh
Mayo Clinic
Department of Otorhinolaryngology
Rochester, Minnesota USA

Keywords: cleft-palate, hartsfield, holoprosencephaly

Case Presentation: Study Objective: The first case of familial Hartsfield syndrome was seen at our institution approximately three years ago. An established clinical diagnosis of Hartsfield syndrome is achieved through the recognition of three distinct pathologies: holoprosencephaly, ectrodactyly, and bilateral cleft lip-palate syndrome. Accurate diagnosis of this disease can be achieved through prenatal ultrasound to detect holoprosencephaly, ectrodactyly of the hands and feet, as well as cleft-lip and palate. Physical findings should be confirmed by genetic evaluation of the FGFR1 gene. This report focuses on the pertinent craniomaxillofacial manifestations and management strategies of Hartsfield syndrome that, to our knowledge, have never been reported. Cleft management: In Hartsfield syndrome, the degree of clefting is severe, and consequently, columellar length in this patient population is drastically shortened to the point of near agenesis, which makes for particularly difficult cleft-lip nasal repair. Primary cleft-lip repair may be undertaken within the normal 10-week window provided the patient is medically stable. Recommended pre-operative consults include Endocrinology, Nutrition, and Airway Management, to ensure the patient can tolerate the procedure. Pre-surgical infant orthopedics, including passive taping and obturator placement with or without nasoalveolar molding may be attempted prior to cleft-lip and palate repair. Bilateral straight-line closure technique was employed for a “cut-as-you-

go", tissue-sparing approach. Consideration must be paid to the large premaxillary segment protrusion which makes primary orbicularis oris repair challenging. Severe hypolasia of the nasal tip cartilages should be addressed by utilizing primary rhinoplasty techniques at time of cleft-lip repair. Single dome and intradomal sutures may be performed at time of cleft-lip repair to improve nasal tip clefting and tip position. It is important to be aware of poor wound healing in the premaxillary segment in these patients. Minimalistic dissection is encouraged. Delayed palate repair is recommended to allow for growth prior to reconstruction. In our experience, clefting seen in this patient population is extremely wide and subject to high-tension closures. In performing cleft-palate repair, a two-flap palatoplasty approach was taken utilizing bilateral vomer flaps. A nasoalveolar molding or a latham appliance is therefore helpful if tolerated. Conclusions: Hartsfield syndrome is a very rare disorder with less than 20 cases reported in the literature. Manifestations of Hartsfield syndrome include: congenital bilateral cleft-lip and palate, retrognathia, gastroesophageal reflux disease, ear deformities, eustachian tube dysfunction, midface abnormalities and craniosynostosis. Management should include multidisciplinary and longitudinal care coordination including: pediatrician, geneticist, otolaryngologist, plastic surgeon, endocrinologist, neurologist and speech and swallow specialist.

42
A CASE OF NK T CELL LYMPHOMA NASAL TYPE PRESENTING AS PAIN OF ODONTOGENIC ORIGIN

Otun, Adegbenga * Qazali, Ahmed; Won, Alexander; Chambers, Mark
University of Texas MD Anderson Cancer Center
Oral Oncology & Maxillofacial Prosthetics
Houston, Texas USA

Keywords: Extranodal NK/T-cell lymphoma, Natural Killer Cell Lymphoma, Midline Lethal Granuloma

Case Presentation: As oral professionals, it is important to recognize the presentation and clinical course of the extranodal NK/T-cell lymphoma nasal type, formerly known as midline lethal granuloma, as this often lethal and poorly understood rare malignancy involves structures of the upper aerodigestive tract primarily the nasal cavity in its early presentation and staging. Early diagnosis and staging greatly improves survival outcomes for these patients who may present initially with a mass involving the nose or mid-facial structures or less commonly with nonspecific symptoms to the underlying disease process such as pain of odontogenic origin prolonging diagnosis and impacting survival outcomes as described in this poster presentation. Presented is the clinical history and treatment course of a 43-year old male Hispanic patient diagnosed with NK/T-cell lymphoma presenting initially to his local dentist with symptoms of severe acute irreversible pulpitis, thus highlighting the importance of a more thorough evaluation of patients presenting with oro-dental symptomology characteristic of a neoplastic process. It is the aim of this presentation to encourage dental professionals for expedient referrals to ENT or oral and maxillofacial surgeons for further evaluation and imaging to rule out underlying disease process when there is a variance between presenting symptoms and clinical signs.

Contribution:
1 Assistant Professor Oral Oncology & Maxillofacial Prosthetics Head and Neck Surgery UT M D Anderson Cancer Center Houston
2 Fellow Section of Oral Oncology & Maxillofacial Prosthetics Head and Neck Surgery UT M D Anderson Cancer Center Houston
3 Assistant Professor Oral Oncology & Maxillofacial Prosthetics Head and Neck Surgery UT M D Anderson Cancer Center Houston
4 Professor & Chair Oral Oncology & Maxillofacial Prosthetics Head and Neck Surgery UT M D Anderson Cancer Center Houston

43
RESTORATION OF A CONGENITAL EAR DEFICIENCY WITH AN AURICULAR PROSTHESIS: A CASE REPORT

Ozdemir-Karatas, Meltem * Cifter, Ebru Demet
Istanbul University, Faculty of Dentistry
Department of Prosthodontics
Istanbul, Turkey

Keywords: auricular prosthesis, congenital, extra-oral implant

Purpose: Auricular defects may be due to congenital diseases, trauma, or surgical removal of benign or malignant tumors. Patients with such defects experience functional and aesthetic problems that may lead to psychological disorders. Prosthetic rehabilitation is an acceptable treatment option for restoring auricular defects for the cases where patients' general health status is not suitable for repetitive surgeries. Improvement of materials and fabrication techniques together with the convenience of osseo-integrated implants offer life-like appearance and improved quality of life for those patients.

Materials and Methods: A 36-year-old female patient with a congenital auricular defect referred to the Department of Prosthodontics, Faculty of Dentistry, Istanbul University. A direct wax pattern providing the mirror image appearance of the contralateral ear was prepared. The maxillo-facial silicone elastomer was processed with the conventional methods. 4 extra–oral implants were used to improve the retention of the final prosthesis.

Results: With the presence of the auricular prosthesis the aesthetic expectations of the patient were met and quality of life of the patient was improved. According to the patient's self-assessment scores the overall satisfaction score (visual analogue scale) was 89.9%.

Conclusion: Not only proper functioning but also having good aesthetics is a great issue to maintain a well-being in everyday life. Without advanced surgeries patients can have a satisfactory facial appearance by the facial prosthesis.

44
PREVENTION OF HPV RELATED CANCER: KNOWLEDGE AND SCREENING PRACTICES OF DUTCH DENTISTS

Poelman, Marcella * Jager, Derk; Brand, Henk; Forouzanfar, Tim
Centre for Special Care Dentistry Amsterdam
Maxillofacial Prosthetics
Amsterdam, Netherlands

Keywords: HPV, prevention, head and neck cancer

Purpose/Aim: As the evidence about the causal association between the human papillomavirus (HPV) and oropharyngeal cancer (OPC) is getting stronger and the incidence is rising, the dental community must be prepared to play a role in prevention and to answer patients' HPV-related questions. The aim of this study was to assess dentists readiness related to HPV associated health prevention and communication.

Materials and Methods: Dutch dental professional networks invited a total of 7364 dental health care professionals to complete a web-based questionnaire. Only practicing dentists were allowed to participate. The survey included socio-demographics, questions about HPV knowledge and oral cancer, a measure of confidence in head and neck examination and questions about their perceived role in preventing HPV-related oral cancer.

Results: Six hundred and seven (n=607) dentists completed the questionnaire. Significantly more male (81.9%) than female (75%) dentists were aware of the relation between HPV and OPC (p=0.047). However, more female (88.2%) than male (80.4%) dentists were aware of the availability of a vaccine against HPV (p=0.015). Less than 50% of dentists answered correctly the question about the changing risk factors for oral and oropharyngeal cancer. Less than 23% was aware of the fact that there are more than 100 types of HPV and that most HPV infections resolve spontaneously within 2 years. Although the majority of the Dutch dentists (86.8%) reported to conduct a screening for oral cancer during routine dental check-ups, only 44% considered the education they had received during their dental study about examining the oral soft tissue as adequate. This opinion was not related to the age of the dentist. Most Dutch dentists (69.5%) agreed that it is important to discuss the relationship between HPV and oral cancer with patients. Development of a protocol for oral cancer screening was considered even more important (81.1%).

Conclusions: This survey among Dutch dentists demonstrated that most dentists are aware of the relation between HPV en OPC, and they are willing to play a role in primary and secondary prevention. However, they consider their current level of knowledge insufficient to inform patients about all aspects of HPV vaccination and the relation with oral cancer. Additional education and training of dentists on these topics seems important.

45
EXTENSIVE REHABILITATION MAXILLOFACIAL

Rocha Fernandes, Aline Ursula * Bissacot, Giovanna; Cavalcante, Gabriel
University of Brasilia
Department of Dentistry, Faculty of Health Sciences
Brasilia, Distrito Federal, Brazil

Keywords: maxillofacial prosthesis, dental prosthesis retention, palatal obturators

Case Presentation: Patients undergoing oncologic treatment and radiotherapy may require complex prosthetic rehabilitation, involving associated prostheses. The present case report aims to describe the treatment of female patients by rehabilitation with palatal obturator, complex facial prosthesis and complete mandibular denture. Due to ionizing radiation therapy, implant retention was avoided. The absence of maxillary bone was a challenge to maxillary denture retention, which implied the need for additional retention using magnets between facial and obturator palatal prostheses. In this case, the complete denture preparation protocol was followed with some modifications to adapt to the clinical situation. The facial sculpture was handmade in wax and included in plaster to obtain the mold. It was filled with pigmented silicone to become the extensive prosthesis, involving areas of lip, eye, cheek and nose. After the prosthetic installation, the patient was able to communicate and socialize, with improved swallowing and chewing. Maxillofacial prostheses are ways to improve the self-esteem and quality of life of patients with cancer sequelae.

46
RADIOTHERAPY-INDUCED TRISMUS MANAGEMENT

Rojanasakul, Nuntaporn *
University of Michigan
Biologin and Material Sciences and Division of Prosthodontics
Ann Arbor, Michigan USA

Keywords: trismus, limit jaw opening, mouth opening appliance

Purpose/Aim: This literature review will explore the available treatments for trismus and will focus on the mouth opening appliances.

Materials and Methods: The electronic database was searched for English-language studies published from 1993 to 2017, containing the key words: trismus, limit jaw opening, mouth opening appliance, jaw exercise, head and neck cancer and radiotherapy.

Results: Presently, there is no standard treatment for trismus. However, a mouth-opening appliance is often utilized because it is non-invasive and effective. It yields better results than no exercise or exercise with fingers or Popsicle sticks, when the patient starts early. It improves mouth opening, leads to trismus-related symptom relief and improved quality of life. However, patient compliance is critical.

Conclusions: The cost of untreated trismus, in terms of suffering and an increased need of health-care resources, may be substantial. The trismus management should be initiated during early onset of trismus in order for it to be most effective. Critical to improvement is motivation and regular follow up care. The options of treatment for trismus should be selected individually, depending upon oral and systemic health status and professional preferences.

47

MULTI-DISCIPLINARY APPROACHES FOR THE PLATE RECONSTRUCTION AFTER SEGMENTAL RESECTION OF MANDIBLE BY VIRTUAL SURGICAL SIMULATION

Sato, Naoko * Miyashita, Hitoshi[2]; Koyama, Shigeto[1]; Ishiko, Risa[1]; Kosaka, Moe[1]; Kato, Hiroaki[3]; Takahashi, Tetsu[2]; Sasaki, Keiichi[4]
Tohoku University Hospital, Tohoku University Graduate School of Dentistry
[1]Maxillofacial Prosthetics Clinic
[2]Division of Oral and Maxillofacial Surgery
[3]Dental Laboratory
[4]Division of Advanced Prosthetics Dentistry
Sendai, Japan

Purpose: The preoperative planning of reconstruction is critical for the patients who undergo mandibular segmental resection. The bony reconstruction is standard method to maintain the bone continuity of the mandible. However, when it is unsuitable, the reconstruction plate with soft tissue transfer is used as an alternative method. Although the plate size and position affect functional and esthetic outcomes, there is little information. This report presents the preoperative planning of the plate reconstruction following segmental mandibulectomy by virtual surgical simulation.

Materials and Methods: A 72-year-old woman had extensive squamous cell carcinoma in mandible. The resection from the right lateral mandible to the left gonial angle and complex soft tissue resection and the plate with vascularized anterolateral thigh flap (ALT) reconstruction were planned. There were some factors to affect the surgical planning, including edentulous after cancer resection, no dental rehabilitation in mandible, skeletal class ? relationship, and resection of lower lip and oral floor. Taking into account those factors, three-dimensional simulated model was designed to alter

intermaxillary relation by the virtual surgical simulation using CAD software and fablicated. The reconstruction plate was pre-bended according to simulated model. Results: The surgery was performed and the plate was positioned as preoperative surgical simulation. Because of poor blood flow, left lateral tongue was partially resected and closed. The defect of lower lip was reconstructed by Fries's method and the lip closure was maintained. The palatal augumentation prosthesis was delivered in the perioperative period.

Conclusions: Preoperative surgical planning by virtual surgical simulation and speech and swallowing rehabilitation in perioperative periods offered optimal outcomes for the patients. The multi-disciplinary management of reconstruction including surgical treatment and functional rehabilitation is necessary for the patients who undergo mandibular segmental resection.

48

EFFECTS OF POLYPHENOLS ON DOXORUBICIN-INDUCED ORAL KERATINOCYTE CYTOTOXICITY AND ANTICANCER POTENCY AGAINST ORAL CANCER CELLS

Sheng, Hong * Ogawa, Toru; Niwano, Yoshimi; Sasaki, Keiichi; Tachibana, Katsuro
[1]Tohoku University Graduate School of Dentistry
[3]Fukuoka University School of Medicine
Sendai, Japan

Keywords: Resveratrol, Epigallocatechin gallate, Tannic acid

Purpose/Aim: Doxorubicin (DOX) is a potent and widely used anticancer agent. However, a number of reports have shown that DOX was highly cytotoxic to normal human oral keratinocytes (NHOK). Resveratrol (RSV), epigallocatechin gallate (EGCG) and tannic acid (TA) are polyphenolic compounds found in dietary sources, and are regarded as potent antioxidants. It has been reported that oxidative stress is involved in DOX-induced cardiotoxicity, and some antioxidants could mitigate the cardiotoxicity. Thus, the aim of the present study is to examine if the three polyphenols could alleviate DOX-induced cytotoxicity in NHOK without weakening its cytotoxic potential against human oral cancer cells.

Materials and Methods: Cell viability of NHOK and a human oral squamous cell carcinoma cell line (HSC-2) was determined by 3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide (MTT) assay. Apoptotic and necrotic cells were determined by annexin v and propidium iodide double staining followed by the analysis with Tali Image-Based Cytometer.

Results: DOX showed concentration dependent cytotoxicity in both NHOK and HSC-2 cells. RSV, EGCG and TA were also cytotoxic in NHOK cells to some degree or another, and highly cytotoxic in HSC-2 cells especially at their higher concentrations. In the case of co-treatment of DOX and RSV, RSV additively augmented DOX cytotoxicity in a concentration dependent manner both in HOK and HSC-2 cells. When combined with DOX, EGCG and TA attenuated cytotoxicity induced by higher concentrations of DOX in NHOK cells, while potent cytotoxicity of EGCG and TA at higher concentrations in HSC-2 cells was kept in combination of DOX at any concentrations tested. These results propose the possibility that EGCG and TA could alleviate cytotoxic effect of DOX on normal oral cells without weakening anticancer effect of DOX, or even the two polyphenols could potentiate the anticancer effect because of strong cytotoxic effect of EGCG and TA on cancer cells. The results of cell death analysis are to be fully described in the poster.

Conclusions: The present study suggests that combined use of EGCG or TA with DOX at a certain concentration could mitigate DOX-induced keratinocyte cytotoxicity without weakening the DOX anticancer efficacy or even with augmenting it.

49
AVASCULAR NECROSIS OF THE MAXILLA FOLLOWING LEFORT I OSTEOTOMY

Sinha, Nikita * Arwani, Noura; Salinas, Thomas J.
Mayo Clinic
Dental Specialities
Rochester, Minnesota USA

Keywords: Avascular necrosis, Lefort I osteotomy

Introduction: Maxillofacial orthognathic surgery is considered as a safe, predictable and stable procedure. The sequelae of inadequate vascularity subsequent to maxillary orthognathic surgery can vary from loss of tooth vitality, to periodontal defects, to tooth loss, to loss of major dentoalveolar segments.[1] One of the most rare post-operative complications following orthognathic surgery is avascular necrosis of the maxilla.[2] This case report entails a patient who had suffered a near complete avascular necrosis of the maxilla subsequent to Lefort I osteotomy. This was subsequently reconstructed through digital surgical planning and three segment vascularized fibula graft.

Case Report: A 20-year-old female patient had undergone interpositional Lefort I osteotomy, bilateral sagittal split osteotomy and genioplasty for correction of Class III malocclusion. Unfortunately, terminal vascular compromise of her maxilla was noticed 48 hours post operatively. Conservative management included thirty-three dives of

hyperbaric oxygen to increase probabilities of angioneogenesis which were found to be ineffective. She was ultimately diagnosed with avascular necrosis of maxilla secondary to orthognathic devitalization and was referred to the division of Oral and Maxillofacial Surgery, Mayo Clinic, Rochester, MN.

Treatment: She was advised to undergo bilateral infrastructure maxillectomy and fibular osteomyocutaneous free flap and adjunctive dental reconstruction with endosteal dental implants to restore the maxillary defect. Digital surgical planning helped fabricate the contour and dimensions of the native maxilla for the best possible supportive configuration. The fibula segments were adapted with prebent reconstruction plates and secured to the zygoma with bicortical locking screws. The patient advised to undergo therapeutic exercise and activities for ideal healing of the graft. The flap was evaluated through visual perfusion inspection and Doppler ultrasound tests. Subsequent dental reconstruction would include placement of endosseous dental implants and fabrication of a fixed dental prosthesis for the complete maxillofacial rehabilitation.

Conclusion: Fibula graft reconstructions have become state of art in maxillofacial reconstructions, popularized by Hidalgo.[3] However for better psychological outcome from the patient's perspective, dental rehabilitation should be carried out as soon as possible.

50
OSSEOUS FLAP FAILURE COMPOUNDED BY SAPHO SYNDROME: A CASE PRESENTATION

Sinha, Nikita * Arwani, Noura; Salinas, Thomas J.
Mayo Clinic
Dental Specialties
Rochester, Minnesota USA

Keywords: Flap failure, SAPHO Syndrome

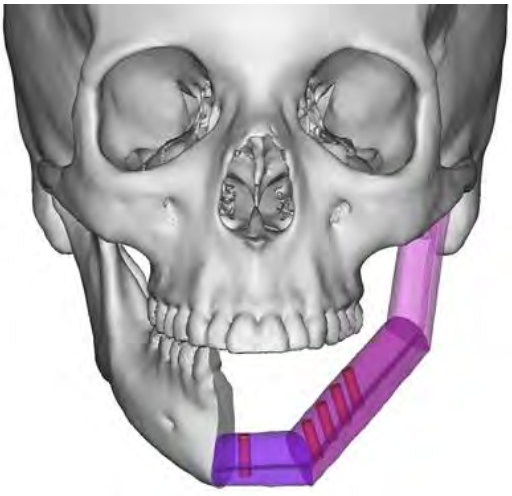
Introduction: Microvascular free flaps have become the most preferred modality of treatment in most major head and neck oncologic and acquired defects. They have demonstrated better functional outcomes, improved cosmetics and higher success rates when compared to local and regional flaps.[1] Unfortunately, such challenging cases come with their own set of risks and complications and the most concerning of all is the loss of free flap.[2]

Case Report: A 32-year-old female patient reported to division of Oral and Maxillofacial Surgery, Mayo Clinic, Rochester, MN. She had a history of jaw pain and stiffness associated with increase in benign sclerosis and thickening of the left mandible and

lateral pterygoid plate due to SAPHO (synovitis, acne, pustulosis, hyperostosis, and osteitis) involvement. Radiographic examination revealed a moth-eaten appearance leading to the diagnosis of chronic sclerosing osteomyelities accompanying SAPHO syndrome.

Treatment: Alternative to symptomatic curettage/debridement, lifelong steroid therapy and immunomodulation, patient was given a choice of treatment to undergo resection and microvascular reconstruction of her mandible. This would remove the source of infection, decrease pain and help with soft tissue asymmetry which the patient was concerned with. Digital surgical planning for the vascularized fibula free flap reconstruction was initiated with immediate placement of endosseous implants and immediate provisional prosthesis in left mandibular region. (Fig 1) Surgical reconstruction was performed along with implant insertion and prosthesis placement. Post-surgery, a Cook implantable Doppler was applied to monitor the anastomosis and was noted to have a very weak signal. The junction was reopened and was found to have thrombosed during the 2-hour fixation and anastomosis time. Thrombectomy was performed, and the flap was reanastomosed and yielded favorable perfusion. At the 3 week follow up visit, 3.7 x 4.0 x 2.6 cm abscess was seen with sloughing of flap. Increased sclerosis and benign periostitis of the residual graft and residual mandibular body was observed. Exploration of the implants was performed and four out of five implants were found to be mobile. They were removed and the abscess was treated with debridement, antibiotic therapy and allowed to drain. Follow up visits displayed progressive loss of bone within the flap necessitating revisiting surgical reconstructive options.

Conclusion: Flap failure can lead to additional surgery, hospitalization and increased costs. This case highlights flap failure in a patient suffering from osteomyelitis compounded by a rare syndrome.



51
USE OF DIGITAL IMPRESSION FOR RESOLVING ISSUES WITH IRREVERSIBLE HYDROCOLLOIDS IN FABRICATING A MAXILLARY OBTURATOR

Srivastava, Akanksha * Bidra, Avinash S.; Agar, John R.; Taylor, Thomas D.
University of Connecticut
Post-Graduate Prosthodontics
Department of Reconstructive Sciences
New Britain, Connecticut USA

Keywords: digital impression, palatal defect, maxillary obturator

Case Presentation: CAD/CAM technology is rapidly evolving in modelling, designing and manufacturing of maxillofacial prosthetics. Within the CAD/CAM workflow, conventional impressions are being largely replaced with digital impressions using intra-oral scanners. The use of digital impressions in fabrication of maxillary obturators is not well described in the literature. In addition, challenges with irreversible hydrocolloid impression material are well known, including potential dislodgement of a bolus of alginate in small oro-nasal communications. This case presentation describes a CAD/CAM and a conventional workflow for fabrication of 2 maxillary obturator frameworks in a patient with a palatal defect. For the conventional workflow, diagnostic and final impressions were made using irreversible hydrocolloid impression material. A conventional wax pattern was made and casted into a metal framework. For the digital workflow, an intra-oral scanner was used for diagnostic and final impressions. The obturator framework was digitally designed, wax pattern fabricated by rapid prototyping and then casted into a metal framework. This poster will outline the advantages and disadvantages of both the workflows as well as briefly describe the operator's and patient's experiences with both methods.

52
OBTURATORS TO FACILITATE SPEECH AND SWALLOWING IN A MAXILLECTOMY PATIENT WITH DEMENTIA AND CEREBRAL INFARCTION.

Sumita, Yuka * Namba Toshimitsu[2]; Kamarul Hisham Bin Kamarudin[3]; Kamiyanagi Ayuko[1]; Hattori Mariko[1]; Ino Shuichi[4]; Taniguchi Hisashi[1]
[1]Tokyo Medical and Dental University Department of Maxillofacial Prosthetics
[2]Namba Dental Clinic
[3]Ministry of Health, Malaysia. Kuala Lumpur Dental Clinic
[4]National Institute of Advanced Industrial Science and Technology
Tokyo, Japan

Keywords: maxillectomy, dimentia, cerebral infarction

Introduction: Oral-nasal communication following maxillectomy can cause speech impairment, swallowing disorder, and reduced quality of life (QOL). An obturator is a useful treatment option. However, the complicated structure of the resulting defect and its sensitivity and readiness to bleed can hamper the patient's ability to manage the prosthesis, and this may be compounded by in some cases by trismus, dementia, or cerebral infarction. This case report describes the delivery of different obturators to facilitate speech and swallowing in a maxillectomy patient with dementia and cerebral infarction.

Case: A 64-year-old man who underwent maxillectomy in 2000 and was referred to our clinic in 2001 for fabrication of an obturator. He experienced no problems with the prosthesis until having a cerebral infarction in 2012, after which left hemiparesis and vascular dementia required his wife to provide fulltime care. Following the sudden death of his wife in 2013, he moved to a nursing home and his dementia worsened. Hasegawa Dementia Scale score was 20 (0-30) indicating dementia. He did not always wear his prosthesis. Sometimes he forgot how to place obturator and also could not place it using his hands, instead biting down onto it, causing irritation especially of the defect area. We first tried a denture with an acrylic base plate without artificial teeth, but this was still difficult for him to use. We retained the structure but changed the material to silicone, which resolved the irritation and readiness to bleed but there were retention problems. We next tried a plastic plate with silicone added. The patient wore the obturator for 2 months without problem, but biting force when placing the prosthesis fractured the plate. Ultimately, the patient was able to use an obturator with a base of heat-cured acrylic resin and silicone added to protect the defect area.

Discussion: We opted not to include artificial teeth and to use silicone to protect the defect area because prevention of air and water leakage and of irritation and injury was more important than improved esthetics and masticatory function for this maxillectomy patient. These solutions allowed him to use the prosthesis without problems, despite

having cerebrovascular disease and vascular dementia. He remains in relatively good health with improved QOL. This work was partially supported by JSPS KAKENHI Grant Number JP17H00755.

53
IMMEDIATE SURGICAL OBTURATION WITH FULL ARCH DENTITION AFTER PARTIAL MAXILLECTOMY: A CASE REPORT

Teshigawara, Daisuke *, Ino, Teruo, Fujisawa, Masanori
Meikai University School of Dentistry
Division of Fixed Prosthodontics,
Department of Restorative & Biomaterials Sciences
Sakado, Japan

Keywords: Immediate surgical obturation, Maxillary defect, Removable partial denture

Introduction: The auxiliary use of an immediate surgical obturator (ISO) prosthesis for postoperative management following maxillectomy and/or palatectomy can improve oral function, such as speaking and deglutition, by reproducing normal dentition and palatal contours. Mastication using the posterior teeth is not usually adapted because of the difficulty of management in the early postoperative period. The use of a well-adapted prosthesis produced by accurate fabrication is thought to avoid this problem. Here the effectiveness of immediate surgical obturation using an acrylic resin prosthesis to reproduce preoperative dentition after partial maxillectomy is reported.

Clinical Report: A 79-year old woman presented with a tumor of the left alveolar gingiva that was diagnosed as stage IV squamous cell carcinoma (T4aN0M0) and underwent maxillofacial surgery at the Meikai University Dental Clinic, which included partial maxillectomy and full thickness skin transplantation. After surgery, she received prosthetic management as an outpatient. All teeth within the surgical area were resected, thus the patient was fitted with a removable partial denture (RPD), which caused a decrease in retention because of age-related deterioration. Immediate surgical obturation with a new prosthesis was adapted. Maxillary (with and without the RPD) and mandibular impressions and casts were created. A base plate with clasp retainers and arranged resin teeth was fabricated. The base plate and resin teeth unit were fitted and then an ISO was made using acrylic resin materials by conventional methods. The ISO was adapted to the patient soon after surgery and a flange was attached at 2 weeks after surgery. The patient reported no occlusal interference caused by the ISO.

Conclusion: The use of an ISO prosthesis lessens the psychological and mental burden of patients after surgery by improving quality of life and early reintegration into society.

Immediate surgical obturation reduces the period of lower oral dysfunction. Reproduced dentition of the prosthesis improves esthetics as well as mastication.

54
A CONCEPTUAL FRAMEWORK FOR THE REHABILITATIVE MANAGEMENT OF CANADIAN ARMED FORCES PATIENTS REQUIRING MAXILLOFACIAL RECONSTRUCTION

Thornton, Ian *
iRSM
Maxillofacial Prosthodontics
St. Albert, Alberta CA

Case Presentation: The nature of military service consistently put our Canadian Armed Forces (CAF) members in harm's way and there is an inherent risk of various traumatic injuries that could require facial resection and subsequent restoration. Additionally, the typical age of a soldier is in the middle of the cohort where an increase of p-16 positive HPV associated oral cancer is expected to be diagnosed in the coming years. Therefore, it would be highly beneficial to have an established digital treatment pathway protocol and an established access to early care for our soldiers, wherever they serve, to ensure the best possible functional and esthetic outcomes are achieved and that their quality of life remains as close to pre-treatment levels as possible. A mutually beneficial relationship between the CAF and civilian institutes across Canada, like iRSM, is integral in developing this capability. During the development of this conceptual framework,

additional elements will require analysis. These elements include, but are not limited to: the cost to access this care; the transportation/posting options for patients; the care options available; the examination and comparison of treatment modalities at centers nationwide; the psychological support for the patient and their family from the diagnosis/injury onwards; the development of any necessary CAF maxillofacial policy statements; the analysis of any interorganizational digital pathway/communication network need; and the establishment of a dedicated CAF maxillofacial treatment team. The Royal Canadian Dental Corps' vision statement speaks to this desire to provide the very best care to our patients.

Initial case studies will be completed by means of two current cases involving CAF members, from opposite sides of the country, who are both receiving rehabilitative care at iRSM. These case studies will not only justify the need for this rehabilitative capability but will also highlight the procedures required to access this care as well as any challenges that were identified in this process. Utilizing the lessons learned in these cases, the vision statements and the aforementioned analysis, a conceptual framework will be presented. The ultimate goal being the establishment of a conceptual streamlined rehabilitative management guideline for CAF personnel requiring this comprehensive care so that all future CAF cases can be proactively digitally planned and then implemented in a timely manner. This would then ensure that the maxillofacial rehabilitative needs that arise from facial trauma or oral cancer reconstructions for CAF patients are clearly met.

55
DEFECT SIDE CLASP HACKS: WHY CLASP A TOOTH-AT-RISK?

Wagner, Elyse * Kurtz, Kenneth S.
Montefiore Medical Center
Prosthodontics
Bronx, New York USA

Case Presentation: Maxillectomy patients have reduced tooth and hard and soft tissue support for their prostheses. Little if any evidence exists with regards to design of an obturator prosthesis. Anecdotal observation at a large Bronx hospital prosthodontics clinic reveals that the tooth at risk is the anterior tooth adjacent to the maxillectomy site. Thus, obturators are designed that do NOT clasp this tooth, but do clasp the penultimate defect tooth. Additional laboratory techniques lend to considering this approach as a suitable clinical therapeutic.

56
A SOLUTION FOR EXTREME VERTICAL RESTORATION SPACE AFTER EXTENSIVE MANDIBULAR RECONSTRUCTION

Wang, Tong-Mei *, Lee, Mei-Lin; Chen, Chia-Chun; Chao, Yueh-Ling; Kok, Sang-Heng; Lin, Li-Deh
School of Dentistry, National Taiwan University
Graduate Institute of Clinical Dentistry
Taipei, Taiwan, China

Keywords: mandibulectomy, fixed detachable hybrid prosthesis

Case Presentation: Extreme vertical restoration space is common in patients with extensive mandibular reconstruction. When the patients are restored with dental implants and fixed detachable hybrid prosthesis, the height of the restoration may exceed the length of screw driver and make screw tightening or loosening very difficult. This case report demonstrated a patient with ameloblastoma going through a journey from extensive surgical excision to final rehabilitation. For his final prosthesis, two layers of metal substructures were designed for ease of placement of prosthetic screws. The first layer of substructure was made using CAD/CAM technique to provide precision and smoothness at implant-restoration junction. The second layer of substructure was made of temporary cylinders of dental implant embedded in a casting Co-Cr framework. Screw holes and threads matching to the temporary cylinders were tapped on the first layer of substructure so that two layers of substructures could be connected by stronger screws. Because the height of each substructure is much decreased, the prosthesis is easily removed for routine periodic maintenance procedure. This final prosthesis functioned well in the past 3 years.

57
INCIDENCE OF MANDIBULAR PLATE FRACTURE

Wojnarwsky, Pandora * Muller, Olivia; Carr, Alan; Salinas, Thomas
Mayo Clinic
Maxillofacial Oncology & Dental Oncology
Rochester, Minnesota USA

Keywords: plate, fracture, reconstruction

Purpose/Aim: Reconstruction plates have been used in the mandible following resection of cancer or following trauma since 1976. These plates are often used to

stabilize free fibula grafts that may include several segments. Since their introduction, they have evolved to reduce operating time – first being contoured in the operating room, then being pre-contoured, and most recently being custom milled or printed. Overtime, fractures of these plates have been observed. Mandibular flexure has been thought to attribute to fracturing of fixed dental prostheses in native mandibular bone that extend bilaterally past the mental foramens. Flexure during mandibular movement may also be a contributing factor as to why these fixation plates are fracturing with fibular reconstruction. The purpose of this study is to quantify the nature of and determine the incidence of mandibular plate fracture in patients that have been reconstructed with a free fibula graft.

Materials and Methods: The Mayo Clinic patient database was be queried and retrospectively reviewed to select for all patients who met the criteria of having a primary mandibular resection with a free fibula graft reconstruction done at the Mayo Clinic and separated into patients with plate fractures versus no plate fractures. Information such as type of reconstruction plate used, number of fibula segments, length and thickness of plates, number of screws used to fixate the plate to the segments, and fracture site was recorded for each patient. The data was pooled to compare plate fracture incidence within the plate fracture group and overall.

Results: Results are to be deferred upon final presentation.

Conclusions: Selection of plate type is largely dependent upon the surgeon preference. Therefore, plate manufacturer may play a factor in fracture. However, since the Mayo Clinic has largely used KLS Martin plates, manufacturer difference was not able to be determined. This data will help the surgeon and prosthodontist quantify the incidence of fracture to a patient that will be undergoing free fibula graft reconstruction following mandibular resection. The results may also help surgeons and prosthodontists plan alternative reconstruction designs that may reduce the incidence of plate fracture.

58
A PERIORAL FORCE MEASUREMENT SYSTEM FOR INFANTS WITH CLEFT LIP AND PALATE

Wu, Guofeng * Zheng, Yaqi
Nanjing Stomatological Hospital, Medical School of Nanjing University
Department of Prosthodontics
Nanjing, Jiangsu, China

Keywords: Infant; Cleft lip and palate; Perioral force

Purpose/Aim: The aim of this study was to investigate a new way to accurately and reliably measure perioral force in UCLP infants and explore the change before and after cheiloplasty.

Materials and Methods: A perioral force measurement system was developed and applied to measure perioral force at labial frenum area as well as the commissures on both the normal and the cleft sides of 4 infants with unilateral CLP before and after cheiloplasty. The results were analyzed using SPSS 19.0 software.

Results: The perioral force measurement system appears to produce valid results in infants with UCLP?Before cheiloplasty, perioral force of labial frenum area was 1.79±0.94 g/cm2, that of commissure on the normal side and cleft side was 5.41±1.01 g/cm2 and 3.12±1.55 g/cm2, respectively (P<0.05). After cheiloplasty, perioral force of labial frenum area was 12.73±3.51 g/cm2, that of commissure on the normal side and cleft side was 7.64±1.64 g/cm2 and 7.27±1.89 g/cm2, respectively (P>0.05).

Conclusions: The study revealed that the self-designed perioral force measurement system could accurately measure the perioral force of UCLP infants with less variation.

59
THE IMPLANTS IN ORAL TUMOR PATIENTS-A RETROSPECTIVE STUDY OF -12 YEARS OF EXPERIENCE

Xingzhou, Qu * Wang, Mingyi; Wu, Yiqun; Huang, Wei; Sun, Jian; Zhang, Chenping
Shanghai, China

Keywords: Implant, Oral maxillofacial, Rehabilitation

Purpose/Aim: To review and analyze the application and functional evaluation of implant technique in patients with oral and maxillofacial head and neck tumors.

Materials and Methods: a total of 106 cases of dentition and jaw defects caused by oral, maxillofacial, head and neck tumors were collected in our hospital from 2005 to now. A total of 533 implants were implanted. Age: 18~82; gender ratio was 1.1:1; the longest follow-up period was 12 years; the shortest follow-up was 4 months. Of all the patients, there were 79 benign tumors and 27 malignant tumors. 36 patients were treated with vascularized bone graft reconstruction in one stage, and 70 patients were implanted in two-stage operation. 192 implants were placed in jaws, 289 implants were placed in bone graft (fibula and ilium), 43 zygomatic implants were placed in zygomatic bone, and 9 implants were placed in craniofacial bone (frontal, temporal etc.). Among all cases, 16 patients were received the radiotherapy before the implants placement. In all implants, 22 implants were failed. They were distributed that 16 implants in jaws, 2 implants in fibula graft, and 4 implants in iliac crest. A total of 96 patients completed the final rehabilitation, including 43 cases of implant supported fixed partial denture 32 cases of implant supported overdenture, 18 cases of movable obturator, 3 cases of facial

composite organ prostheses. Of all the patients, 68 cases had undergone alveolar plasty or vestibuloplasty, 15 cases received keratinized mucosal grafts, and 49 cases underwent graft replacement with biological artificial membrane. There were 89 implants with peri - implant mucositis, and 34 implants developed peri - implantitis.

Results: the osseointegration rate was 95.87%, and the repair success rate was 90.57%. The incidence of mucositis around the implant was 16.70%, and the incidence of peri-implantitis was 6.38%.

Conclusions: rehabilitation with implant is an ideal way of restoration in patients with oral and maxillofacial head and neck tumors. However, because of the loss of the keratinized gingiva, the incidence of mucositis around the implant is very high. It is critical for the maintenance of the tissue around the implant health before and after the rehabilitation.

60
BIOMECHANICAL EFFECT ON BONE REMODELING IN A MANDIBULAR RECONSTRUCTION CASE USING FIBULA FREE FLAP

Yoda, Nobuhiro * Zhang, Keke; Chen, Junning; Koyama, Shigeto; Sato, Naoko; Kiyama, Tomomi; Swain Michael; Li, Qing; Sasaki, Keiichi
Tohoku University Graduate School of Dentistry
Division of Advanced Prosthetic Dentistry
Sendai, Miyagi, Japan

Keywords: Fibula free flap, Mandibular reconstruction, Finite element analysis

Purpose/Aim: Mandibular reconstruction using fibula free flap (FFF) has become a well-established procedure following substantial bone resection. Nevertheless, some clinical complications remain with delayed or poor union between the grafted fibula bone and native mandible. While the newly established biomechanical conditions following mandibular reconstruction using FFF can be a critical determinant for achieving favorable bone union, little has been known about their association in a time-dependent fashion. This study evaluated the bone healing and remodeling activity in the reconstructed mandible with FFF using longitudinal CT data in vivo, and further quantified its correlation with mechanobiological responses through an in-silico approach.

Materials and Methods: A 66-year-old male patient who was received mandibular reconstruction with osteotomized FFF with a titanium fixation plate, due to a squamous-cell carcinoma at the right molar gingiva, was studied. Post-operative CT scans were

taken at 0, 4, 16 and 28 months (M0, M4, M16 and M28, respectively). Longitudinal change of bone morphologies and mineral densities were measured at three bone union interfaces (two docking sites between the fibula and mandibular bones and one between the osteotomized fibulas) to investigate healing and remodeling events. Four case-specific three-dimensional heterogeneous finite element models were created based on the CT data taken at M0, M4, M16, and M28, respectively, to quantify mechanobiological responses in the bone at these different time points.

Results: Bone mineral density increased rapidly along the bone interfaces over the first four months. Cortical bridging formed at the osteotomized interface earlier than the other two interfaces with larger bone shape discrepancy between fibula graft and mandibular bone. The longitudinal changes in bone volume were site-specific and the rate of volume increase in the cortical bone region was positive in all the three sites from M4 to M16. Bone morphology was found to significantly affect jaw biomechanics in the osteotomized region. The anatomic position and shape discrepancy at bone union affected the bone healing and remodeling process.

Conclusions: Within the limitation of this study, the anatomic position and the discrepancy of initial shape at the docking sites between the host mandible and fibula graft affected the bone healing and remodeling process. This newly developed analyzing methods provides new understanding of healing and remodeling of mandible following the FFF reconstruction, which established important mechanobiological insights into patient-specific surgical planning and occlusal rehabilitation.

61
PROVISIONAL RESTORATIONS FOR DIAGNOSIS ACCURACY AND RELATION IN FABRICATION OF DEFINITIVE RESTORATIONS: A CASE ILLUSTRATION

Zavada, Richard *
Mayo Clinic
Dental Specialties
Rochester, Minnesota USA

Keywords: Provisional, Metal-ceramic, Maxillofacial

Case Presentation: A 69-year old male patient presented to Mayo Clinic dental specialties with history of a T4, N2b, left maxillary squamous cell carcinoma and subsequent resection of left maxilla and left orbital exenteration. The head and neck surgeons utilized an osteomyocutaneus free flap to repair the maxillary and palatal defect. On presentation the patient was completely edentulous in the maxilla and partially dentate in the mandible. The patient was xerostomic secondary to his post

ablative radiation therapy with caries in the remaining anterior lower teeth. His goal was to be able to have previous form and function. After obtaining a medical grade CT and a three-dimensional printing of the patient's skull, the oral and maxillofacial surgeons met to discuss treatment plan options. The proposed and accepted treatment was the extraction of remaining mandibular teeth with placement of six, well distributed, endosseous dental implants for a fixed dental prosthesis in the mandible. The maxilla would require six endosseous dental implants with three into the native maxilla and three into the graft. Due to the lack of native structures to stabilize a complete removable prosthesis, the goal was to provide a fixed dental prosthesis for the maxilla. After the appropriate healing time, at uncovery, it was determined that the dental implants in the patient's native maxilla had failed. Discussion with the surgical team and the patient led to the decision to place an extended length endosseous implant into the right zygoma. With appropriate healing times we then began the linear series to fabricate the fixed prostheses. After the trial arrangement was approved, fabrication of an all-acrylic resin, direct to fixture mandibular fixed dental prosthesis was completed and inserted. A direct to fixture bar was designed with three locator attachments was made for the removable maxillary prosthesis. After a trial period, the patient returned for cross-mounting and shade selection. At insertion, we seated the porcelain fused to metal fixed dental prosthesis. The two anterior implants required 30-degree angle correcting abutments to be used. The remaining dental implants were connected at the fixture level. The mandibular prosthesis was porcelain fused to metal and was direct to fixture. The patient expressed satisfaction with improved mastication at follow- up and has indicated that he would like to explore an orbital prosthesis to complete his reconstruction.

62
CLINICAL OUTCOMES OF MANDIBULAR RECONSTRUCTION WITH FIBULA FREE FLAP AND DELAYED IMPLANT-SUPPORTED PROSTHETIC CONSTRUCTION

Zhang, Dongsheng *, Huang, Shengyun; Zuo, Shuyu; Li, Wengang; Chen, Zhanwei; Zou, Huwei; Hu, Lihua
Shandong Provincial Hospital Affiliated to Shandong University
Department of Oral and Maxillofacial Surgery
Jinan, Shandong, China

Keywords: fibula free flap, dental implant, mandibular reconstruction

Purpose/Aim: Mandibular defects in patients may be caused by oral neoplasm, trauma

or osteoradionecrosis, among which ameloblastoma is the most common reason. Mandibular reconstruction with microvascular free fibula is the top choice after oncologic resection because it allows esthetic and functional restoration and implant-borne dental rehabilitation. However, whether to choose simultaneous reconstruction or to select delayed reconstruction following lesion resection remained controversial. This study sought to evaluate the outcomes of partial mandibular reconstruction treated with fibula grafts and dental implant placement in Shandong Provincial Hospital, China.

Materials and Methods: Patients suffered from oral neoplasm, with segmental mandibular section were selected in this study. They were all treated with fibula free flap grafts right after the osteotomies or 1~2 years later between 2010 and 2015. Clinical and radiographic data were evaluated, subjective criteria were also collected from patients.

Results: 96 patients were enrolled in this cohort study. They all had complete medical records and were available for continuous follow-up. 15 of them (15.6%) were treated with an implant-supported prosthetic construction, totally 76 implants were inserted. The fibula graft survival rate at the latest follow-up (mean follow-up 25 months, range 2~65 months) was 97%. Among the patients diagnosed with malignant tumor, the recurrence rate was very low, showing no difference between simultaneous mandible reconstruction group and delayed reconstruction group, on condition that extended osteotomies was taken. In all the cases suffered from ameloblastoma, no recurrence happened after lesion resection and fibula free flap reconstruction. Of all the implants, only 3 (3.9%) were lost due to infection.

Conclusions: Vascularized fibula free flap surgery and implant-supported prosthetic construction was found to be reliable treatment modalities for patients with mandibular defects. Patients' satisfaction degree were extremely high. The ideal management for them should minimize recurrence, restore oral function and appearance and cause minimal donor site morbidity. Recently we have treated 6 patients with successful mandible reconstruction using fully 3-dimensional digitally planned prefabricated free fibula flap, and have placed implants in the fibula using guided surgical templates as expected. Facts proved that: i). virtual surgical planning can decrease the handling trauma to the graft, limit ischemia time, achieve better bone-to-bone contact, and also provide precise positions for the grafts; ii). templates-guided implant surgery allows for high primary stability and better restoration effect. Furthermore, regular follow-up visits and proper oral hygiene maintenance are absolutely necessary for long-term successful treatments.

63
MANDIBULECTOMY AND RECURRENT CARCINOMA OF THE LEFT MANDIBLE CASE

Zhang, Manjin * Sumita, Yuka; Liu Rongguang; Li Na; Hattori, Mariko; Taniguchi, Hisashi
Tokyo Medical and Dental University (TMDU)
Department of Maxillofacial Prosthetics
Tokyo, Japan

Keywords: mandibulectomy, recurrent, brachytherapy

Introduction: Maxillofacial prosthetic treatment is a good option for the patient. However, the functional impairment caused by the several resection are severe and sometimes there is a limitation of prosthetic treatment.

Case: A 83-year-old man who suffering from stenocardia, carotid artery stenosis and Diabetes Mellitus in 1996 moreover had prostate cancer in 2004. In 2006, he was examined for granulomatous lesions on the left side of the mandible at 7, then made a mandible segment resection surgery and free scapular skin grafting was also performed. After this surgery, complete denture was delivered. In 2007, Posterior suture of left buccal mucosa had a induration, then the patient do the surgery to remove it and did the STSG. As the denture, we use O-ring attachments in maxillary denture which can have good retention. In 2008, the patient wanted to have the implant retained prosthesis was requested by patient in mandible, so he did the surgery to remove the plates and screws. After that, screw retained prosthesis was set. In 2012, squamous cell carcinoma of the left buccal mucosa was diagnosed. Brachytherapy was applied under the use of radiotherapy appliance called spacer in order to prevent the osteoradionecrosis. But in 2013, the biopsy showed moderate to severe dysplasia, so by the buccal approach did the tumor resection and did the anterior wrist skin graft. In 2016, gingival carcinoma of the left mandible was diagnosed. The patient did the tumor resection and split-thickness skin graft. Now, the maxillary denture only uses one O-ring attachment, have not enough retention, because of the effect of skin graft scar tension.

Discussion: Following long term observation, there is a possibility of recurrent and the presence of another tumor. It affects the patients' psychological problem and the severe functional impairments. It is necessary to treat the patients from various aspects. Encourage patients to regularly visit the hospital, and according to the recovery of the patient's skin graft, adjust the denture in time to reduce the irritation.

64
A VSP+CAD/CAM SYSTEM FOR A MULTI-DISCIPLINARY TEAM: 2017 UPDATE

Zhao, Linping * Patel, Pravin; Reisberg, David; Seelaus, Rosemary; Warshawsky, Neil; Cohen, Mimis
Shriners Hospitals for Children, Pediatric Plastic and Reconstructive Surgery; University of Illinois at Chicago, the Craniofacial Center
Chicago, IIllinois USA

Keywords: Digital Technology, Multidisciplinary Center, Virtual Surgical/Treatment Planning

Case Presentation: The system of virtual surgical planning (VSP) integrated with computer assisted design (CAD) and computer assisted manufacturing (CAM), or VSP+CAD/CAM system, was initially established at Shriners Hospitals for Children at Chicago and at the Craniofacial Center, University of Illinois at Chicago in 200, and has been upgraded and expanded recently, in order to fulfill the needs of our multidisciplinary craniofacial/cleft team in pursuing highest quality of care and rehabilitation to our patients with various craniofacial deformities and conditions. The updated system consists of data acquisition, modeling and simulation, design and fabrication. Patient specific information is acquired via cone beam CT scanner, 3D photo, and intra-oral scanners and then constructed to be a patient-specific model. Based upon this model, either surgical or non-surgical treatment procedures are simulated virtually and treatment plans are formulated. Further, procedure specific guides, templates, prosthesis, fixation system are designed and then fabricated using either numeric controlled milling machine or 3D printers. This presentation will demonstrate our 2017 updated VSP+CAD/CAM system, its components, its functions and its applications, with typical workflows for craniofacial reconstructive surgery, for facial prosthesis, for intraoral appliances, and beyond.

65
DIGITAL DESIGN AND WAX-UP MODEL ANALYSIS: NECESSARY STEPS FOR ANTERIOR ESTHETIC IMPLANT-SUPPORTED RESTORATIONS

Zhen, Wang * Tian Zhou, Mingyi Wang, Xingzhou Qu
Ninth People'S Hospital, Shanghai Jiao Tong University, School of Medicine
Department of Oral & Maxillofacial-Head & Neck Oncology
Shanghai, China

Keywords: implant, esthetic, restoration

Introduction: An ideal esthetic implant restoration was a combination of a functional and visually pleasing prosthesis. All the times treatment plan based on a diagnostic wax-up and cosmetic mock-up was commonly applied in functional and aesthetic rehabilitation. Although some of its advantages had been continued in dental implantology, limitations in precise contour measurement of soft tissue and alveolar bone were prominent too. Cone-beam Computer Tomography, CBCT data and relative implant surgical simulation system could be used to design operative schemes, choose the best operative paths, and teach the processes of operations and anatomy. This report had implications for the necessity of esthetic treatment planning by utilizing both digital design and wax-up model analysis for dental implant treatment.

Case Report: A female patient carrying old ill-fitting prosthesis was referred to the Ninth People's Hospital, Shanghai Jiaotong University School of Medicine. Microleakge of the porcelain fused to metal crowns, mesiodens, gummy smile, periapical periodontitis of upper incisors and unbalanced gingival level were diagnosed at first appointment. Digital analysis of the photos taken from patient, wax-up on models, temporary resin crown guided crown lengthening, extraction of mesiodens, CBCT based preoperative plan and root canal retreatment of upper incisors were conducted step-by-step in subsequent treatment. One single 4.3*10mm NobelRplace Conical Connection bone level implant had been selected for the further restorative treatment in light of overall design considerations of both wax-up and digital analysis. Provisional and final crowns with exact morphological traits as previous design were subsequently cemented and patient was satisfied with the esthetic outcome.

Result and Discussion: In this case, due to the comprehensive consideration of multiple planning methods, the single implant was guided and precisely placed in the ideal position of incisive bone. Digital photograph adjustment and intraoral temporary crown modification contributed equally in the cosmetic analysis. Color images contain a wealth of information on color could merely provide a single lens or perspective, however, the model with wax-up teeth brought out more spatial information. Of specific interest here was that image processing software for 3D design and modeling definitely calculated data in 3D patterns, but the result only could be displayed in 2D patterns from a screen. Therefore, traditional wax-up model analysis still played a very important role in

cosmetic dentistry.

Conclusion: In conclusion, combined use of digital design and wax-up model analysis were offer clear benefits, not only for cosmetic analysis, but also for dentist-patient communication as well.

Cover Artwork Generously Provided By
Nate Tan

14th Meeting of the

ISMR

International Society for Maxillofacial Rehabilitation
ismr-org.com

64th Annual Meeting of the

American Academy of Maxillofacial Prosthetics
maxillofacialprosthetics.org

ADMINISTRATION OFFICE

RES Seminars
4425 Cass St., Suite A
San Diego, CA 92109 USA
T. 858-272-1018
F. 858-272-7687
E-mail: ismr-aamp2017@res-inc.com
www.res-inc.com