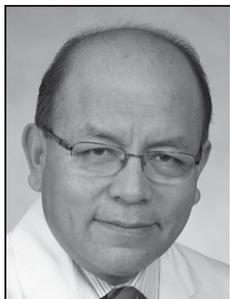


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## Message from the President, Jesus E. Medina, MD FACS

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Welcome to Orlando! Thank you for attending our 116th Annual Meeting at COSM. It has been a pleasure to serve the membership as President this year and I am very proud of the outstanding program that has been assembled by our Program Chair, Greg Krempf, MD and our Program Committee. Some of the highlights include a presentation on "The Joy and Responsibilities of Teaching Well" which will be given by my Keynote Speaker, L. Dee Fink, PhD, and Dr. Randal Weber's Joseph Ogura Lecture "Training Head and Neck Surgeons in the 21st Century: Is It Time for a New Paradigm?". Our Friday panels include "Cochlear Implants--Which Device? It Depends . . .", "Advances in Office Based Diagnostic and Therapeutic Procedures for Otolaryngologists", and "Molecular Markers in Head and Neck Cancer". We also have a panel on Saturday, "Common Pitfalls in Facial Plastic/Reconstructive Surgery". We are confident that you will find this meeting to be of great value in assisting you with the care of your patients, your research endeavors, and your teaching. I look forward to renewing old friendships and meeting new colleagues.

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## Meeting Overview

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### Wednesday - April 10

6:00 am - 6:00 pm Speaker Ready Room - Cordova 4  
6:30 am - 5:00 pm Registration - Mediterranean Foyer

### Thursday - April 11

6:00 am - 6:00 pm Speaker Ready Room - Cordova 4  
7:00 am - 5:00 pm Registration - Mediterranean Foyer  
8:00 am - 2:00 pm Spouse Hospitality Suite - Segura 5  
9:00 am - 4:00 pm Exhibits open - Coquina Ballroom  
12:00 noon - 1:00 pm Lunch with Exhibitors - Coquina Ballroom  
8:00 pm - 10:00 pm Triological Poster Set Up - Coquina Ballroom

### Friday - April 12

6:00 am - 6:00 pm Speaker Ready Room - Cordova 4  
7:00 am - 5:00 pm Registration - Mediterranean Foyer  
7:00 am - 9:00 am Triological Poster Set Up - Coquina Ballroom  
7:00 am - 7:50 am BUSINESS MEETING - Mediterranean 4  
7:00 am - 8:00 am NEW FELLOW INDUCTION CEREMONIES AND RECEPTION WITH MEMBERS  
8:00 am - 9:15 am SCIENTIFIC SESSION - Mediterranean 4  
9:00 am - 4:00 pm Exhibits open - Coquina Ballroom  
9:00 am - 4:00 pm Poster viewing - Coquina Ballroom  
9:45 am - 12:00 noon CONCURRENT SESSION I (Otology, Pediatrics) - Mediterranean 4  
9:45 am - 12:00 noon CONCURRENT SESSION II (General, Rhinology) - Mediterranean 5  
8:00 am - 2:00 pm Spouse Hospitality Suite - Segura 5  
12:00 noon - 1:00 pm Lunch with Exhibitors - Coquina Ballroom  
1:00 pm - 5:00 pm SCIENTIFIC SESSION - Mediterranean 4  
5:30 pm - 7:00 pm MEET THE AUTHORS POSTER RECEPTION - Coquina Ballroom

### Saturday - April 13

7:00 am - 6:00 pm Speaker Ready Room - Cordova 4  
7:00 am - 3:00 pm Registration - Mediterranean Foyer  
7:00 am - 7:50 am BUSINESS MEETING - Mediterranean 4  
9:00 am - 4:00 pm Exhibits open - Coquina Ballroom  
9:00 am - 4:00 pm Poster Viewing - Coquina Ballroom  
8:00 am - 12:00 noon SCIENTIFIC SESSION - Mediterranean 4  
8:00 am - 2:00 pm Spouse Hospitality Suite - Segura 5  
12:00 noon - 1:00 pm Lunch with Exhibitors - Coquina Ballroom  
12:00 noon Meeting Adjourns  
4:00 pm - 5:00 pm POSTER REMOVAL (posters not taken down by 5:00 pm will be recycled)



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# 116TH ANNUAL MEETING

## JW MARRIOTT GRANDE LAKES

### ORLANDO, FLORIDA

### APRIL 12-13, 2013

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#### **About the Triological Society**

The American Laryngological, Rhinological and Otological Society, Inc., aka The Triological Society, was founded in 1895 in New York, NY. In the years since its founding, the Triological Society has attracted the best and brightest in academic and clinical otolaryngology. Membership in the Triological Society brings the distinction of being elected to the most prestigious society in otolaryngology. Active Fellowship is achieved by presenting a thesis in the field of otolaryngology considered acceptable to a panel of peers. For those entering the field of otolaryngology, the Society provides role models. For those who are committed to research and related scholarly activity, the Society offers fellowship with like-minded peers who share common values, interests, and concerns.

The Society disseminates scientific information by presenting the latest basic science and clinical information at scientific meetings and through publication of its scientific journal, The Laryngoscope. The Society promotes research into the causes of and treatments for otolaryngic diseases by attracting promising physicians to scholarly otolaryngology research and supporting their development, providing financial support for the research efforts of young scientists, and promoting the highest standards in the field of otolaryngology-head and neck surgery.

#### **Mission Statement**

The mission of the Triological Society is to assist physicians and other health care professionals in maintaining and enhancing their knowledge of and skills in otolaryngology-head and neck surgery in pursuit of improved patient care.

#### **Goals**

- To disseminate the latest basic and evidence based clinical research findings pertaining to the diagnosis, treatment and prevention of the full spectrum of disorders of the head and neck and related structures in pursuit of improved patient care.
- To provide a forum for the international exchange of ideas and knowledge in otolaryngology-head and neck surgery and related fields of medicine and science.
- To provide for physician professional development through support of teaching and peer reviewed research.
- To encourage the highest ethical and professional standards in the delivery of patient care by otolaryngologists-head and neck surgeons.
- To promote academic excellence by requiring peer recommendations and an acceptable mentored thesis for admission to membership.
- To ensure that all educational activities comply with ACCME requirements.
- To ensure the continuation of the noble legacy of the Triological Society by mentoring young otolaryngologists to become scholars and leaders.

To facilitate the above goals, the Society sponsors educational meetings. The Society's journal, The Laryngoscope, serves as a means of disseminating the latest basic and clinical research results. The Society encourages clinical and basic research by providing research grants and awards on a competitive basis.

## Educational Objectives for Program

After attending this meeting, participants will be able to:

- describe the pros/cons of different cochlear implant devices;
- understand the best application for select cochlear implant devices in individual patient scenarios where the outcome is more dependant on the device chosen for implantation;
- discuss the implications of adding in-office procedures including imaging, application of cosmetic injectables, and laryngology procedures including the pros/cons with the ability to consider a business plan for each practitioner based on practice patterns and patient populations;
- describe currently available molecular markers for salivary gland and thyroid neoplasms;
- understand the utilization of molecular markers in salivary gland and thyroid neoplasms and malignant melanoma in forming an individualized treatment plan for patients;
- discuss the common pitfalls in select facial plastic surgery procedures and methods to avoid them;
- better understand the roles/responsibilities of teachers in post-graduate education.

## Accreditation Statement

This activity has been planned and implemented in accordance with the Essential Areas and Policies of the Accreditation Council for Continuing Medical Education through the joint sponsorship of the American College of Surgeons and The Triological Society. The American College Surgeons is accredited by the ACCME to provide continuing medical education for physicians.

## AMA PRA Category 1 Credits™

The American College of Surgeons designates this live activity for a maximum of 10 *AMA PRA Category 1 Credits™*. Physicians should claim only the credit commensurate with the extent of their participation in the activity.



American College of Surgeons  
Division of Education

## Exhibits/Commercial Support

Exhibitors will include representatives of pharmaceutical companies, instrument companies (including laser and endoscopic equipment), diagnostic equipment companies, publishers, public service companies, and others. We encourage attendees to examine the exhibits for information that may assist in their pursuit of improved patient care. Exhibitor arrangements and commercial support are in compliance with the Accreditation Council for Continuing Medical Education (ACCME) Standards for Commercial Support.

Information presented by exhibitors and oral and poster presenters does not represent an endorsement by the Triological Society.

## Program Evaluation and CME Certificates

Participant comments on program evaluation forms assist Program Advisory Committees in determining the direction of future educational activities. We appreciate your input and request that you complete a program evaluation in exchange for a certificate of attendance. Records are maintained in the Administrative Office of the Society and maintained by the American College of Surgeons for Fellows of the College. Requests may be made by sending a self-addressed envelope to: Triological Society • 13930 Gold Circle, Suite 103 • Omaha, NE 68144 • 402-346-5500

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## **Program Planning and Advisory Committee**

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**President - Jesus E. Medina, MD FACS**  
Oklahoma City, OK

Albert L. Merati, MD FACS  
Seattle, WA

**Program Chair - Greg A. Krempf, MD FACS**  
Oklahoma City, OK

Andrew H. Murr, MD FACS  
San Francisco, CA

Charles W. Beatty, MD FACS  
Rochester, MN

Kerry D. Olsen, MD FACS  
Rochester, MN

Sukgi S. Choi, MD FACS  
Washington, DC

Edmund DeAzevedo Pribitkin, MD FACS  
Philadelphia, PA

Rick A. Friedman, MD  
Los Angeles, CA

David W. Roberson, MD FACS  
Boston, MA

C. Gaelyn Garrett, MD  
Nashville, TN

James E. Saunders, MD  
Lebanon, NH

Stilianos E. Kountakis, MD PhD FACS  
Augusta, GA

Brent A. Senior, MD FACS  
Chapel Hill, NC

David I. Kutler, MD FACS  
New York, NY

David L. Steward, MD FACS  
Cincinnati, OH

Thomas B. Logan, MD FACS  
Henderson, KY

Kathleen L. Yaremchuk, MD  
Detroit, MI

Daniel D. Lydiatt, MD FACS  
Omaha, NE

**Disclosure Information**  
**THE TRIOLOGICAL SOCIETY**  
**116th Annual Meeting**  
**April 12-13, 2013**  
**Orlando, FL**

In accordance with the ACCME Accreditation Criteria, the American College of Surgeons, as the accredited provider of this activity, must ensure that anyone in a position to control the content of the educational activity has disclosed all relevant financial relationships with any commercial interest. Therefore, it is mandatory that both the program planning committee and speakers complete disclosure forms. Members of the program committee were required to disclose **all** financial relationships and speakers were required to disclose any financial relationship **as it pertains to the content of the presentations**. The ACCME defines a 'commercial interest' as "any entity producing, marketing, re-selling, or distributing health care goods or services consumed by, or used on, patients". It does not consider providers of clinical service directly to patients to be commercial interests. The ACCME considers "relevant" financial relationships as financial transactions (in any amount) that may create a conflict of interest and occur within the 12 months preceding the time that the individual is being asked to assume a role controlling content of the educational activity.

ACS is also required, through our joint sponsorship partners, to manage any reported conflict and eliminate the potential for bias during the activity. All program committee members and speakers were contacted and the conflicts listed below have been managed to our satisfaction. However, if you perceive a bias during a session, please report the circumstances on the session evaluation form.

**Please note we have advised the speakers that it is their responsibility to disclose at the start of their presentation if they will be describing the use of a device, product, or drug that is not FDA approved or the off-label use of an approved device, product, or drug or unapproved usage.**

The requirement for disclosure is not intended to imply any impropriety of such relationships, but simply to identify such relationships through full disclosure and to allow the audience to form its own judgments regarding the presentation.

SPEAKERS / MODERATORS/ CHAIRS / DISCUSSANTS	NOTHING TO DISCLOSE	DISCLOSURE (As it pertains to the content of the presentation)
Jeremiah A. Alt, MD PhD	X	
Philip F. Anthony, MD		VertiGONE, Inc. (stock-speaker)
Karam W. Badran, BS	X	
Thomas J. Balkany, MD FACS		Advanced Bionics (educational consultant); Cochlear Americas (medical advisory board)
Charles W. Beatty, MD FACS	X	
Craig A. Buchman, MD FACS		Advanced Bionics (unpaid consultant); Cochlear Corp. (unpaid consultant); MedEl Corp. (unpaid consultant)
Jeffrey M. Bumpous, MD FACS	X	
James K. Byrd, MD		Intuitive Surgical (My fellowship was funded through a grant from Intuitive Surgical to the UPMC Foundation. I receive no direct contribution or additional support.)
Dylan K. Chan, MD PhD	X	
Joseph M. Chen, MD		Advanced Bionics (honorarium-consultant); MedEl (honorarium-consultant); MedEl (research funding-researcher); Neurelec (research funding-researcher)
Anthony L. Chin-Quee, MD	X	
Sukgi S. Choi, MD FACS	X	
Mark S. Courey, MD	X	
Subinoy Das, MD FACS		Acclarent Corporation (speaking fee); Medtronic Corporation (consultant fee); Ohio State University and Nationwide Children's Hospital (potential royalties from successful commercialization of any intellectual property in this thesis, international patent filings)
Anthony G. Del Signore, MD	X	
Fred G. Fedok, MD	X	
Robert L. Ferris, MD PhD FACS	X	
L. Dee Fink, PhD	X	

Shannon C. Fraser, MD	X	
Rick A. Friedman, MD	X	
Maya M. Furman, BA	X	
Bruce J. Gantz, MD FACS		Advanced Bionics Corporation (fee-consultant); Cochlear Corporation (fee-consultant)
C. Gaelyn Garrett, MD	X	
Ankona Ghosh, MD	X	
Christine G. Gourin, MD FACS	X	
Jonathan L. Hatch, MD	X	
Richard E. Hayden, MD	X	
Steven S. Hong, MD	X	
Melissa S. Hu, MD	X	
Stacey L. Ishman, MD MPH	X	
Nausheen M. Jamal, MD	X	
Robert M. Kellman, MD FACS	X	
Katherine A. Kendall, MD	X	
Adam J. Kimple, MD PhD	X	
Matthew L. Kircher, MD	X	
David I. Kutler, MD FACS	X	
Brian J. Lawton, MD	X	
Jason M. Leibowitz, MD	X	
Lawrence R. Lustig, MD FACS		Advanced Bionics Corp. (medical advisory board); MedEl Corp. (surgical advisory board)
Carol J. MacArthur, MD	X	
Hossein Mahboubi, MD MPH	X	
Anna M. Marcinow, MD	X	
Conor W. McLaughlin, BS	X	
Andrew H. Murr, MD FACS		IntersectENT (consultant and minor stockholder)
Jeffrey N. Myers, MD FACS	X	
Kerry D. Olsen, MD FACS	X	
Nitin J. Patel, MD	X	
Rajanya S. Petersson, MD	X	
Swati Pradhan Bhatt, PhD	X	
Edmund A. Pribitkin, MD FACS	X	
Mindy R. Rabinowitz, MD	X	
Tara D. Rachakonda, MD	X	
Wm. Russell Ries, MD FACS	X	
Regina E. Rodman, MD	X	
Jennifer P. Rodney, MD	X	
Jonathon O. Russell, MD	X	
Issam Saliba, MD FRCS	X	
Brent A. Senior, MD FACS	X	
Zachary M. Soler, MD		NIH/NIDCD (salary support-co-investigator)
Heather M. Starmer, MA	X	
David L. Steward, MD FACS		Inspire Medical (research, clinical trial)
Samantha H. Tam, MD	X	
J. Regan Thomas, MD FACS	X	
Brian R. Thomas, MD	X	
Veronique G.S. Wan Fook Cheung, MDCM BSc	X	
Marilene Wang, MD FACS	X	
James C. Wang, BS	X	
Ivan Wayne, MD	X	
Randal S. Weber, MD FACS	X	
William C. Yao, MD	X	
Kathleen L. Yaremchuk, MD	X	
Adam M. Zanation, MD	X	
Sabrina Zapata, MD	X	

PLANNING COMMITTEE	NOTHING TO DISCLOSE	DISCLOSURE (All commercial relationships)
Charles W. Beatty, MD FACS	X	
Sukgi S. Choi, MD FACS	X	
Rick A. Friedman, MD		Otonomy (founder, consultant)
C. Gaelyn Garrett, MD	X	
Stilianos E. Kountakis, MD PhD FACS	X	
Greg A. Krempf, MD FACS	X	
David I. Kutler, MD FACS	X	
Thomas B. Logan, MD FACS	X	
Daniel D. Lydiatt, MD FACS	X	
Jesus E. Medina, MD FACS	X	
Albert L. Merati, MD FACS	X	
Andrew H. Murr, MD FACS		Intersectent (consultant, minor stockholder)
Kerry D. Olsen, MD FACS	X	
Edmund DeAzevedo Pribitkin, MD FACS		Stryker, Inc. (fee-consultant)
David W. Roberson, MD FACS	X	
James E. Saunders, MD	X	
Brent A. Senior, MD FACS		ENTrigue (stock options-consultant); Laurimed (consulting fee, options-consultant); Medtronic (honorarium-consultant); Olympus (honorarium-consultant); Sinuwave (consulting fee-consultant)
David L. Steward, MD FACS		Inspire (research grant-investigator); Veracyte (research grant-investigator)
Kathleen L. Yaremchuk, MD	X	

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# Honorees

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## GUEST OF HONOR

**Robert H. Mathog, MD FACS**



Robert H. Mathog, MD, has been Professor and Chairman of the Department of Otolaryngology at Wayne State University since 1977. He served as WSU Residency Program Director from 1977 to 2012. He also served as Chief of Otolaryngology at Harper and Detroit Receiving Hospitals from 1977 to 2007. Dr. Mathog has been President/Chairman of the Board of the Lions Hearing Center of Michigan (aka Lions Hearing Center of Southeastern Michigan) since 2000. Prior to these appointments Dr. Mathog was an Assistant and Associate Professor at the University of Minnesota and Chief of Otolaryngology at Hennepin County Hospital.

Dr. Mathog was born in New Haven, Connecticut and received his Bachelor of Arts Degree in 1960 from Dartmouth College. He attended Medical School at New York University and had a surgical internship at Duke Hospital. At the same institution he completed one year of surgical residency and three years of Otolaryngology training. In 1969 he joined the United States Air Force School of Aerospace Medicine in Brooks Air Force Base, Texas. During this time he served as medical consultant for the vestibular function laboratory. Board certification in Otolaryngology was obtained in 1971 and in Facial Plastic and Reconstructive Surgery in 1993.

As a specialist in Otolaryngology, Dr. Mathog has achieved an international reputation in facial trauma, cancer and rehabilitative surgery. He has made major innovative contributions to the field and has published over 200 papers and chapters in scientific journals and books on a range of issues dealing with vestibular function, otology, swallowing, scar revision, facial fractures, craniofacial reconstruction for cancer regional flaps for head and neck surgery and post-traumatic deformities. He is well-known for his Textbook of Maxillofacial Trauma, Atlas of Craniofacial Trauma and Mathog's Atlas of Craniofacial Trauma published in 1983, 1992 and 2012 respectively. He has made over 200 national and international presentations.

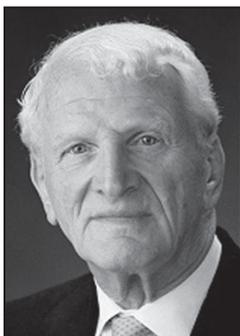
Honors include the Valentine Mott Medal for proficiency and anatomy, multiple citations in Who's Who of the World, America and Midwest and the Award of Merit from the American Academy of Otolaryngology. For his research efforts in vestibular function, research training and rehabilitation of head and neck cancer patients he has been awarded approximately 8 million dollars. Dr. Mathog has served on the Editorial Board of several scholarly journals including the American Journal of Otolaryngology, Laryngoscope, and Otolaryngology-Head and Neck Surgery. He has also been a specialist site visitor for the Residency Review Committee, a member of the Communication Disorders Review Committee of the National Institutes of Health and a member of the National Institute on Deafness and Other Communication Disorders Advisory Council of the National Institutes of Health. He has served as President of the Association for Research in Otolaryngology, Vice-President of the American Academy of Facial Plastic and Reconstructive Surgery, President of the Society of University Otolaryngologists-Head and Neck Surgeons and Vice President of the Triological Society. He is currently an active member of 20 regional and national societies and licensed to practice medicine in Minnesota and Michigan.

Dr. Mathog and his wife, Deena, have been married for 48 years. They have four children: Heather, Tiby, Lauren, and Jason. The Mathogs have made their home for the last 35 years in Franklin, Michigan. Dr. Mathog is an avid fly fisherman and enjoys spending time outdoors.

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## SPECIAL HONORED GUEST

**Eugene N. Myers, MD FACS**



Eugene N. Myers, MD, FACS, FRCS Edin (Hon) is Distinguished Professor and Emeritus Chair in the Department of Otolaryngology at the University of Pittsburgh School of Medicine. He is a graduate of the University of Pennsylvania and Temple University School of Medicine. A residency at Massachusetts Eye and Ear Infirmary--Harvard Medical School was followed by a Fellowship in Head and Neck Surgery with Dr. John Conley in New York.

Dr. Myers became Chairman of the Department of Otolaryngology, University of Pittsburgh School of Medicine in 1972, a position he held for 33 years. He is a specialist in head and neck cancer surgery and is very active in patient care and teaching. He has published hundreds of articles, book chapters, as well as many books on this subject, including Cancer of the Head and Neck considered a classic in the field. He is or has been a member of the Editorial Board of 14 international journals. He is now the American Academy of Otolaryngology-Head and Neck Surgery Regional Advisor to the Balkan Societies. He is past President of the American Board of Otolaryngology, the American Academy of Otolaryngology-Head and Neck Surgery, the American Head and Neck Society, and the American Laryngological Association.

Dr. Myers has devoted a large part of his career to international activities. He was President of the Pan American Association of Otolaryngology-Head and Neck Surgery in 1991, Honorary President of the Israeli Section on Head and Neck Oncology from 1991-1998, and has been Honorary President of the Balkan Society of Otorhinolaryngology Head and Neck Surgery since 2010. Dr. Myers

is an Honorary Member of 20 national Otolaryngology societies, and is an Honorary Fellow of the Royal College of Surgeons of Edinburgh and the Royal Society of Medicine.

Dr. Myers was awarded the Gold Medal of the Comenius University in Bratislava, Slovakia. At the XIX ENT World Congress IFOS 2009 in San Paolo, Brazil, Dr. Myers was awarded a Gold Medal for his work in International Otolaryngology as well as a Gold Medal from the University of Maribor, Slovenia. He is included in the International Who's Who of Professionals.

Dr. Myers is the Director of the International Visiting Scholars Program in the Department of Otolaryngology which hosts 50-75 physicians, residents, fellows, and students from overseas as observers or researchers in our Department.

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## **PRESIDENTIAL CITATION AWARDEE**

### **Paul R. Lambert, MD FACS**



Paul R. Lambert, M.D. graduated from Duke University summa cum laude and Phi Beta Kappa then attended Duke University Medical School, graduating in 1976. His Otolaryngology-Head and Neck Surgery training was completed at UCLA Medical Center in Los Angeles. This was followed by a Fellowship in Otolaryngology-Neurotology at the House Ear Institute in Los Angeles.

Dr. Lambert began his professional career at the University of Virginia in 1982, and was on faculty there until 1999. He was Director of Otolaryngology-Neurotology and became a Professor and Vice-Chairman of the Department. In 1999 he moved to his present position as the Professor and Chair of the Department of Otolaryngology-Head and Neck Surgery and Director of the Otolaryngology-Neurotology Division at the Medical University of South Carolina.

Dr. Lambert has been involved in hearing-related research all his career. In 1987, he published the seminal discovery that inner ear hearing hair cells could regenerate in birds. His subsequent work in this area was widely published in prestigious journals including Science. In 1994 he was awarded The Triological Society's Edmund Prince Fowler Award for work in this field. He has been a recipient of NIH support, including a 5 year Clinical Investigator Development Award.

Dr. Lambert has served on the Board of Directors and as Vice President for the American Academy of Otolaryngology-Head and Neck Surgery. He is currently one of 12 Directors for the American Board of Otolaryngology, and is President-elect of the ABOto. He has been President of the American Neurotology Society, and is currently President of the American Otological Society. He served as Southern Section Vice President for the Triological Society Combined Section meeting in 2013. Dr. Lambert has authored over 130 publications and book chapters, and several textbooks related to ear diseases and ear surgery.

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## **PRESIDENTIAL CITATION AWARDEE**

### **Kerry D. Olsen, MD FACS**



Kerry D. Olsen, M.D., is chair of the Division of Head and Neck Surgery in the Department of Otolaryngology at Mayo Clinic and medical director of the Mayo Clinic Dan Abraham Healthy Living Center. He is a member of Mayo Clinic Board of Governors and Mayo Clinic Board of Trustees. He is former president of Mayo Clinic staff. Dr. Olsen oversaw for 15 years the construction and planning of numerous major facility projects at Mayo Clinic including the Gonda project and the Dan Abraham Healthy Living Center.

Dr. Olsen received a B.A. degree in economics from Northwestern University and the M.D. degree from the first graduating class of Mayo Medical School. He completed an internship in general surgery and a residency in otolaryngology at Mayo Graduate School of Medicine and facial plastic surgery training at the Massachusetts Eye and Ear Infirmary. He holds the academic rank of professor of Otolaryngology and Head and Neck Surgery in the Mayo College of Medicine.

He has been named Teacher of the Year multiple times and is in the Mayo Fellows Association Teaching Hall of Fame. He has also been recognized as a Distinguished Mayo Clinician.

His publications number over 200 and he has championed surgical approaches for the removal of head and neck tumors that are commonly used today. He is widely recognized for his surgical practice, which is devoted exclusively to head and neck surgery and is one of the largest head and neck surgical practices in the country.

His greatest source of satisfaction is his family, a wonderful wife, four children, and a growing number of grandchildren. Dr. Olsen is often found enjoying his lake home, exercising regularly, or traveling on adventurous outdoor trips around the globe.

## PRESIDENTIAL CITATION AWARDEE

### Ashok R. Shaha, MD FACS



Dr. Ashok Shaha is an Attending Head and Neck Surgeon at Memorial Sloan-Kettering Cancer Center, Jatin P. Shah Chair in Head and Neck Surgery, and Professor of Surgery. Dr. Shaha completed his surgical training in India and his head and neck fellowship at Memorial Hospital. He joined the Department of Surgery at Downstate Medical Center in 1982 as a Head and Neck Surgeon, rising to the rank of Professor of Surgery in 1992.

During his post-graduate training, Dr. Shaha secured several gold medals and was given the Golden Apple Teaching Award. Other awards Dr. Shaha received include: Faculty Member of the AOA Honor Medical Society, the Outstanding Teacher Award at Memorial hospital in 1996, the Honor Award from the American Academy of Otolaryngology/Head and Neck Surgery. He has been President of the New York Head and Neck Society, the American Society for Surgeons of Indian Origin, and the Brooklyn Surgical Society. He was Co-President of the American Head and Neck Society, 1998-1999, and was President of the New York Cancer Society, 1999-2000 and President of the New York Surgical Society, 2004-2005. He is a member of many scientific organizations and serves on the editorial board of several high impact journals. He was the Program Chairman

for the Fifth International Head and Neck Oncology Meeting in San Francisco (2000) and served as the Conference Chairman for the Sixth International Head and Neck Meeting in 2004. Recently Dr. Shaha was the recipient of the Distinguished Service Award by the American Academy of Otolaryngology-Head and Neck Surgery; he was recently President of the American Association of Endocrine Surgeons. Recently he was elected to the American Surgical Association.

Dr. Shaha has been academically active at national and international meetings, with approximately 585 papers, 435 of which are peer reviewed. He has 140 published abstracts, 63 posters and 45 scientific exhibits. His research interests include tracheal reconstruction and an experimental model of tracheomalacia and thyroid cancer.

Dr. Shaha has dedicated his professional career to the training of medical students and residents and has developed a preceptorship program at Cornell University Medical College in head and neck training for medical students. He was Chairman of the Advanced Training Council for Head and Neck Oncology Fellowships in the USA for the past ten years.

## PRESIDENTIAL CITATION AWARDEE

### James Y. Suen, MD



Dr. Suen is a 1966 graduate of the College of Medicine at the University of Arkansas. Following his Residency in Otolaryngology at the University of Arkansas for Medical Sciences, as a Captain in the United States Air Force, he completed a Fellowship at the Armed Forces' Institute of Pathology in Washington, D.C. He was next accepted as the first Otolaryngologist in the Head and Neck Surgery Fellowship at the M.D. Anderson Cancer Center. After seven months he became a Faculty member. When the chair of the Department of Otolaryngology at Arkansas became vacant, Dr. Suen was recruited to become the chair. He has been the Chairman of the University of Arkansas for Medical Sciences for the past 38 years.

He was the co-editor of 4 Textbooks, Cancer of the Head and Neck, with Dr. Eugene Myers. He also co-edited a textbook, Emergencies in Otolaryngology, and another titled, Hemangiomas and Vascular Malformations of the Head and Neck. He also has published over 150 articles and book chapters.

In 1990 he was awarded the Distinguished Faculty Award at the University of Arkansas for Medical Sciences. He was the personal physician for President William J. Clinton during his Presidency and continues to treat him. He was awarded the Distinguished Alumnus Award by the M.D. Anderson Cancer Center in 1995. In 1998 he was the recipient of the 25th Annual Award from the Chinese Hospital of San Francisco for the most outstanding Chinese-American physician in Medical Science. An Endowed Chair was named for him in 1996, and in 2000 he was named the Gerald F. Hamra Distinguished Professor in Otolaryngology. He has been listed in every edition of the Best Doctors in America, America's Top Doctors for Cancers, and Top Surgeons in the United States. In 2007 he was awarded the status of Distinguished Professor at the University of Arkansas for Medical Sciences.

Dr. Suen was the president of the American Head and Neck Society in 1993 and served on the Board of Directors of the American Academy of Otolaryngology from 1997 to 2001.

Dr. Suen helped to popularize the modified neck dissection and the classification of neck dissections. His primary interests have been the treatment of head and neck cancer and also the management of vascular anomalies.

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**OGURA LECTURER**  
**Randal S. Weber, MD FACS**



Randal S. Weber, MD FACS is a renowned surgeon and expert in the treatment of patients with head and neck cancer. He is Chairman of the Department of Head and Neck Surgery, with a joint appointment as Professor, Department of Radiation Oncology, at The University of Texas MD Anderson Cancer Center in Houston, Texas, and is Adjunct Professor, Department of Otolaryngology-Head and Neck Surgery, at Baylor College of Medicine in Houston. He is the recipient of the John Brooks Williams and Elizabeth Williams Distinguished University Chair in Cancer Medicine. A leader in healthcare initiatives to improve cancer care, Dr. Weber has been instrumental in the establishment of performance driven processes and evidence based medicine for patients with head and neck cancer. In addition to maintaining a busy clinical schedule, he remains closely involved in the development and oversight of several training fellowships. He is active in clinical research investigating various head and neck cancers and is a pioneer in the use of organ sparing oncologic techniques. Highly sought after for his expertise and professional insights, Dr. Weber has been the guest lecturer and visiting professor on more than 80 occasions in the United States and internationally and has led numerous courses and seminars.

Dr. Weber was honored as the Hayes Martin Lecturer and recipient of the Distinguished Service Award at the April 2011 meeting of the American Head and Neck Society. He has served as President of the Society of University Otolaryngologists-Head and Neck Surgeons, the American Radium Society, and the American Head and Neck Society. He is currently a Director on the American Board of Otolaryngology and Chair of the Head and Neck Surgery Committee of the Radiation Therapy Oncology Group. Dr. Weber is a prolific author whose works include scientific articles, book chapters, and textbooks. He is the immediate past Editor in Chief of Head & Neck: Journal for the Sciences and Specialties of the Head and Neck, is an Associate Editor for Cancer, and serves on the editorial boards of American Journal of Rhinology; Clinical Medicine Insights: Ear, Nose and Throat; and Head & Neck. Dr. Weber will present the Ogura Lecture "Training Head and Neck Surgeons in the 21st Century: Is It Time for a New Paradigm?" on Friday at 1:00.

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**KEYNOTE SPEAKER**  
**L. Dee Fink, PhD**



Dr. L. Dee Fink is a nationally and internationally recognized consultant on college teaching and faculty development.

After receiving his doctorate from the University of Chicago in 1976, he accepted a faculty position at the University of Oklahoma. In 1979 he founded the Instructional Development Program at the University of Oklahoma and served as its director until his retirement from Oklahoma in May 2005. In 2004-2005, he served as president of the POD Network (Professional and Organizational Development) in Higher Education, the primary professional organization for faculty developers in the US.

He is the author of *Creating Significant Learning Experiences: An Integrated Approach to Designing College Courses* (Jossey-Bass, 2003).

Dr. Fink will present his Keynote Address "The Joy and Responsibilities of Teaching Well" on Saturday at 9:20. His presentation will address what faculty can and need to do to experience the deep, personal joy and fulfill one's social responsibility to students and society that comes not just from teaching but from teaching well.

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## **Thesis Award Winners**

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### **Harris P. Mosher Award**

**Joseph M. Chen, MD, Toronto, ON Canada**

*Cost Utility Assessment of Bilateral Cochlear Implantation: A Health Economic Evaluation in Adults from the Perspective of a Publicly Funded Program*

### **Harris P. Mosher Award**

**Adam Mikial Zanation, MD, Chapel Hill, NC**

*How Does Coordinated Multidisciplinary Care Impact Head and Neck Tumor Treatment Planning? A Prospective Evaluation of a Multidisciplinary Tumor Conference*

### **Edmund Prince Fowler Award**

**Subinoy Das, MD FACS, Columbus, OH**

*Improving Patient Care via a Protein Based Diagnostic Test for Microbe Specific Detection of Chronic Rhinosinusitis*

### **Honorable Mention for Basic Science Award**

**John D. Macias, MD FACS, Phoenix, AZ**

*Differential Gene Expression in Cholesteatoma by DNA Chip Analysis*

### **Honorable Mention for Clinical Research Award**

**Amy Y. Chen, MD FACS, Atlanta, GA**

*Temporal Trends in Oropharyngeal Cancer Treatment and Survival: 1998 - 2009*

### **Honorable Mention for Clinical Research Award**

**Sam Joseph Daniel, MD MSC, Montreal, PQ Canada**

*Outcomes of an Innovative Ambulatory Minimally Invasive Botulinum Toxin Injection Technique in a Cohort of Drooling Children*

### **Honorable Mention for Clinical Research Award**

**Tanya Kim Meyer, MD BS, Seattle, WA**

*Voice Disorders in the Workplace: Productivity in Spasmodic Dysphonia and the Impact of Botulinum Toxin*

### **With Distinction Award**

**Joseph A. Brennan, MD FACS, Ft. Sam Houston, TX**

*Head and Neck Trauma in Iraq and Afghanistan: Different War, Different Surgery, Lessons Learned*

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## **New Fellows to Be Inducted**

New Fellow Ceremonies followed by the reception with Triological Fellows is scheduled on Friday, April 12th from 7:00 - 7:55 am in Mediterranean Ballroom 4.

<b>Pete S. Batra, MD FACS</b> .....	Dallas, TX
<b>Joseph A. Brennan, MD FACS</b> .....	Ft. Sam Houston, TX
<b>Paul F. Castellanos, MD</b> .....	Birmingham, AL
<b>Amy Y. Chen, MD FACS</b> .....	Atlanta, GA
<b>Joseph M. Chen, MD</b> .....	Toronto, ON Canada
<b>Sam Joseph Daniel, MD MSC</b> .....	Montreal, PQ Canada
<b>Subinoy Das, MD FACS</b> .....	Columbus, OH
<b>Soha Nadim Ghossaini, MD FACS</b> .....	Hershey, PA
<b>Ho-Sheng Lin, MD FACS</b> .....	Detroit, MI
<b>Sandra Y. Lin, MD</b> .....	Baltimore, MD
<b>John D. Macias, MD FACS</b> .....	Phoenix, AZ
<b>Tanya Kim Meyer, MD BS</b> .....	Seattle, WA
<b>Kourosh Parham, MD PhD</b> .....	Farmington, CT
<b>Michael J. Pitman, MD</b> .....	New York, NY
<b>Diego Alfonso Preciado, MD PhD</b> .....	Washington, DC
<b>Udayan K. Shah, MD</b> .....	Wilmington, DE
<b>Abtin Tabaei, MD</b> .....	New York, NY
<b>Adam Mikial Zanation, MD</b> .....	Chapel Hill, NC

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# Harris P. Mosher Award Citation

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In recognition of the excellence of his/her Candidate's Thesis in Clinical Research, the Society confers upon \_\_\_\_\_ the Harris P. Mosher Award.

This honor was created to perpetuate the ideals of the great teacher for whom it was named and to bestow upon a worthy recipient the responsibility of furthering the highest standards of perfection in the study, teaching and practice of Otolaryngology.

In witness whereof the Society has caused this certificate to be signed and its seal affixed on the \_\_\_\_\_ day of \_\_\_\_\_, Two Thousand and Thirteen.

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## Recipients

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1957	Harold G. Tabb, MD	1985	Frank E. Lucente, MD
1958	Jack V.D. Hough, MD John A. Kirchner, MD	1986	Harold C. Pillsbury, MD
1959	Maurice Schiff, MD	1987	James N. Thompson, MD
1960	Walter A. Petryshyn, MD Alex Weisskopf, MD	1988	Thomas V. McCaffrey, MD
1961	Godfrey E. Arnold, MD	1989	Arnold Komisar, MD Bernard R. Marsh, MD
1962	Wesley E. Compere, MD	1990	Patrick J. Gullane, MD
1963	Edward G. McCoy, MD William W. Montgomery, MD Henry J. Rubin, MD	1991	Robin T. Cotton, MD
1964	Hugh O. Barber, MD	1992	Myles L. Pensak, MD
1965	Brian F. McCabe, MD	1993	Ronald A. Hoffman, MD
1966	No award	1994	Robert Sofferman, MD
1967	Frank N. Ritter, MD George T. Singleton, MD	1995	Fred Herzon, MD
1968	Leslie Bernstein, MD	1996	Stimson P. Schantz, MD
1969	David A. Hilding, MD Lindsay Lee Pratt, MD	1997	Scott C. Manning, MD
1970	Herbert H. Dedo, MD	1998	No award
1971	Byron J. Bailey, MD	1999	Dennis S. Poe, MD
1972	Hugh F. Biller, MD	2000	Lyon L. Gleich, MD David J. Terris, MD
1973	Mark May, MD Andrew W. Miglets, MD	2001	Joseph G. Feghali, MD
1974	Robert W. Cantrell, MD	2002	Wendell G. Yarbrough, MD
1975	Donald G. Sessions, MD	2003	Edwin M. Monsell, MD PhD
1976	No award	2004	Craig A. Buchman, MD
1977	Donald B. Hawkins, MD	2005	Francisco J. Civantos, MD
1978	Robert A. Jahrsdoerfer, MD	2006	Henry T. Hoffman, MD Dana M. Thompson, MD
1979	Arnold M. Noyek, MD	2007	Erin D. Wright, MD
1980	H. Bryan Neel, MD	2008	Robert C. O'Reilly, MD
1981	Bruce A. Feldman, MD	2009	Steven J. Wang, MD
1982	Roger L. Crumley, MD	2010	Adrian L. James, MD
1983	S. George Lesinski, MD	2011	Robert L. Ferris, MD PhD
1984	Irwin F. Stewart, MD	2012	Nira A. Goldstein, MD MPH Judith E.C. Lieu, MD MSPH
		2013	Joseph M. Chen, MD Adam Mikial Zanation, MD

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## **Harris P. Mosher 1867-1954**

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Highly respected, feared yet revered by his students, Dr. Mosher attended Harvard College and the Harvard Medical School, receiving his MD degree in 1896. There were no formal residency training programs then, so he sought training at the best ear, nose and throat centers in Germany, namely, with Jansen in Berlin and Grunert in Halle. After returning home, Mosher became associated with the Massachusetts Eye and Ear Infirmary and the Harvard Medical School as an instructor in the department of anatomy.

He started the first course in sinus anatomy in the United States. This course was to become famous for its content and its progenitor and was appropriately named "Mosher's course". It endured for 35 years.

In 1919 he was appointed Professor of Laryngology at the Harvard Medical School and Chief of Laryngology at the Massachusetts General Hospital. In 1932 he was appointed to the Walter Augustus LaCompte Chair of Otology at Harvard and at age 66 became the second individual to hold two chairs at Harvard. Dr. Mosher was a member and became the president of all of our prominent national otolaryngology societies. When the American Board of Otolaryngology was formed in 1924 (the second certification board after ophthalmology in 1917\*) he was chosen as its president and served in that capacity for 25 years. He was the recipient of the Semon Medal from the Royal Society of Medicine of London, the Gold Medal from the American Laryngological Association, and a service medal from the American Academy of Ophthalmology and Otolaryngology. He is known for his intranasal ethmoidectomy technique and his method for the removal of safety pins swallowed by babies, for which he was given a citation by the American College of Surgeons in 1934.

\*Deliberations and progress in our specialty were interrupted by World War I. Also, there was growing resistance to authority to regulate specialty education and training—in essence, the transition from apprenticeships to formal training programs as we know them today. The need was urgent because some form of evaluation of physicians was needed to supplement the general licensing regulations of the various states' Boards of Public Health.

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# Edmund Prince Fowler Award Citation

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In recognition of the excellence of his/her Candidate's Thesis in Basic Research, the Society confers upon \_\_\_\_\_ the Edmund Prince Fowler Award.

This honor was created to perpetuate the ideals of the great teacher for whom it was named and to bestow upon a worthy recipient the responsibility of furthering the highest standards of perfection in the study, teaching and practice of Otolaryngology.

In witness whereof the Society has caused this certificate to be signed and its seal affixed on the \_\_\_\_ day of \_\_\_\_\_, Two Thousand and Thirteen.

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## Recipients

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1971	Richard R. Gacek, MD	1992	Vanessa G. Schweitzer, MD
1972	Duane W. Nagle, MD	1993	Ralph F. Wetmore, MD
	Raimund G. Rueger, MD	1994	Paul Lambert, MD
1973	Robert J. Ruben, MD	1995	Michael Pratt, MD
1974	Robert I. Kohut, MD	1996	P. Ashley Wackym, MD
	Willard B. Moran, Jr., MD	1997	Allen Hillel, MD
	Gershon J. Spector, MD		D. Bradley Welling, MD
1975	Gregory J. Matz, MD	1998	No award
	Richard L. Vorhees, MD	1999	Debra L. Tucci, MD
1976	Shokri Radpour, MD	2000	Rick A. Friedman, MD
1977	LaVonne Bergstrom, MD		Michael D. Seidman, MD
1978	Diran O. Mikaelian, MD	2001	J. Christopher Post, MD
1979	William L. Meyerhoff, MD	2002	Richard D. Kopke, MD
	Clarence T. Sasaki, MD	2003	Chung-Ku Rhee, MD PhD
1980	Robert A. Schindler, MD	2004	Shawn D. Newlands, MD
1981	Don E. Gebhart, MD	2005	Steven W. Cheung, MD
1982	Michael E. Johns, MD	2006	Alan G. Micco, MD
1983	Bruce W. Jafek, MD	2007	Bradley W. Kesser, MD
1984	David E. Schuller, MD	2008	Eric M. Genden, MD
1985	Marvin P. Fried, MD		Marlan R. Hansen, MD
1986	Michael Friedman, MD	2009	Ravindhra G. Elluru, MD PhD
1987	Stanley M. Shapshay, MD		Andrew P. Lane, MD
1988	Timothy T.K. Jung, MD	2010	Philip D. Littlefield, MD
1989	Robert T. Sataloff, MD	2011	Stacey L. Halum, MD
1990	Soly Baredes, MD	2012	Quyên T. Nguyen, MD PhD
1991	Douglas E. Mattox, MD	2013	Subinoy Das, MD FACS

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## **Edmund Prince Fowler 1872-1966**

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It says something about the intellectual wealth of the Triological Society that Edmund Prince Fowler, Sr., MD, succeeded Max Goldstein, MD, as president in 1932. Both were giants in otology, prolific authors and advocates for the hard of hearing. In honor of Dr. Fowler's contributions to otolaryngology, the Society established The Edmund Prince Fowler Award in 1971, given each year for the best thesis in basic research.

After earning his MD from Columbia University, Dr. Fowler joined the Manhattan Eye and Ear Hospital and became a clinical professor at Columbia University in 1933. He was a decorated colonel of World War I. He was president of the American Otological Society in 1937, recipient of the first Award of Merit from that society in 1952 and founder of the first hearing center in the United States (in New York City). To the legacy of the prodigious researcher and "Dean of Audiology", as he was called, we attribute the invention of the modern clinical audiometer. He tested many patients and soon became aware of the fact that some patients with severe or unilateral losses had suprathreshold hearing values, a condition he coined as "recruitment". This clinical finding resulted in the Alternate Binaural Loudness Balance test, the first to separate cochlear from retrocochlear losses.

In his address to the sections in January 1932, Dr. Fowler described specific recommendations for hearing tests on schoolchildren. He also asked his colleagues to be thoughtful: "Let us not forget to treat the patient as a sensitive human being," he said, "and aid him in surmounting the drawbacks and psychological reactions to his disability."

At the 38th Annual Meeting in Atlantic City, NJ, in 1932, Dr. Fowler shared the spotlight with Edward B. Dench, MD, first president of the Triological, then 72 years old. (Dr. Dench had been named Honorary President of the Society in 1931 until his death in 1936.) At the meeting George Richards, MD, editor of the Transactions, outlined a list of guidelines for submissions. During the same meeting the council approved a resolution supporting the ABO and its work in raising educational standards in the specialty as part of an effort to stem the tide of proposals for examinations for specialists by each of the 48 states.

Dr. Fowler died in 1966, six months after the last of his 113 papers was presented (at 94 years of age!) at a meeting of the American Otological Society.



**TRIOLOGICAL SOCIETY**  
**116th ANNUAL MEETING PROGRAM**  
**APRIL 12-13, 2013**  
**JW MARRIOTT GRANDE LAKES, ORLANDO, FL**  
**FRIDAY, APRIL 12, 2013**

**7:00 - 7:50**      *Business Meeting (Fellows Only) - Mediterranean 4*  
*New Fellow Induction Ceremonies and Member Reception*

**8:00 - Noon Scientific Sessions**  
***Mediterranean 4***

**8:00**              **WELCOME/OPENING REMARKS BY PRESIDENT**  
Jesus E. Medina, MD FACS\*, Oklahoma City, OK

**INTRODUCTION AND AWARDING OF PRESIDENTIAL CITATIONS**

Kerry D. Olsen, MD FACS\*, Rochester, MN  
Ashok R. Shaha, MD FACS\*, New York, NY  
James Y. Suen, MD, Little Rock, AR  
Paul R. Lambert, MD FACS\*, Charleston, SC

**INTRODUCTION OF GUEST OF HONOR**

Robert H. Mathog, MD FACS\*, Detroit, MI

**INTRODUCTION OF SPECIAL HONORED GUEST**

Eugene N. Myers, MD FACS\*, Pittsburgh, PA

**8:25**              **PRESIDENT'S ADDRESS**

**The Relevance of the Triological Society Today and Tomorrow**

Jesus E. Medina, MD FACS\*, Oklahoma City, OK

**INTRODUCTION AND AWARDING OF TRIOLOGICAL SOCIETY GOLD MEDAL**

to Harold C. Pillsbury, MD FACS\*, Chapel Hill, NC

**8:40**              **CO-MOSHER AWARD FOR TRIOLOGICAL THESIS**

**Cost Utility Assessment of Bilateral Cochlear Implantation: A Health Economic Evaluation in Adults from the Perspective of a Publicly Funded Program**

Joseph M. Chen, MD, Toronto, ON Canada

**Educational Objective:** At the conclusion of this presentation, the participants should be able to 1) understand the basic concept of a cost utility study and its relevance; and 2) apply the outcome of this study to the current practice of bilateral cochlear implantation, vis-a-vis the healthcare environment.

**Objectives:** Determine cost-effectiveness of bilateral sequential cochlear implantation (CI) in deaf adults. **Methods:** Cost utility analysis (CUA) was performed on 4 subject groups (n=142): pre-implant candidates (30), unilateral implantees (30), bilateral implantees (30), and healthcare professionals (52). Base case was established using the Health Utility Index (HUI) to generate scenario based estimates. Three other preference instruments (EQ5D, Visual Analog Scale, and Time-Trade-Off) were used to provide a broader range of estimates. Costs reflected the burden on the Ministry of Health over 25 years. Discounting and sensitivity analyses were applied. **Results:** Total costs were \$63,632 (unilateral CI), \$111,764 (bilateral CI), and \$48,132 (incremental cost of a second CI). Utility gained from no intervention to unilateral implantation, and to bilateral implantation were 0.270 and 0.305. Gain from the second device was 0.035. Incremental cost utility ratio (ICUR) of \$14,658/QALY for bilateral CI compared to no intervention suggested excellent cost effectiveness. ICUR was \$55,020/QALY for bilateral CI compared to unilateral CI, which approximates the current benchmark in willingness to pay. ICUR can be improved with differential discounting, price reduction of the second device, and reduced frequency of upgrades. ICUR improvements were dramatic with the use of other preference instruments, while the HUI provided the most conservative estimates. **Conclusions:** Sequential bilateral CI is cost effective in adults when compared to no inter-

\* Denotes Fellow

vention although gains are made mostly by the first implant. Comparing with unilateral CI, the cost effectiveness of the second implant can be significantly improved through variations from the base case to reflect long term gains, or cost saving measures.

**8:50 CO-MOSHER AWARD FOR TRIOLOGICAL THESIS**  
**How Does Coordinated Multidisciplinary Care Impact Head and Neck Tumor Treatment Planning? A Prospective Evaluation of a Multidisciplinary Tumor Conference**  
Adam M. Zanation, MD, Chapel Hill, NC

**Educational Objective:** At the conclusion of this presentation, the participants should be able to describe the benefits and the magnitude of treatment changes made to head and neck tumor patients after discussion at a head and neck multidisciplinary tumor board.

**Objectives:** Multidisciplinary tumor conference (MDTCs) are often utilized in the treatment plan for head and neck cancer, but rigorous prospective studies demonstrating their efficacy are lacking. To evaluate this, we hypothesize that patients with head and neck tumors that are presented at MDTCs will have significant changes to their diagnosis, workup, stage, and treatment plan as a direct result of MDTC discussion. Additionally, we hypothesize that patient demographics and disease related factors influence the odds of such a change occurring due to a MDTC. Specifically, we evaluated a series of objectives by comparing pre- and post-MDTC discussion data in a prospective observational clinical trial. These objectives are as follows: objective 1: characterize the frequency and quality of changes in histopathological diagnosis after re-review of the pathological specimens at the MDTC; objective 2: characterize the frequency and quality of changes in tumor staging after re-review of radiological images with clinical correlation at the MDTC; objective 3: characterize the frequency and quality of treatment changes and additional workup that are made due to MDTC discussion; and objective 4: analyze patient factors that correlate with higher odds of having treatment changes due to MDTC discussion. **Study Design:** IRB approved, prospective observational clinical trial. **Methods:** The pre- and post-conference diagnosis, staging, and treatment plan were recorded by multiple independent observers for 413 case presentations of new head and neck tumor patients at a tertiary care center MDTC. Fisher's exact tests and odds ratios compared the malignant and benign cohorts, high (III and IV) and low (I and II) stage malignancies, node positive and negative disease, squamous cell cancer (SCCa) and non-SCCa malignancies and patient demographic factors related to MDTC changes. **Results:** 413 patients with new presentations of head and neck tumors were enrolled and fully met inclusion criteria. At initial MDTC presentation, tumor diagnoses included 69% malignant, 21% benign, and 9% indeterminate. After MDTC discussion, 27% of cases were recommended to have additional workup, 12% had a change in histopathological diagnosis, and 34% were recommended to have an intermodality treatment change (ITC) or intramodality approach change (IAC). Of the patients with malignant disease, 7% had a change in overall stage. Malignant tumors had higher odds of a change in treatment (OR=3.5, p=0.0003) relative to benign tumors. Of the malignancies, the MDTC resulted in more changes in treatment decisions in high versus low stage disease (OR=2.5, p=0.006). **Conclusions:** Head and Neck MDTCs result in total treatment changes in 34% of head and neck tumor patients. With expertise in multiple methods of diagnosis (neuro-radiology and pathology) and treatment (surgeons, radiation oncology and medical oncology), the MDTC provides a collaborative atmosphere that optimizes diagnosis, staging, and treatment planning for patients with head and neck tumors. Changes in management due to an MDTC occur significantly more often in patients with malignant and high stage disease.

**9:00 FOWLER AWARD FOR TRIOLOGICAL THESIS**  
**Improving Patient Care Via a Protein-Based Diagnostic Test for Microbe-Specific Detection of Chronic Rhinosinusitis**  
Subinoy Das, MD FACS, Columbus, OH

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand how the validation of biomarkers for bacterial sinusitis may lead to the development of a rapid, point-of-care medical diagnostic test to assist in the diagnosis and treatment of CRS.

**Objectives:** The hypothesis is that signature bacterial proteins can be identified in sinus secretions via high-throughput, proteomic based techniques. Non-typeable *haemophilus influenzae* (NTHI) is the most common bacterial pathogen associated with sinusitis and will serve as a proof of principle pathogen for identifying biomarkers. **Study Design:** *In vitro* and *in vivo* studies using proteomic based analysis of bacterially infected fluids and a novel, experimental chinchilla polymicrobial sinusitis model. **Methods:** Nano-liquid chromatography/tandem mass spectrometry (nano-LC-MS/MS) was performed to annotate the secretome from an NTHI biofilm. A model of NTHI induced sinusitis was developed in a chinchilla and NTHI proteins were detected in chinchilla secretions. A reference standard RT-PCR based assay was adapted to allow for sensitivity and specificity testing of the identified signature biomarkers in human patients. **Results:** Outer membrane proteins P2 (OMP-P2) and P5 (OMP-P5) were identified as promising candidates for detection of NTHI biofilms and positively detected in nasopharyngeal secretions of chinchillas experimentally infected with NTHI. An RT-PCR based test for the presence of NTHI biofilms demonstrated 100% sensitivity and 100% specificity against 8 different strains commonly found in human bacterial rhinosinusitis. **Conclusions:** Proteomic analysis was successful in identifying signature proteins for possible use as a biomarker for CRS. OMP-P2 and OMP-P5 were validated as promising candidates and were positively detected from nasopharyngeal secretions from chinchillas experimentally infected with NTHI. Collectively, these data support the use of OMP-P2 and OMP-P5 in a human clinical trial to develop a point of care medical diagnostic test to assist in the diagnosis and treatment of CRS.

**9:10 Q&A**

9:15 - 9:45 *Break with Exhibitors/Poster Viewing*

## 9:45 - Noon Scientific Sessions

### 9:45 - Noon Concurrent Session I - Otology, Pediatrics *Mediterranean 4*

Moderators: Sukgi S. Choi, MD FACS\*, Washington, DC  
Rick A. Friedman, MD\*, Los Angeles, CA

9:45 **The Clinical Effect of Freehand Epley Maneuver vs. Visual Feedback Guided Epley Maneuver Variability and Accuracy**  
Philip F. Anthony, MD\*, Fort Worth, TX

**Educational Objective:** At the conclusion of this presentation, the participants should be aware of the decreased BPPV resolution after inaccurate in Epley maneuver performance.

**Objectives:** Objective measurement of freehand canalith repositioning (Epley) maneuver vs. visual feedback guided Epley maneuver performance is reported. Faster resolution of positional vertigo with accurate vs. inaccurate Epley maneuvers is hypothesized. **Study Design:** Direct measurement. Single blinded multicenter cross-over study. **Methods:** Digital recording of a subject's head position was recorded during classic Epley maneuvers. Fourteen (14) performers executed recorded freehand and visual feedback guided Epley maneuvers. Differences in accuracy and consistency were documented. A study was performed using accurate visual feedback guided Epley maneuver vs. 20 degree inaccurate visual feedback guided Epley maneuvers on 60 patients in three otologic practices. **Results:** Fourteen (14) individual performers freehand Epley maneuvers error varied +/- 47 degrees and visual feedback guided Epley maneuvers error varied +/- 4 degree. Visual feedback guided classic and 20 degree inaccurate (+/- 4 degrees) Epley maneuvers were performed on patients with classic positional vertigo. Accurate Epley maneuvers were more effective than inaccurate Epley maneuvers in resolving rotary nystagmus. **Conclusions:** Clinical variation decreases and accuracy increases in Epley maneuvers using accurate visual feedback guidance. Accurate visual feedback guided Epley maneuvers are more effective than 20 degree error Epley maneuvers in resolving rotary nystagmus.

9:53 **GJB2 Associated Hearing Loss: Systematic Review of Worldwide Prevalence, Genotype, and Auditory Phenotype**  
Dylan K. Chan, MD PhD, Stanford, CA; Kay W. Chang, MD\*, Stanford, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the worldwide distribution and variable audiometric characteristics of GJB2 (Connexin-26) associated hearing loss. They should realize that the hearing loss phenotype, in terms of severity, symmetry, and risk of progression, varies highly with the exact mutations involved, and that these mutations correlate strongly with patient ethnicity. Finally, they will appreciate the future direction that research should lead in order to better understand, prognosticate, and treat this very common and highly variable type of congenital hearing loss, especially as they treat more ethnically diverse patient populations.

**Objectives:** To perform a systematic review of GJB2 associated hearing loss to describe worldwide genotype distributions and carrier frequencies of common mutations, as well as determine rates of asymmetric and progressive hearing impairment. **Study Design:** Systematic review and meta-analysis of case series and case control studies. **Methods:** PubMed was searched systematically to screen broadly for any study reporting on genotype and carrier frequencies for biallelic GJB2 associated hearing loss in defined populations around the world. Genotype and audiometric data were extracted and subjected to meta-analysis to determine overall genotype distributions, carrier frequencies in the general population, and rates of asymmetric or progressive hearing loss. **Results:** 245 articles comprising over 23,000 hearing loss probands were included in the study. The prevalence of biallelic GJB2 associated hearing loss was consistent across over 50 countries around the world, with different mutations being predominant in different countries. Common mutations were found in greater than 3% of the general population worldwide. Meta-analysis of 29 case control studies demonstrated a three-fold higher carrier frequency among hearing impaired individuals compared to normal hearing controls. Progression and asymmetry were present in 18% and 12% of individuals with GJB2 associated hearing loss, respectively. **Conclusions:** GJB2 mutations are highly prevalent around the world. The variety of predominant mutations in different populations attests to the importance of this gene for normal cochlear function. The unusually high carrier rate among hearing impaired individuals suggests either a carrier phenotype or as yet undiscovered complementary mutations. The significant rate of asymmetry and progression highlights the importance of close clinical followup for this highly variable condition.

**10:01 Utility and Cost Analysis of Cholesteatoma Specimen Pathologic Confirmation**  
Matthew L. Kircher, MD, Farmington Hills, MI; Seilesh C. Babu, MD, Farmington Hills, MI; Prasad John Thottam, DO, Farmington Hills, MI

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the utility and cost analysis of cholesteatoma specimen pathologic confirmation and make an informed decision on whether to routinely request these pathology services.

**Objectives:** To evaluate correlation between surgeon intraoperative findings and pathologic confirmation of cholesteatoma specimen and the associated healthcare expenditures in requesting pathologic evaluation. **Study Design:** Retrospective chart analysis. **Methods:** Chart data collected at tertiary neurotology referral center from patients undergoing tympanomastoidectomy for chronic otitis media over the past 2 years. All specimens sent for pathologic evaluation were reviewed. Correlation between surgeon intraoperative findings and pathologic diagnosis was evaluated. Cost analysis per procedure with or without pathologic consultation was also reviewed. **Results:** There is a strong correlation between surgeon intraoperative findings and pathologic diagnosis of cholesteatoma after tympanomastoidectomy. Pathologic confirmation of cholesteatoma specimen after tympanomastoidectomy increases total cost of the procedure and does not alter medical decision making. No malignant specimens were identified in cases with suspected cholesteatoma. **Conclusions:** Intraoperative findings of evident cholesteatoma are in general adequate to confirm diagnosis in patients undergoing tympanomastoidectomy without pathologic confirmation. The increased cost of routine pathologic confirmation of cholesteatoma specimens should be considered in future healthcare cost containing measures, as the clinical utility of routine pathologic confirmation of cholesteatoma appears to be low.

**10:09 Otologic Manifestations of a Novel Form of Hearing Loss Due to Loss of Function of SLITRK6**  
Mindy R. Rabinowitz, MD, Philadelphia, PA; Thierry Morlet, PhD, Wilmington, DE; Robert C. O'Reilly, MD\*, Wilmington, DE; Erik G. Puffenberger, PhD, Strasburg, PA; D. Holmes Morton, MD, Strasburg, PA; Kevin A. Strauss, MD, Strasburg, PA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the clinical otologic manifestations secondary to a loss of function mutation to SLITRK6.

**Objectives:** The Slitrk family consists of neuronal transmembrane proteins that control neurite outgrowth. In mice, SLITRK6 plays a role in the survival and innervation of sensory neurons in the inner ear and vestibular apparatus. Alterations in this family of proteins have not yet been described as a cause of hearing or vestibular loss in humans. We provide the first report the audiologic and vestibular manifestations associated dysfunction of SLITRK6 in humans. **Study Design:** Original work. **Methods:** Four affected children from a single Amish sibship were used to map the disease gene to chromosome 13q31 and sequencing of candidate genes in the interval revealed a homozygous nonsense mutation in SLITRK6. Each child underwent audiologic and vestibular testing to characterize the degree of hearing loss. **Results:** Ipsilateral middle ear muscle reflexes were absent at 0.5, 1 and 2 kHz at 100 dB in 3 children. Reflexes were present bilaterally at 100 dB for 4 kHz in 1 child and unilaterally in another. Audiograms revealed moderate hearing loss in 3 of 4 children and moderate to severe in one. Auditory brainstem response (ABR) testing revealed the presence of a cochlear microphonic in all children. The duration of the cochlear microphonic was significantly increased in 3 of 4 children. The ABRs were highly dys-synchronized with questionable wave five in all ears at high intensities. Vestibular evoked myogenic potentials were normal in 3 out of 4 tested ears. **Conclusions:** Children harboring the SLITRK6 mutation presented with moderate to severe hearing loss. Their ABRs mimic those of children with auditory neuropathy/dys-synchrony.

**10:17 Genetic Susceptibility to Chronic Otitis Media with Effusion: Candidate Genes**  
Carol J. MacArthur, MD\*, Portland, OR; Beth Wilmot, PhD, Portland, OR; Linda Y. Wang, BS, Portland, OR; Michael J. Schuller, MS, Portland, OR; Dennis R. Trune, PhD, Portland, OR

**Educational Objective:** At the conclusion of this presentation, the participants should be able to demonstrate a working knowledge of the candidate genes for chronic otitis media with effusion and how the TagSNP technique enables the identification of SNPs that tag regions of a gene for association with a phenotype.

**Objectives:** Chronic otitis media with effusion (COME) is a common complication of acute otitis media. Environmental risk factors have been established, but genetic risk is not delineated. The objective of this study is to develop a TagSNP (single nucleotide polymorphism) panel to determine if there is an association between candidate gene polymorphisms and the development of COME. The correlation structure of SNPs within a gene allows for the identification of a subset of SNPs that will tag regions of the gene for association with a phenotype. **Study Design:** A case control design was utilized. Cases included children aged 2-18 with COME, based on history, otomicroscopic exam, and tympanometry, who meet the criteria to undergo tympanostomy tube placement. A total of 100 cases and 100 controls were recruited to obtain a power of 80%. **Methods:** Saliva samples were obtained for genomic DNA extraction. A panel of 192 TagSNPs was selected from the following genes: TLR4, FBOXO11, MUC2, MUC5AC/B, SCN1B, SMAD2, SMAD4 and SFTPD. DNA from each subject was hybridized to the SNP probes and genotypes were generated. Each SNP was then analyzed for statistical association with COME. **Results:** Eight SNPs were found to have an association with COME (unadjusted  $p < 0.05$ ). These SNPs were found in the following genes: TLR4 (5), MUC5AC/B (1), SMAD2 (1), and SMAD4 (1). **Conclusions:** Eight

candidate gene polymorphisms are shown to be associated with the COME phenotype. These genes are involved in the innate immune response, mucin production, and activation of TGF- $\beta$  transcription. This study points to genes of interest in the COME phenotype.

**10:25 Q&A**

**10:33 Dynamic Facial Reanimation with Orthodromic Temporalis Tendon Transfer in the Pediatric Population**  
Rajanya S. Petersson, MD, Richmond, VA; Daniel E. Sampson, DDS MD, St. Anthony, MN; James D. Sidman, MD\*, Minneapolis, MN

**Educational Objective:** At the conclusion of this presentation, the participants should be able to 1) understand orthodromic temporalis tendon transfer for dynamic facial reanimation in the pediatric population; and 2) describe modifications necessary for the application of the procedure to children.

**Objectives:** To report our experience with orthodromic temporalis tendon transfer for dynamic facial reanimation in the pediatric population. **Study Design:** Case series. **Methods:** Three pediatric patients with facial paralysis underwent orthodromic temporalis tendon transfer for dynamic facial reanimation between August 30, 2010 and January 23, 2012. Our modified technique is described. Preoperative and postoperative photographs and videos are reviewed, and the results are descriptively summarized. **Results:** Two patients were four years old at the time of surgery, and the third patient was age 17. Causes for facial paralysis were congenital absence of cranial nerves VII and VIII in the first patient, Möbius syndrome in the second, and facial nerve schwannoma resection in the third. All underwent upper eyelid gold weight placement and modified orthodromic temporalis tendon transfer. Hospital stay was one to two nights. By the first postoperative visit, all exhibited improved symmetry at rest, creation of a nasolabial crease, and voluntary movement of the oral commissure and smile production without the need for physical therapy. **Conclusions:** Orthodromic temporalis tendon transfer for dynamic facial reanimation in children appears to be safe and effective. To our knowledge, this is the first report of the use of this procedure in pediatric patients. This procedure has an advantage over free muscle transfer procedures in achieving immediate dynamic reanimation in a single stage surgery without additional donor site morbidity. This is now an important procedure in our armamentarium for treating pediatric facial paralysis.

**10:41 Measurement of the Sound Intensity during Suction of Middle Ear Fluid following Myringotomy**  
John Marchbanks, MD, Lubbock, TX; James C. Wang, BS, Lubbock, TX (Presenter); Sarah J. Allen, BS, Lubbock, TX; Amanda I. Rodriguez, BS, Lubbock, TX; Christopher Zahner, BS, Lubbock, TX; Steven Zupancic, AuD PhD, Lubbock, TX

**Educational Objective:** At the conclusion of this presentation, the participants should be able to compare the differences between the sound pressure levels during suction of mucoid versus serous effusions.

**Objectives:** The purpose of this study is to evaluate the overall sound pressure levels during the process of suctioning effusion which may create a temporary hearing threshold shift (TTS). Knowledge of the sound pressure levels could change the procedures for removing excess middle ear fluid during surgery to prevent the temporary auditory threshold shift. **Study Design:** Institutional review board (IRB) approval was obtained prior to enrollment of patients for this study. Pediatric subjects (1 month to 18 years of age) who were scheduled for surgery with myringotomy and placement of pressure equalization tubes were enrolled in this study. **Methods:** The otolaryngologist evaluated the status of the external auditory canal and performed the myringotomy. Following the myringotomy, the middle ear fluid was extracted via suction and a tympanostomy tube was placed. During the suction, a probe tube microphone was attached to the suction tip which was connected to a custom developed computerized sound level meter. **Results:** Data has been analyzed for 11 patients. Out of these patients, 9 ears had mucoid effusion, 7 ears had serous effusion, and 6 had no effusion. The average of the maximum decibels recorded for air, serous effusion, and mucoid effusion was 144.03, 155.91, 168.8 dB respectively. There was a significant difference between mucoid versus serous effusion SPLs ( $p < 0.0309$ ). **Conclusions:** There is a significant difference in sound pressure levels (SPLs) when suctioning air compared to that of serous and mucoid effusion. We are continuing to recruit patients to increase the power of this study.

**10:49 The Effect of Repeated Tracheostomy Tube Reprocessing on Biofilm Formation**  
Jennifer P. Rodney, MD, Orlando, FL; Carolyn P. Ojano-Dirain, MD, Gainesville, FL; Patrick J. Antonelli, MD\*, Gainesville, FL; Rodrigo C. Silva, MD, Gainesville, FL

**Educational Objective:** At the conclusion of this presentation, the participants should be able to better understand the effect of tracheostomy tube reprocessing on bacterial biofilm formation.

**Objectives:** To determine the effect of repeated reprocessing of pediatric tracheostomy tubes (TTs) on biofilm formation. **Study Design:** In vitro microbiologic study. **Methods:** Pediatric, uncuffed TTs from two different manufacturers (Tracoe Mini and Shiley) were reprocessed mechanically with ammonium parath sulfate and lauramidopropylamine oxide (Palmolive detergent) and soaked in sodium hypochlorite. Two TTs of each brand were reprocessed 0, 10, or 20 times. Twenty 2-mm coupons were then obtained from each TT, immersed in human mucus and cultured with either staphylococcus aureus or pseudomonas aeruginosa. Biofilm formation was quantified with bacterial counts. The TTs were evaluated with scanning electron microscopy. **Results:** Bacterial counts of *S. aureus* for both brands were significantly higher in the tubes that were reprocessed twenty times compared to those that were not reprocessed (Tracoe:

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p=0.040, Shiley: p< 0.0001) or those that were reprocessed ten times (Tracoe: p=0.022, Shiley: p= 0.0002). There was not a significant difference in bacterial counts of control TTs compared to those reprocessed 10 times (Tracoe: p=0.76, Shiley: p=0.24). *P. aeruginosa* counts were not significantly different among the varying numbers of reprocessing cycles for either Tracoe or Shiley TTs (p= 0.08 and p= 0.97, respectively). Scanning electron microscopy revealed *P. aeruginosa* to grow in larger numbers on Tracoe mini tubes that were reprocessed 20 times compared to those that were reprocessed less. **Conclusions:** Repeated mechanical reprocessing of PVC TTs may promote biofilm development. Further investigation is needed to determine the optimal technique and limits of reprocessing TTs in clinical practice.

## 10:57 **Validity, Discriminative Ability and Reliability of a Hearing Related Quality of Life Questionnaire for Adolescents, the HEAR-QL**

Tara D. Rachakonda, MD, Saint Louis, MO; Donna B. Jeffe, PhD, Saint Louis, MO; Judith E.C. Lieu, MD MSPH\*, Saint Louis, MO

**Educational Objective:** At the conclusion of this presentation, the participants should be able to describe the steps of a psychometric validation of a quality of life questionnaire; describe the unique quality of life changes that adolescents with hearing loss face; and describe what the HEAR-QL is.

**Objectives:** Hearing loss (HL) in adolescents has grown over the past decade, but hearing related quality of life (QOL) has not been well measured. We sought to develop a reliable, valid measure of hearing related QOL for adolescents, the Hearing Environments and Reflection on Quality of Life (HEAR-QL). **Study Design:** Multi-site observational study of adolescents with and without HL. **Methods:** Adolescents with and siblings without HL were recruited from five medical centers. Participants completed the HEAR-QL and validated questionnaires measuring generic pediatric QOL (PedsQL), depression and anxiety (RCADS-25), and hearing-related QOL for adults (HHIA) to determine construct and discriminant validity. Participants completed the HEAR-QL two weeks later for test-retest reliability. We determined the factor structure of the HEAR-QL using exploratory principal components analysis and evaluated internal consistency using Cronbach's alpha. Sensitivity and specificity of the HEAR-QL and the PedsQL were assessed using receiver-operating-characteristics curves. We compared scores on all surveys between those with normal hearing, unilateral and bilateral HL. **Results:** We enrolled 226 adolescents (13-18 years old), 172 with HL and 54 siblings without HL. The 28 item HEAR-QL demonstrated good reliability (standardized alpha = .956) and construct validity (with HHIA: r = .848, with PEDSQL: r = .595; with RCADS-25: r = .482). The AUC was higher for the HEAR-QL (0.909) than for the PedsQL (0.585) or RCADS-25 (0.486), displaying excellent discriminant validity. Teens using devices reported lower QOL than their peers who did not use hearing devices. **Conclusions:** The HEAR-QL is a sensitive, reliable and valid measure of hearing related QOL for adolescents.

## 11:05 **Q&A**

## 11:10 - 12:00 **COCHLEAR IMPLANTS—WHICH DEVICE? IT DEPENDS . . .**

**Moderator:** Charles W. Beatty, MD FACS\*, Rochester, MN  
**Panelists:** Thomas J. Balkany, MD FACS\*, Miami, FL  
Craig A. Buchman, MD FACS\*, Chapel Hill, NC  
Bruce J. Gantz, MD FACS\*, Iowa City, IA  
Lawrence R. Lustig, MD FACS, San Francisco, CA

## 12:00 - 1:00 **Lunch with Exhibitors/Poster Viewing**

## **9:45 - Noon Concurrent Session II – General, Rhinology Mediterranean 5**

**Moderators:** Andrew H. Murr, MD FACS\*, San Francisco, CA  
Marilene Wang, MD FACS\*, Los Angeles, CA

## 9:45 **Sleep Quality and Disease Severity in Patients with Chronic Rhinosinusitis**

Jeremiah A. Alt, MD PhD, Portland, OR; Timothy L. Smith, MD MPH\*, Portland, OR; Jess C. Mace, MPH, Portland, OR; Zachary M. Soler, MD MSc, Charleston, SC

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the differences in disease severity, quality of life, and sleep quality metrics in patients with chronic rhinosinusitis.

**Objectives:** To evaluate sleep quality in patients with chronic rhinosinusitis (CRS) using a validated questionnaire and to compare measures of CRS disease severity with sleep dysfunction. **Study Design:** Cross-sectional evaluation of a multi-center cohort. **Methods:** Patients with CRS according to the 2007 Adult Sinusitis Guideline were prospectively enrolled from four academic, tertiary care centers across North America. Each subject completed the Pittsburgh Sleep Quality Index (PSQI) instrument, in addition to measures of CRS specific quality of life (QOL), sinonasal endoscopy, computed tomography (CT), and olfaction. Differences in demo-

graphics, comorbid conditions, and clinical measures of disease severity were compared between patients with good (PSQI; < 5) and poor (PSQI; > 5) sleep quality. **Results:** Patients with CRS (n=302) reported a mean PSQI score of 9.4 (range: 0 - 21). Overall, 75.8% of patients reported PSQI scores above the traditional cut-off indicating poor sleep quality. Patients with poor sleep quality were found to have significantly worse QOL scores on both the Rhinosinusitis Disability Index (RSDI;  $p < 0.001$ ) and the 22 item Sinonasal Outcome Test (SNOT-22;  $p < 0.001$ ). No significant differences in endoscopy grade, CT score, or olfactory function were found between patients with good or poor sleep quality. Patients reporting poor sleep were more likely to have comorbid depression, and this difference persisted after controlling for gender ( $p = 0.017$ ). **Conclusions:** The majority of patients with symptomatic CRS have a poor quality of sleep as measured by the PSQI survey. Poor sleep quality is significantly associated with CRS specific QOL and comorbid depression but not CT score or endoscopy grade.

9:53

#### Patient Centered Decision-Making in the Treatment of Chronic Rhinosinusitis

Zachary M. Soler, MD, Charleston, SC; Luke R. Rudmik, MD, Calgary, AB Canada; Peter H. Hwang, MD\*, Stanford, CA; Jess C. Mace, MPH, Portland, OR; Rodney J. Schlosser, MD, Charleston, SC; Timothy L. Smith, MD\*, Portland, OR

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand and compare some of the important factors involved in patient centered decisions in the treatment of chronic sinusitis.

**Objectives:** To explore possible factors which might impact a patient's choice to pursue endoscopic sinus surgery (ESS) or continue with medical management for treatment of refractory chronic rhinosinusitis (CRS). **Study Design:** Cross-sectional evaluation of a multi-center, prospective cohort. **Methods:** 242 subjects with CRS were prospectively enrolled within four academic, tertiary care centers across North America with ongoing symptoms despite prior medical treatment. Subjects either self-selected continued medical management (n=62) or ESS (n=180) for treatment of sinonasal symptoms. Differences in demographics, comorbid conditions, and clinical measures of disease severity between subject groups were compared. Validated metrics of social support, personality, risk aversion, and physician patient relationships were compared using bivariate analyses, predicted probabilities, and receiver operating characteristic curves at the 0.05 alpha level. **Results:** No significant differences were found between treatment groups for any demographic characteristic, clinical cofactor, or measure of social support, personality, or the physician patient relationship. Subjects electing to pursue sinus surgery did report significantly worse average quality of life (QOL) scores on the 22 item Sinonasal Outcome Test (SNOT-22;  $p < 0.001$ ) compared to those electing continued medical therapy ( $54.6 \pm 18.9$  vs.  $39.4 \pm 17.7$ ), regardless of surgical history or polyp status. SNOT-22 score significant predicted treatment selection (OR=1.046; 95% CI: 1.028, 1.065;  $p < 0.001$ ) and was found to accurately discriminate between subjects choosing endoscopic sinus surgery and those electing medical management 72% of the time. **Conclusions:** Worse patient reported disease severity, as measured by the SNOT-22, was significantly associated with the choice of treatment for CRS. Strong consideration should be given for incorporating CRS specific QOL measures into routine clinical practice.

10:01

#### 3D Sinus Imaging as an Adjunct to 2D Imaging to Accelerate Education in the Spatial Orientation of the Paranasal Sinuses and Anterior Skull Base

William C. Yao, MD, Houston, TX; Rachel M. Regone, BS, Houston, TX; Nancy Huyhn, DC, Houston, TX; E. B. Butler, MD, Houston, TX; Masayoshi Takashima, MD, Houston, TX

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss and compare the utility of three dimensional anatomical model as an adjunct to two dimensional imaging in teaching the spatial orientation in the anterior skull base and paranasal sinuses compared to two dimensional imaging studies alone.

**Objectives:** 1) Develop a novel three dimensional (3D) anatomical model to assist in improving spatial knowledge of the skull base, paranasal sinuses and its adjacent structures; and 2) validate the utilization of 3D reconstruction versus two dimensional (2D) computed tomography (CT) for the training of medical students and otolaryngology - head and neck surgery (OTO-HNS) residents. **Study Design:** Prospective cohort study. **Methods:** A prospective cohort study of eighteen subjects (fourth year medical students applying to OTO-HNS residency and OTO-HNS junior residents) studying sinus anatomy was conducted at a tertiary academic center during the 2011-2012 academic year. TeraRecon, an image processing and 3D modeling program, was used to create a color coded 3D scalable/layerable/rotatable model of key paranasal and skull base structures from a 2D high resolution sinus CT scan. Subjects were assigned to review an educational module of a 2D CT scan and/or 3D reconstruction followed by a questionnaire to self-assess their knowledge of the sinus and adjacent structures. **Results:** The 3D reconstruction group demonstrated significant improvement in the perceived understanding of the anatomy as compared to 2D CT group ( $p < 0.01$ ). Every subject believed the addition of 3D imaging accelerated their education of sinus anatomy and recommended its use to others. **Conclusions:** This novel 3D model, highlighting key structures, is a highly effective tool to enhance the education of medical students and junior otolaryngology residents in sinus and skull base anatomy and its adjacent structures. Specifically, it was found to be highly effective in conceptualizing the spatial orientation of these structures.

## 10:09 RGS21, A Regulator of Taste?

Adam J. Kimple, MD PhD, Chapel Hill, NC; Francis S. Willard, PhD, Chapel Hill, NC; David P. Siderovski, PhD, Chapel Hill, NC

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss how bitter, sweet, and umami flavors are transduced at the molecular level and how RGS21 may modulate gustatory signaling.

**Objectives:** It has been demonstrated with biochemical studies and animal models that bitter, sweet, and umami tastes are mediated through G protein coupled receptors (GPCRs). While numerous proteins are known to modulate GPCR signaling in general, to date, no taste specific regulators of G protein signaling (RGS proteins) has been identified. **Study Design:** This is a pilot investigation that involved cloning a potential tastant specific RGS gene (RGS21) from rat circumvallate papillae and producing recombinant protein in *Escherichia coli*. The recombinant protein was used to determine if RGS21 was biochemically active against G alpha subunits. **Methods:** The rat RGS21 open reading frame was cloned into a eukaryotic expression vector, overexpressed, and purified using multi-step fast protein liquid chromatography. A variety of biochemical and biophysical assays were then used to determine if RGS21 could bind to and accelerate the hydrolysis of GTP on heterotrimeric G alpha subunits. **Results:** RGS21 was overexpressed in *E. coli* and purified as a monodisperse protein. The purified recombinant protein was biochemically active and could directly bind and accelerate GTP hydrolysis on G alpha subunits. **Conclusions:** RGS21 is expressed in rat circumvallate papillae, is amenable to purification as a recombinant protein, and can bind to G alpha subunits. Furthermore, RGS21 can accelerate the hydrolysis rate of GTP on G alpha subunits. This provides evidence that RGS21 may be a negative regulator of gustation. Future studies will be needed to determine the expression pattern of RGS21 and the physiological role of this protein in mammals.

## 10:17 Q&A

## 10:23 Outcomes of Tracheotomy in Critically Ill Obese Patients

James K. Byrd, MD, Pittsburgh, PA; Kristine E. Day, MD, Birmingham, AL; Bethany J. Wolf, PhD, Charleston, SC; Eric J. Lentsch, MD, Charleston, SC

**Educational Objective:** At the conclusion of this presentation, the participants should be able to better counsel critically ill obese patients and their family members about the outcomes of tracheotomy.

**Objectives:** Tracheotomy in obese patients is a challenging operation for patients with significant medical comorbidities. Our study will measure outcomes of tracheotomy in critically ill obese patient population and identify factors that affect outcomes. **Study Design:** Retrospective case series. **Methods:** Obese patients in the intensive care unit who underwent tracheotomy at an academic medical center between 2007 and 2010 were identified, excluding patients with a diagnosis of cancer contributing toward hospital admission. Chief diagnoses were divided into "traumatic", "neurologic", or "other," and patient outcomes were defined as death, decannulation, or dependence. Comorbidities were identified for each patient. Types of tracheotomy and complication rates were evaluated. **Results:** 102 patients admitted to the ICU with ICD-9 codes for obesity or morbid obesity who underwent tracheotomy met study criteria. Average patient age and BMI were 53 and 45.7, respectively. 74% underwent open versus 26% underwent percutaneous tracheotomy. The most common outcome was dependence (49%), followed by decannulation (35.3%), and death (15.7%). In our study, there was no difference in BMI between the open and percutaneous groups. In multivariate logistic regression models, African Americans experienced a higher rate of death and a lower rate of decannulation. Additionally, obese patients with pulmonary hypertension who undergo tracheotomy are at increased risk for death. **Conclusions:** A significant number of critically ill obese patients who undergo tracheotomy are likely to remain tracheostomy dependent, and those with pulmonary hypertension are at increased risk of death. The poor outcomes for African Americans may represent a health disparity related to prior access to healthcare.

## 10:31 Robotic Assisted Surgery for the Treatment of Lingual Tonsillitis

Shannon C. Fraser, MD, Pittsburgh, PA; Melonie A. Nance, MD, Pittsburgh, PA; Umamaheswar Duvvuri, MD PhD, Pittsburgh, PA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to describe the presentation of lingual tonsillitis and discuss treatment options including robotic assisted lingual tonsillectomy.

**Objectives:** Diagnosis of lingual tonsillitis can be challenging due to vague presenting symptoms and a difficult exam. Persistent symptoms despite maximal medical therapy should prompt consideration of lingual tonsillectomy for definitive management. Several techniques have been described to perform a lingual tonsillectomy and the procedure has evolved with the development of newer technologies. With the advent of the da Vinci surgical system, robotic assisted resection of the tongue base has become an important technique for surgical management of this region. We describe extension of this approach for treatment of chronic lingual tonsillitis. **Study Design:** Case series, retrospective review. **Methods:** Between February 2010-September 2012 we identified 5 patients treated with robotic assisted lingual tonsillectomy for chronic tonsillitis. A retrospective chart review was performed to identify the following information for each patient: presenting symptoms, preoperative therapies, significant exam findings, postoperative complications and subjective symptom improvement. **Results:** All patients presented with complaints of dysphagia. Four presented with throat pain or odynophagia. All had documented lingual tonsillar hypertrophy on preoperative endoscopy. Postoperatively all patients reported improvement in odynophagia and dysphagia. There were no complications of intraoperative or delayed hemorrhage. One patient was

readmitted in the immediate postoperative period due to severe dehydration. **Conclusions:** Robotic assisted surgery of the tongue base has been described primarily for the management of oncologic disease. The utility of robotic tongue base resection for the management of chronic tonsillitis has not been previously described. Based on our initial case series, robotic assisted lingual tonsillectomy appears to be a safe and effective method for control of symptoms related to chronic lingual tonsillitis.

**10:39 You Can't Pay Me to Quit: The Failure of Financial Incentives for Smoking Cessation in Head and Neck Cancer Patients**

Ankona Ghosh, MD, Philadelphia, PA; Evan Ransom, MD, San Francisco, CA; Arnaud Bewley, MD, Charleston, SC; Genevieve Philiponis, BA, Philadelphia, PA; Natasha Mirza, MD\*, Philadelphia, PA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to demonstrate awareness of the difficulties inherent in smoking cessation counseling and offer new insights for clinically effective smoking cessation programs.

**Objectives:** A prospective randomized study was conducted at a tertiary care hospital to evaluate the effects of financial incentives for smoking cessation targeted to a high risk population. **Study Design:** Prospective randomized pilot study. **Methods:** Patients with a history of head and neck cancer were voluntarily enrolled over a 2 year period. They were randomized to a cash incentives or no incentive group. Subjects were offered free enrollment in 3 smoking cessation courses and free prescriptions for anti-smoking medications. Carbon monoxide levels were assessed at 30 days and urine cotinine levels at 3 and 6 months. Subjects in both groups received \$50 for coming in for testing and the incentive group received \$100 if smoking cessation was confirmed at each testing period. **Results:** Over two years, 114 patients with an established diagnosis of head and neck cancer were offered enrollment. 24 enrolled and 14 attended the smoking cessation classes. Nine attended all 3 smoking cessation classes. Five patients tested positive for tobacco byproducts at their followup visits, while 2 withdrew after classes were completed. Only 2 successfully quit smoking at 6 months. Both these patients were in the financially incentivized group and received \$150 at each test visit. **Conclusions:** The addictive value of tobacco is underestimated. Even providing a financial incentive to a population already carrying a diagnosis of head and neck cancer to promote a positive behavior change was unsuccessful. Other strategies and investments will be needed to keep these individuals tobacco free in the long term.

**10:47 Risk Factors for Middle Ear Barotrauma in Patients Undergoing Monoplace Hyperbaric Oxygen Therapy**

Jonathan L. Hatch, MD, Omaha, NE; Barbara M. Heywood, MD, Omaha, NE; Jeffrey S. Cooper, MD, Omaha, NE

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the etiology of middle ear barotrauma incurred in hyperbaric oxygen therapy (HBOT) and identify patients who are at risk for barotrauma and require tympanostomy tubes.

**Objectives:** To identify additional risk factors for middle ear barotrauma in patients undergoing HBOT in a monoplace setting. **Study Design:** Retrospective cohort study. **Methods:** Data was collected from all patients who received HBOT from January 2007 to December 2011. Patients were divided into two groups, those who required tympanostomy tubes (study group) and those who did not (control group). Additional data points were collected age, gender, BMI, indications, H&N surgery for cancer, H&N radiation, other body radiation, chemotherapy, altered mental status, prior ear surgery, tonsillectomy, adenoidectomy, antibiotics, intubated, smoking status, diabetes mellitus status. The two groups were compared. **Results:** Total patients n=343 included in study. Males 61%, head and neck irradiation n=111. Overall rate for patients requiring PE tubes was 24.7% for all indications. Advancing age (p value <.001), smoking status (p value <.001), and mental status changes (p value =0.07) were significant risk factors and have a dependent relationship (p value <.001). Other risk factors did not meet significance including prior head and neck irradiation or surgery, indications for HBO, or intubation status. **Conclusions:** Age, altered mental status and smoking were risk factors that contribute to middle ear barotrauma and an increased rate of PE tube placement. Smoking status as a risk factor was previously unknown.

**10:55 Patient Perceived Long Term Voice and Swallow Function following Cerebellopontine Angle Surgery**

Heather M. Starmer, MA, Baltimore, MD; Bryan K. Ward, MD, Baltimore, MD; Simon R. Best, MD, Baltimore, MD; Lee M. Akst, MD, Baltimore, MD; Howard W. Francis, MD, Baltimore, MD

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss voice and swallowing concerns noted long term in individuals who have had surgery to the cerebellopontine angle.

**Objectives:** Evaluation of long term patient perceived outcomes and quality of life related to voice and swallowing after cerebellopontine angle (CPA) surgery. **Study Design:** Prospective cross-sectional study. **Methods:** The MD Anderson Dysphagia Inventory (MDADI), Voice Handicap Index (VHI), and Facial Clinometric Evaluation (FaCE) were distributed to a cohort of previously identified patients who underwent CPA surgery between January 2008 and December 2010. Data regarding immediate postoperative cranial nerve function was extracted from an existing database and comparisons were performed between postoperative function and long term patient perception of function. **Results:** Surveys were returned by 111 of 181 potential participants (61%). The mean time to post-surgery survey completion was 31.6 months (range 15-49). A significant correlation was found between the three instruments (p<0.0001). Immediate postoperative facial nerve palsy and dysphagia during the postoperative hospital stay were both associated with poorer FaCE (p<0.001), MDADI (p<0.05), and VHI scores (p<0.05). Tumor size, presence of postoperative dysphagia, type of postoperative dysphagia, presence of facial nerve palsy, House Brackmann score at discharge, and length of stay were all significantly associated with MDADI,

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VHI, and FaCE scores ( $p < 0.05$ ). Age, sex, race, and vagal palsy diagnosed in the postoperative setting were not associated with long term perception of function and quality of life. **Conclusions:** Patients undergoing surgery to the CPA are at risk for long term perceived functional deficits, particularly to swallowing and facial nerve function. The presence of facial nerve palsy and dysphagia postoperatively predict long term poor patient perception of voice and swallowing function and diminished quality of life.

11:03 Q&A

## 11:10 - Noon ADVANCES IN OFFICE BASED DIAGNOSTIC AND THERAPEUTIC PROCEDURES FOR OTOLARYNGOLOGISTS

**Moderator:** Mark S. Courey, MD\*, San Francisco, CA

**Panelists:** C. Gaelyn Garrett, MD\*, Nashville, TN

*Laryngology*

Brent A. Senior, MD FACS\*, Chapel Hill, NC

*In Office CT*

David L. Steward, MD FACS\*, Cincinnati, OH

*Ultrasound*

Ivan Wayne, MD, Oklahoma City, OK

*Laser Procedures*

Noon - 1:00 *Lunch with Exhibitors/Poster Viewing*

## 1:00 - 5:00 Scientific Session *Mediterranean 4*

1:00 - 1:40 JOSEPH H. OGURA, MD LECTURE

**Training Head and Neck Surgeons in the 21st Century: Is It Time for a New Paradigm?**

Randal S. Weber, MD FACS\*, Houston, TX

## 1:40 - 3:00 Head and Neck, Clinical Fundamentals

**Moderator: Christine G. Gourin, MD, FACS\*, Baltimore, MD**

**David I. Kutler, MD FACS\*, New York, NY**

1:40 **Medical Malpractice and Otolaryngology: A Review of the Past Decade (2001-2011)**

Steven S. Hong, MD, Honolulu, HI; Christopher G. Yheulon, MD, Honolulu, HI; Eric D. Wirtz, MD, Honolulu, HI;

Joseph C. Sniezek, MD\*, Honolulu, HI

**Educational Objective:** At the conclusion of this presentation, the participants should be able to recognize current trends in malpractice litigation involving otolaryngologists. The participants should be able to recognize common procedures and injuries involving otolaryngologists and discuss certain associated litigation pitfalls.

**Objectives:** To better understand the causes and outcomes of lawsuits involving otolaryngologists in the past decade by analyzing malpractice litigation trends in order to prevent future litigation and improve physician education. **Study Design:** Retrospective.

**Methods:** The WESTLAW database was reviewed from 2001 to 2011. Data were compiled on the plaintiff demographics, use of expert witnesses, surgical procedures, nature of injury, legal allegations, verdicts, and indemnities. **Results:** One hundred ninety-eight cases met inclusion criteria. Verdicts for the defendant/otolaryngologist predominated (58%), while the average award when the verdict favored the plaintiff was \$1,782,514. When otolaryngologists were used as expert witnesses by the defense, the verdict outcome statistically favored the defendant. Two of the most commonly cited legal allegations were improper performance and failure to diagnose and treat. Fifty-one cases involved allegations of wrongful death with the overall outcome favoring the plaintiffs (51%). The average indemnities in these cases were significantly higher for plaintiff verdicts at \$2,552,580 versus settlements at \$992,896. Forty-two cases involved malignancy with the two most common allegations being failure to diagnose and treat (79%) and delay in diagnosis (74%).

**Conclusions:** Our study reveals that in the past decade, in significant malpractice litigations, the outcomes favored otolaryngologists, although average awards for the plaintiffs were significantly high especially when involving malignancy. The analysis of the litigation reveals the importance of superb surgical techniques and thorough preoperative evaluations. Lastly, when otolaryngologists are defendants in litigation, our review reiterates the value of using otolaryngologists as expert witnesses.

1:48

**Growth Factors Expression in Hyaluronic Acid Fat Graft Myringoplasty**

Issam Saliba, MD FRCSC, Montreal, QC Canada; Tang Zhu, MD PhD, Montreal, QC Canada; Sylvain Chemtob, MD FRCSC, Montreal, QC Canada

**Educational Objective:** At the conclusion of this presentation, the participants should be able to 1) explain how hyaluronic acid fat graft myringoplasty (HAFGM) provides better results than fat graft myringoplasty alone; and 2) identify what kind of growth factors are increased and play a role in the success of this new myringoplasty technique.

**Objectives:** To evaluate the effect of hyaluronic acid (HA) epidisc and assess the growth factors expression by the association of HA to fat graft myringoplasty (FGM). **Study Design:** Animal study. **Methods:** Tympanic membranes (TM) of 30 guinea pigs divided into three groups of 10 were totally perforated on day 0. FGM was performed in groups II and III but HA epidisc was added to the fat graft in the group III. No surgery was performed in group I, which served as a control group. TM samples were taken on day 0 from group I and then on days 3, 8, and 21 from each group. A reverse transcription polymerase chain reaction was performed in order to detect the expression of IGF, EGF, TNF $\alpha$  and VEGF. Photography of all perforation before surgery and on the 3rd, 8th and 21st day after surgery was taken. **Results:** IGF, EGF, TNF $\alpha$  and VEGF were statistically significantly higher in group III on day 3 (IGF: III vs. I;  $p=0.03$ , EGF: III vs. I and II:  $p=0.037$  and  $p<0.01$  respectively, TNF $\alpha$ : III vs. I:  $p=0.025$  and VEGF: III vs. I:  $p<0.01$ ), day 8 (IGF: III vs. I and II:  $p<0.01$  for both, EGF: III vs. II:  $p<0.01$  and TNF $\alpha$ : III vs. I:  $p=0.04$ ), and day 21 (TNF $\alpha$ : III vs. I and II:  $p=0.036$  and  $p=0.03$  respectively and VEGF: III vs. I:  $p=0.02$ ). Photography shows TM healing process and greater new vascularization in group III. **Conclusions:** HAFGM shows a higher growth factor expression than FGM alone or spontaneous perforation healing.

1:56

**Functional Salivary Gland Restoration Using Expanded Populations of Human Salivary Progenitor Cells Expressing Stem Cell Markers**

Swati Pradhan Bhatt, PhD, Newark, DE; Daniel A. Harrington, PhD, Houston, TX; Emily E. Thomas, BS, Houston, TX; Mary C. Farach-Carson, PhD, Houston, TX; Xinqiao Jia, PhD, Newark, DE; Robert L. Witt, MD\*, Newark, DE

**Educational Objective:** At the conclusion of this presentation, the participants should be able to demonstrate that our laboratory has been successful in culturing human salivary gland progenitor cells that express stem cell markers which reflects a step forward toward the functional restoration of the salivary gland, in order to aid patients suffering from xerostomia, post-radiation therapy.

**Objectives:** To create a tissue engineered salivary gland from human salivary progenitor cells for treatment of radiation induced xerostomia. **Study Design:** A 3D hyaluronate (HA) based hydrogel culture system was used to completely encapsulate salivary gland progenitor cells and to obtain organized acini-like spheroids with central lumens able to secrete alpha-amylase following neurotransmitter stimulation. Structures were stained for typical salivary biomarkers, HA receptors including RHAMM, and for progenitor stem cell marker and hyaluronate interacting protein, CD44, involved in the growth and renewal of the normal salivary gland cells. **Methods:** Salivary tissue from surgical patients was collected with IRB approved tissue collection protocol. Isolated salivary gland progenitor cells capable of proliferating for several months without apparent senescence were cultured in 3D. **Results:** Salivary gland progenitor cells organized into spheroid structures in 3D and expressed salivary biomarkers including tight junction proteins and alpha-amylase. These spheroids merged over time, grew to over 500 $\mu$ m in diameter, maintained cortical actin and could be cultured for several months in culture and several weeks in vivo. Structures in 3D stained positive for HA receptors RHAMM and CD44, which is also a stem cell marker. Over 99% of the cells in 3D produced robust amounts of CD44 that was localized to the cell membrane. **Conclusions:** An HA based hydrogel culture system able to support long term culture of salivary progenitor cells into differentiated acini-like spheroids was established. The expression of CD44 among salivary cultures may explain their regenerative potential and should aid the development of these 3D structures into complex salivary units.

2:04

**Timing of Postoperative Drain Removal following Parotidectomies and Its Effects on Rate of Hematoma Formation and Length of Hospital Stay**

Veronique G.S. Wan Fook Cheung, MDCM BSc, Vancouver, BC Canada; Donald W. Anderson, MD BSc, Vancouver, BC Canada

**Educational Objective:** At the conclusion of this presentation, the participants should be able to compare the rate of hematoma formation and length of hospital stay in patients having their postoperative drain removed 4 hours following their parotidectomy to those having their drains removed on postoperative day 1 or more.

**Objectives:** The timing of wound drain removal in parotidectomies is very surgeon dependent. Our objective is to report our rates of hematoma formation when drains are removed 4 hours following parotidectomies, prior to patient discharge compared to when drains are removed on postoperative day 1 or more. **Study Design:** Case series with prospective data collection. **Methods:** Consecutive parotidectomy only cases undertaken between January 1 and June 15, 2011, were identified through a single surgeon's electronic billing record and reviewed for timing of drain removal, incidence of hematoma requiring drainage and average length of hospital stay. **Results:** Of the 629 charts reviewed, 536 met the inclusion criteria—394 superficial and 142 complete parotidectomies. 10 (1.9%) did not have drains placed intraoperatively; 235 (43.8%) had their drains removed 4 hours postoperatively; 273 (50.9%) on postoperative day (POD) 1; and 19 (3.5%) on POD 2 or more. There were 13 (2.4%) cases of hematoma formation, 2.0% (8/394) from the superficial group, 3.5% (5/142) from the complete parotidectomy group ( $p=0.34$ ). 1 (10%) did not have a drain placed intraoperatively and 5 had a hematoma less than 4 hours postoperatively, with the drain still in place. Of the 7 remaining cases, 1.7% (4/235) had their drains

# Friday

removed 4 hours postoperatively and 1.1% (3/273) on POD 1; this was not statistically significant ( $p=0.71$ ). The mean lengths of stay for the 2 groups were not statistically different (0.75 and 1.0 night respectively;  $p=0.67$ ). **Conclusions:** Our results suggest that keeping the drain in longer than 4 hours postoperatively does not decrease the rate of hematoma formation postoperatively.

2:12 Q&A

2:18 **Objective Measures of Structural Displacements during Swallowing after Oropharyngeal Chemoradiation Therapy**

Katherine A. Kendall, MD, Salt Lake City, UT; Krisitine M. Tanner, PhD, Salt Lake City, UT; Steven R. Kosek, MS, Minneapolis, MN

**Educational Objective:** At the conclusion of this presentation, the participants should be able to describe changes in structural displacements that occur during swallowing after treatment with chemoradiation therapy to the oropharynx compared to those found in normal individuals.

**Objectives:** To determine if changes occur in the extent of structural displacements during swallowing as a result of treatment for oropharyngeal carcinoma with chemoradiation therapy. **Study Design:** Patients seen for followup at least one year after treatment of oropharyngeal carcinoma with chemoradiation therapy were sequentially approached and asked to participate in the study. **Methods:** Objective measures of pharyngeal constriction, hyoid elevation, and upper esophageal sphincter (UES) opening size were made from modified barium swallowing studies in a group of 31 patients at least one year after chemoradiation therapy for the treatment of oropharyngeal carcinoma. Study subject results were compared to those from an historical group of age matched controls without complaints of swallowing difficulty. Measures were made for a liquid 1cc, 3cc and 20cc bolus. **Results:** Significant reduction in hyoid elevation and pharyngeal constriction were found in the treatment group for all bolus sizes. No reduction in UES opening size was identified. **Conclusions:** Chemoradiation therapy for the treatment of oropharyngeal carcinoma results in diminished hyoid bone elevation and poor pharyngeal constriction during swallowing. These pathophysiologic changes likely contribute to dysphagia complaints in this patient population.

2:26 **Surgical Approach to Zenker's Diverticulum: Which Is the Best?**

Jason M. Leibowitz, MD, Miami, FL; Christopher E. Fundakowski, MD, Miami, FL; Marianne Abouyared, BA, Miami, FL; Andrew Rivera, MD, Miami, FL; Jason Rudman, BA, Miami, FL; Francisco J. Civantos, MD\*, Miami, FL

**Educational Objective:** At the conclusion of this presentation, the participants should be able to demonstrate the various surgical techniques for Zenker's diverticulum and discuss and compare the pros and cons for each technique.

**Objectives:** To compare the different modalities for Zenker's diverticulum repair and associated clinical outcomes. **Study Design:** Retrospective chart review. **Methods:** Between 2005 and 2011, 171 patients underwent surgical correction of Zenker's diverticulum by one of three techniques (stapler,  $n=66$ ; laser,  $n=64$ ; open,  $n=26$ ). Patient sociodemographics, medical comorbidities, pre and postoperative subjective dysphagia and regurgitation score (3 point Likert scale), complications (major and minor), length of stay, time to oral intake (clear diet was started after 24 hours in both laser and stapler group), and recurrence (defined as need for revision surgery) were reviewed for each surgical modality. **Results:** No statistically significant difference in diverticulum prevalence was associated with age, gender, nor treatment group. Mean length of hospital stay was not noted to be significantly different between the three groups ( $p=0.14$ ). A statistically significant difference in time to oral intake (shorter) was observed in the laser group as compared to the other 2 groups ( $p=0.012$ ). No significant difference in recurrence ( $p=0.21$ ) or complication ( $p=0.12$ ) rates was identified between the three groups. Although all three groups demonstrated a statistically significant decrease between pre (average: 3) and postoperative (average 1.5) dysphasia and regurgitation scores, the degree of improvement was not statistically significant when comparing the 3 groups. **Conclusions:** Both open and endoscopic (laser, stapler) surgical approaches to Zenker's diverticulum are effective. Similar complication and recurrence rates are noted, though it appears the laser approach demonstrates an advantage in terms of time to oral intake.

2:34 **Long Term Outcomes of Salivary Endoscopy for Chronic Obstructive Sialadenitis**

Conor W. McLaughlin, BS, Charleston, SC; Brendan W. O'Connell, MD, Charleston, SC (Presenter); Shaun A. Nguyen, MD, Charleston, SC; Rishi A. Vashishta, MD, Charleston, SC; Marion B. Gillespie, MD MSc, Charleston, SC

**Educational Objective:** At the conclusion of this presentation, the participants should understand the indications for minimally invasive salivary endoscopy for the treatment of obstructive sialadenitis. Participants should also have an appreciation for the surgical outcomes of salivary endoscopy and understand the implications on patient quality of life.

**Objectives:** Salivary endoscopy is an effective, minimally invasive approach to manage obstructive salivary gland pathology. Short term efficacy and safety of this technique has been validated. Long term symptom resolution, gland preservation, and quality of life data are lacking. **Study Design:** Retrospective chart review with survey data collection. **Methods:** Cross-sectional survey and review of medical records of patients who underwent sialendoscopy for chronic sialadenitis. **Results:** 103 of 252 (41%) patients treated returned the survey. Mean age was 55.6 years (range, 12 - 86 years) and mean length of followup was 18 months (range, 2.9 - 53.2

months). The underlying cause of obstruction was divided between sialolithiasis (48.5%) and other etiologies such as scar, radioiodine, and inflammatory (51.5%). The majority of patients (90.3%) endorsed subjective long term symptom improvement. A second surgery was required in 12.6%, and 9.7% of patients ultimately required gland excision. Etiology of sialadenitis correlated with long term symptom improvement ( $R=-0.25, p=0.01$ ) and was an independent predictor of quality of life as measured by an adapted Oral Health Impact Profile (OHIP)-14 ( $F=4.9, p=0.02$ ). Patients with stones reported more favorable long term outcomes than patients with other obstructive etiology (58.2% vs. 30.9%,  $P < 0.05$ ). The presence of an intact gland did not correlate with quality of life measures. **Conclusions:** Patients undergoing sialendoscopy for chronic sialadenitis have long term resolution of symptoms and favorable gland salvage rates. There is a correlation between etiology of sialadenitis and quality of life measures. Patients who have undergone gland excision do not appear to have improved overall quality of life when compared to patients with intact glands.

**2:42 Sonopalpation is Highly Sensitive for Localizing Submandibular Calculi Prior to Sialendoscopy or Sialolithotomy**

Nitin J. Patel, MD, Washington, DC; Arjun S. Joshi, MD, Washington, DC

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the role of sonopalpation in the diagnosis and treatment of submandibular sialoliths.

**Objectives:** To study the sensitivity of ultrasound alone versus sonopalpation for identification and localization of submandibular stones. **Study Design:** Non-controlled prospective cohort study. **Methods:** Patients with suspected sialolithiasis of the submandibular gland were examined by physical examination, ultrasound alone, and with sonopalpation. The presence/absence and location of sialolithiasis was noted in each patient using each technique and data was tabulated. Sialendoscopy or open sialolithotomy was performed as the gold standard for definitive diagnosis and treatment. Sensitivity for each technique was then determined. **Results:** 59 patients were identified with submandibular stones. Physical examination positively identified sialoliths in 49 patients. Ultrasound alone positively identified calculi in 54 patients. Sonopalpation identified calculi in 57 patients. Sensitivity of physical examination, ultrasound alone, and sonopalpation for submandibular calculi was 83%, 91%, and 96.6% respectively. 17 patients underwent purely endoscopic procedures, 36 patients underwent combined or pure transoral approaches, and 6 underwent sialadenectomy. Of the three modalities, only sonopalpation was able to both identify and localize pathology and guide treatment management. **Conclusions:** Ultrasound is crucial in the proper diagnosis and management of submandibular stones during sialendoscopy or sialolithotomy. Sonopalpation has increased sensitivity over ultrasound alone or physical examination not only for the detection of submandibular calculi, but also for localization of pathology in the ductal system.

**2:50 Q&A**

**2:55 - 3:25 Break with Exhibitors/Poster Viewing**

## **3:00 - 5:00 Head and Neck, Laryngology, Bronchoesophagology**

**Moderator: Kerry D. Olsen, MD FACS\*, Rochester, MN**

**3:25 Genes of Cell Cycle and Apoptosis in Recurrent Respiratory Papillomatosis**

Regina E. Rodman, MD, Houston, TX; Simukayi Mutasa, Galveston, TX; Crystal Dupuis, Galveston, TX; Michael P. Underbrinl, MD MBA, Galveston, TX

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the molecular mechanisms of laryngeal papilloma and discuss genetic dysregulation that potentially explains why patients infected with the virus are unable to mediate a Tcell immune clearance.

**Objectives:** The purpose of this project is to compare genes of cell cycle, apoptosis, and inflammatory cytokines in laryngeal papilloma to normal tissue, to better understand where dysregulation occurs. **Study Design:** Recurrent respiratory papillomatosis (RRP) is a devastating disease, caused by infection of the upper aerodigestive tract with human papillomavirus (HPV) types 6 and 11. The disease in children is particularly aggressive and unpredictable, requiring multiple trips to the operating room for prevention of airway obstruction. There is no cure for RRP and surgical removal is the mainstay of treatment. To find a cure, we must better understand the molecular mechanisms of disease. **Methods:** Papilloma tissue was obtained from patients requiring surgical debridement. For comparison, normal mucosa was obtained from the excised uvula of patients undergoing uvulopalatopharyngoplasty. Total RNA was extracted from both groups, then probed using customized reverse transcriptase real time PCR gene arrays. **Results:** The custom arrays examine expression of 84 separate genes within the cell cycle, apoptosis, and inflammatory cytokine pathways. Our findings based on 11 papilloma samples run in comparison to normal mucosa shows that genes of cell cycle BRCA-1, CDKN1A, CDKN2A are increased, may allow S phase prolongation. Genes of apoptosis including BID, BAD, BCL-2, MCL-1, and BRC are downregulated. Cytokines IL-A, IL-6, IFNG, TNF and IL-29 are also downregulated. **Conclusions:** Genes of cell cycle and apoptosis are upregulated and downregulated, respectively, as expected in papilloma tissue. Of particular interest is the finding of downregulated IL-29, which adds insight as to why patients infected with the virus are unable to mediate a Tcell immune clearance.

- 3:33**      **Partial Epiglottidectomy in Dysphagia Treatment from Radiation Therapy Induced Epiglottic Dysfunction**  
Nausheen M. Jamal, MD, Los Angeles, CA; Andrew A. Erman, MA, Los Angeles, CA; Dinesh K. Chhetri, MD\*, Los Angeles, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to identify when epiglottic dysfunction contributes to dysphagia in post-treatment head and neck cancer patients and when epiglottidectomy may improve swallowing dysfunction.

**Objectives:** To report dysphagia characteristics and swallowing outcomes in patients who underwent partial epiglottidectomy for dysphagia secondary to epiglottic dysfunction after radiation treatment of head and neck cancer. **Study Design:** Retrospective review of case series. **Methods:** A retrospective review was performed of all post-treatment head and neck cancer patients who underwent epiglottidectomy at a single tertiary care referral center. Pre- and post-surgical swallowing assessments, endoscopic evaluations, and patient questionnaire of swallowing outcomes were reviewed. **Results:** Seven patients were identified who underwent the surgical procedure. Epiglottic dysfunction leading to dysphagia was identified by fiberoptic endoscopic evaluation of swallowing (FEES) and modified barium swallow study (MBSS). Specific anatomic and functional findings included oropharyngeal narrowing, increased rigidity of the epiglottis, absence of epiglottic retroflexion, and prevention of adequate food bolus passage during the pharyngeal phase by the obstructing epiglottis. Those with adequate tongue base contraction benefitted most from partial epiglottidectomy. Postoperative FEES and MBSS were analyzed for changes in swallow efficiency and safety. All patients demonstrated significantly improved pharyngeal bolus passage with no added swallowing morbidity. **Conclusions:** There is a role for partial epiglottidectomy in dysphagia treatment. Ideal candidates have adequate base of tongue contraction, poor retroflexion of the epiglottis, a narrowed pharynx, and solid food dysphagia with vallecular residue. In this setting, partial epiglottidectomy enables unimpeded bolus passage in the pharyngeal phase. Minimal postoperative airway morbidity occurs in the appropriately selected patient.

- 3:41**      **Prevalence of Autoimmune Conditions in Patients with Vocal Fold Scarring of Unknown Etiology**  
Sabrina Zapata, MD, Panama City, Panama; Laureano A. Giraldez, MD, Atlanta, GA; Michael Johns III, MD\*, Atlanta, GA; Adam Klein, MD, Atlanta, GA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to consider vocal fold scar of unclear etiology as a possible manifestation of autoimmune disease.

**Objectives:** To evaluate the incidence of initial diagnosis of autoimmune disorders in patients with vocal fold scarring of unknown etiology. **Study Design:** Retrospective chart review of patients who presented with vocal fold scarring and underwent a subsequent autoimmune workup. **Methods:** The charts of 65 patients for which we ordered an autoimmune disease panel at our voice center were reviewed. Patients with vocal fold sulcus, fibrous lesion and loss of superficial lamina propria were diagnosed as having vocal fold scar. **Results:** 65 patients with vocal fold scar of unclear etiology were identified among those worked up for autoimmune disease. Of these, 15 (23%) patients had a positive autoimmune panel. There were 10 (66%) female patients and 5 (34%) male patients. 8 (53%) of patients had a positive rheumatoid factor (RF), 6 (46%) a positive erythrocyte sedimentation rate (ESR), 2 a positive anti-nuclear antibody, 2 a positive SSA, 1 a positive C-ANCA, 1 a positive C3, and 1 a positive SCL-70. **Conclusions:** These results suggest that vocal fold scarring of unknown etiology can raise the suspicion of autoimmune disorders in patients. Furthermore, the incidence of positive autoimmune markers was higher in our vocal fold scar patient group (23%) than in the general population (5%).

- 3:49**      **Paradoxical Vocal Fold Motion Disorder in the Elite Athlete: Experience at a Large Division I University**  
Anna M. Marcinow, MD, Columbus, OH; Tandy Chiang, MD, Aurora, CO; L. A. Forrest, MD MBA\*, Columbus, OH; Brad W. DeSilva, MD, Dublin, OH

**Educational Objective:** At the conclusion of this presentation, the participants should be able to identify the strategies for diagnosis and management of paradoxical vocal fold motion disorder (PVFMD) in the elite athlete. This entity is frequently misdiagnosed as asthma or reactive airway disease and has the potential to significantly impact the performance status of the elite athlete. It should be suspected in athletes with exercise induced dyspnea and minimal response to bronchodilators. The demographic, diagnosis and management of this disorder has been sparsely described in the literature.

**Objectives:** To review our experience at a large division I university with the diagnosis and management of PVFMD in elite athletes. **Study Design:** A single institution retrospective review and cohort analysis. **Methods:** All elite athletes (division I collegiate athletes, triathletes and marathon runners) with a diagnosis of PVFMD were identified. All patients underwent flexible fiberoptic laryngoscopy (FFL) to confirm the diagnosis of PVFMD. The type of PVFMD therapy was identified and efficacy of treatment was graded based on symptom resolution. **Results:** 46 consecutive athletes with PVFMD were identified. 30/46 (65%) were division I collegiate athletes and 16/46 (35%) were triathletes or marathon runners. In comparison to a non-athlete PVFMD cohort, athletes were less likely to present with a history of reflux ( $p<0.01$ ), psychiatric diagnosis ( $p<0.01$ ), dysphonia ( $p<0.01$ ), cough ( $p=0.02$ ) or dysphagia ( $p<0.01$ ). The use of post-exertion FFL provided additional diagnostic information in 11 (24%) patients. Laryngeal control therapy (LCT) was recommended for 45/46. 36/45 attended at least 1 LCT session and 25 (69%) reported improvement of symptoms. Additionally, biofeedback, practice observed therapy and thyroarytenoid muscle botulinum toxin injection were required in 3, 2, and 1 patients, respectively. **Conclusions:** The addition of a trigger during FFL improves the sensitivity to detect PVFMD. PVFMD in athletes responds well to LCT. However,

biofeedback, practice observed therapy and botulinum toxin injection may be required for those patients with an inadequate response to therapy.

**3:57 Revisiting Grade as a Prognostic Indicator in Oral Cavity Squamous Cell Carcinoma: A Population Based Analysis of the Data**

Brian R. Thomas, MD, Lebanon, NH; Louise Davies, MD MS\*, White River Junction, VT

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the prognostic implications of pathologic grade in oral cavity squamous cell carcinoma.

**Objectives:** Histologic grade is not currently included in oral cavity staging criteria to determine prognosis. However, in other tumor locations, tumor grade is known to impact prognosis. We use a large database to test the hypothesis that histologic grade is an independent predictor of prognosis. **Study Design:** Population based cohort study using the Surveillance, Epidemiology, and End Results (SEER) database of the National Cancer Institute. **Methods:** 38,023 patients with squamous cell carcinoma of the oral cavity diagnosed between 1973 and 2009 were included. Survival analysis was performed comparing survival by grade and stage plus grade. **Results:** Five year cancer specific survival for grade 1 (well differentiated) was 63.4% (95% C.I. 62.0%-64.8%), for grade 2 (moderately differentiated) was 50.6% (95% C.I. 49.6%-51.7%) and for combined grades 3-4 (poorly and undifferentiated) was 37.5% (95% C.I. 35.8%-39.1%). When stratified by extent of disease the trend persisted. For patients with localized disease five year cancer specific survival for grade 1 was 78.8% (95% C.I. 76.8%-80.7%), grade 2 was 68.8% (95% C.I. 67.1%-70.5%), grade 3-4 was 55.7% (95% C.I. 52.4%-59%). **Conclusions:** High histologic grade in oral cavity cancer is associated with poorer survival and carries independent prognostic value in addition to TNM stage. Thus, histologic grade should be considered clinically when making treatment decisions, and multivariable models of survival should include grade as a covariate to improve prognostic accuracy.

**4:05 Q&A**

**4:10 - 5:00 MOLECULAR MARKERS IN HEAD AND NECK CANCER**

**Moderator:** Edmund A. Pribitkin, MD FACS\*, Philadelphia, PA

**Panelists:** Jeffrey M. Bumpous, MD FACS\*, Louisville, KY

*Thyroid Cancer*

Robert L. Ferris, MD PhD FACS\*, Pittsburgh, PA

*Salivary Gland Cancer*

Jeffrey N. Myers, MD FACS\*, Houston, TX

*Malignant Melanoma*

**5:00 Adjourn**

**5:30 - 7:00 "MEET THE AUTHORS" POSTER RECEPTION**

## SATURDAY, APRIL 13, 2013

8:00 - Noon

7:00 - 7:50 *Business Meeting (Fellows Only) - Mediterranean 4*

### 7:55 - Noon Scientific Session *Mediterranean 4*

7:55 Announcements

### 8:00 - 10:00 General, Sleep Medicine

Moderators: David L. Steward, MD FACS\*, Cincinnati, OH  
Kathleen L. Yaremchuk, MD\*, Detroit, MI

8:00 **Temporal Trends in Sleep Apnea Surgery: 1993-2010**  
Stacey L. Ishman, MD MPH, Baltimore, MD; Lisa E. Ishii, MD MHS, Baltimore, MD; Christine G. Gourin, MD MPH\*, Baltimore, MD

**Educational Objective:** At the conclusion of this presentation, the participants should be able to explain changes in sleep surgery trends over time.

**Objectives:** Growing evidence supports the use of multilevel surgery to effectively address obstructive sleep apnea (OSA). We sought to characterize changes in the patterns of surgical sleep care over time. **Study Design:** Retrospective cross-sectional study. **Methods:** Discharge data from the Nationwide Inpatient Sample for 232,470 patients who underwent a nasal, palatal or hypopharyngeal procedure for sleep disordered breathing or OSA in 1993-2010 was analyzed using cross-tabulations and multivariate regression modeling. **Results:** There was a 39% increase in inpatient sleep surgical procedures, with 97,363 procedures performed in 1993-2000 and 135,107 in 2001-2010. Sleep surgery in 2001-2010 was associated with an increase in hypopharyngeal procedures (RRR 3.6, 95% CI 2.604-9, P<0.001), particularly tongue radiofrequency/midline glossectomy (RRR 5.1, 95% CI 3.407-5, P<0.001), hyoid suspension (RRR 6.8, 95% CI 3.8-12.5, P<0.001), and nasal surgery (RRR 1.3, 95% CI 1.1-1.5, P=0.002). Compared to 1993-2000, sleep surgery in 2001-2010 was associated with an increase in sleep surgery (RRR 1.9, 95% CI 1.4-2.5, P<0.001), an increase in obesity (RRR 1.5, 95% CI 1.4-1.7, P<0.001) and advanced comorbidity (RRR 2.4, 95% CI 2.0-2.8, P<0.001). Surgeons in the top volume quintile were more likely to perform hypopharyngeal procedures (RRR=2.4, 95% CI 1.7-3.4, P<0.001) and be associated with teaching hospitals (RRR=1.5, 95% CI 1.0-2.2, P=0.034) but represented a lower overall percentage of those performing sleep surgery in 2001-2010 compared to 1993-2000, after controlling for all other variables. **Conclusions:** There has been a significant increase in sleep surgery procedures with a shift towards increased use of procedures that address the nasal and hypopharyngeal airway.

8:08 **Pre and Postoperative Quality of Life in Uvulopalatopharyngoplasty**  
Jonathon O. Russell, MD, Cleveland, OH; Charles J. Bae, MD, Cleveland, OH; Alan H. Kominsky, MD, Cleveland, OH

**Educational Objective:** At the conclusion of this presentation, the participants should be able to quantify changes in quality of life following uvulopalatopharyngoplasty.

**Objectives:** To evaluate objective measures of postoperative quality of life following uvulopalatopharyngoplasty (UPPP) and contrast these with objective measures of preoperative quality of life. **Study Design:** Retrospective chart review with subsequent postoperative survey. **Methods:** All of our institution's patients who have undergone UPPP and have preoperative polysomnogram (PSG) results in the electronic medical record (EMR) were included in the study. Each of these patients was sent a copy of multiple, validated, surveys, including Epworth Sleepiness Scale (ESS), the Fatigue Severity Scale (FSS), Patient Health Questionnaire (PHQ-9), European Quality of Life (EQ-5D), and the Functional Outcomes of Sleep Questionnaire (FOSQ). Preoperative and postoperative survey results and PSG results (including postoperative PSG results when available) were compared using standard statistical analysis. **Results:** 266 patients were identified on initial search of the EMR. Of these, more than 100 had preoperative PSG results. Of 40 patients analyzed to date, the average preoperative apnea-hyponea index (AHI) was 51.4. Where available, average postoperative AHI was 24.3. Of 33 patients with both pre and postoperative results, 30 (90.9%) had a decrease in AHI. Of 9 patients with preoperative and postoperative survey results, 7 of 9 (77.7%) had a decrease in ESS, 6 of 7 (85.7%) had a decrease in the FSS, and 4 of 7 (57.1%) had a decrease in PHQ-9. **Conclusions:** UPPP contributes to objective improvement in quality of life as measured by both PSG and validated sleep related questionnaires.

**8:16 Outcome Measurements in Obstructive Sleep Apnea: A Systematic Review**

Samantha H. Tam, MD, London, ON Canada; B. Tucker Woodson, MD\*, Milwaukee, WI; Brian W. Rotenberg, MD MPH, London, ON Canada

**Educational Objective:** At the conclusion of this presentation, the participants should be able to 1) understand the limitations of apnea-hypopnea index (AHI), and respiratory disturbance index (RDI) in the diagnosis and monitoring treatment of obstructive sleep apnea (OSA); and 2) understand the utility of other outcome measures for diagnosis and monitoring treatment for patients suffering from OSA.

**Objectives:** Polysomnographic measures (apnea hypopnea index [AHI] and respiratory disturbance index [RDI]) are the most commonly used markers for diagnosis and evaluation of treatment in obstructive sleep apnea (OSA). However, these measures lack a strong physiological basis and are in some cases arbitrarily defined. This study investigates the utility of other outcome measures in OSA management. **Study Design:** Systematic review. **Methods:** A systematic review was performed using a PubMed database. All English articles from 1990-2012 focusing on outcome measures in adults with OSA were included. Studies in pediatric populations, those combining obstructing and central sleep apnea, and those without the use of outcome measures were excluded. Papers were categorized according to level of evidence. Two scales (Downs and Black and AMSTAR) were used to assess study quality. **Results:** Of a total of 10,454 retrieved articles, 19 studies met inclusion and exclusion criteria. Many categories of outcome measures were found: general and OSA specific quality of life, measurements of sleepiness, performance, and physiological. Subjects with OSA scored differently in measurement tools in all categories when compared to either control populations or after treatment. A generally poor correlation with AHI and RDI was seen in most categories. **Conclusions:** The literature shows a wide range of measures based on symptoms and physiology of OSA that are useful in distinguishing individuals with or without OSA and assessing effect of treatment. Many diverge from AHI and RDI outcomes. Diagnosis and assessment of OSA should neither be limited nor prioritized to AHI or RDI outcomes.

**8:24 Examining the Association between Clinic Wait Time and Patient Satisfaction Score**

Anthony L. Chin-Quee, MD, Detroit, MI; Alvin B. Ko, MD, Detroit, MI; Lonni R. Schultz, PhD, Detroit, MI

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the implications of clinic wait time on patient satisfaction.

**Objectives:** Patient experience scores are emerging as key measures of healthcare quality. The investigators examine the relationship between patient experience scores and outpatient clinic wait time. **Study Design:** Patient level analysis of Press Ganey Medical Practice surveys by outpatient otolaryngology patients at a tertiary care center from July 1, 2006 through June 30, 2012. **Methods:** The survey contains 33 Likert scaled items comprising an overall score and scores in seven service domains: access, visit, nursing, care provider, personal issues, lab tests, overall assessment. Patient responses were grouped by self-reported wait times to assess correlation with overall scores. T-testing was used to determine the clinic wait time after which patient overall satisfaction score dropped below the Press Ganey average. **Results:** Of 34,083 total visits to our clinic, the Press Ganey Medical Practice survey received 1,669 respondents. The average patient satisfaction rating across all otolaryngology practices using Press Ganey surveys was 90.2, while our average score was 87.5. Preliminary analysis suggests that satisfaction correlates with wait times, with below average scores noted after a wait of 6 or more minutes. T-tests will be done to assess the time frame at which our practice's patient satisfaction scores fall below the Press Ganey Otolaryngology average score. Additional analyses will be done to investigate the association between drop in satisfaction and patient demographic characteristics. **Conclusions:** Patient satisfaction is correlated with wait time in the outpatient clinic setting. The investigators anticipate that targeting wait times in otolaryngology clinics can help improve overall patient satisfaction.

**8:32 Implementing Videoconferencing Technology in the Patient-Surgeon Preoperative Interaction**

Anthony G. Del Signore, MD, New York, NY; Rajan Dang, BS, New York, NY; Jaymarc Illoreta, MD, New York, NY; Benjamin D. Malkin, MD, New York, NY

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the role videoconferencing can play in the patient-surgeon preoperative interaction and identify its benefits and drawbacks for patient care.

**Objectives:** To examine the use of videoconferencing technology as a means of improving the patient-surgeon interaction on the day of surgery. **Study Design:** Randomized controlled study. **Methods:** Subjects were recruited from patients undergoing ambulatory otolaryngologic surgery at a tertiary care hospital. For their preoperative interaction with the surgeon, subjects were randomized to a standard face to face interaction or a videoconference via tablet computer. Afterwards, subjects and surgeons completed questionnaires about the experience. Various time points in patient flow were also recorded. **Results:** Thirty-one patients were enrolled and 25 completed the study; five otolaryngologists participated. Mean overall patient satisfaction scores were similar in the face to face and videoconferencing groups (9.87/10 and 9.88/10, respectively ( $p=0.92$ )), as were mean interaction times (119 seconds and 81 seconds, respectively ( $p=0.18$ )). The mean waiting time in the preoperative holding area also did not vary significantly between the groups. Twenty percent of the videoconference interactions took place while the operating surgeon was more than 5 minutes away from the preoperative area. Surgeons were highly satisfied with the videoconferencing and indicated a likelihood of incorporating the technology into their daily practice. **Conclusions:** This pilot study demonstrates the feasibility of incorporating videoconferencing technology into a surgical practice and the potential for improved efficiency. We found that overall patient satisfaction with a preoperative videoconfer-

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enced patient-surgeon interaction did not differ significantly from that for a standard face to face discussion.

8:40 Q&A

8:44 **Contributing Factors to Adoption of Electronic Medical Records in Otolaryngology Offices**  
Hossein Mahboubi, MD MPH, Irvine, CA; Ara A. Salibian, BS, Irvine, CA; Edward C. Wu, MD MBA, Irvine, CA;  
Madhukar S. Patel, MD MBA, Irvine, CA; William B. Armstrong, MD\*, Irvine, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to explain the advantages of electronic medical record (EMR) adoption, demonstrate a basic knowledge of incentive programs by Medicare and Medicaid, and discuss the barriers to electronic medical record adoption in outpatient offices.

**Objectives:** 1) To determine the percentage and characteristics of outpatient otolaryngology offices with electronic medical record (EMR) system; and 2) to compare the adoption rate with other specialties. **Study Design:** Cross-sectional analysis of U.S. representative data from the National Ambulatory Medical Care Survey (NAMCS). **Methods:** The 2007-2010 NAMCS datasets were analyzed. Offices with all or partial EMR system adoption were compared to offices without EMR systems with respect to year, geographic region, urban setting, office setting, practice type, practice ownership, employment status, electronic billing, and revenues from Medicare, Medicaid, private insurance, and patient payment. In addition, the usage rate within each variable was compared between otolaryngologists and other specialists. **Results:** Univariate analysis found EMR use was significantly higher among otolaryngology practices located in metropolitan areas, practices owned by larger groups of practitioners, and practices utilizing electronic billing. Sources of patient revenue did not correlate with likelihood of EMR use. Multivariate analysis revealed that EMR use by otolaryngologists was significantly associated with group practices and offices using electronic billing. EMR utilization by otolaryngology practices increased year over year from 2007-2009 and dropped from 57.7% in 2009 to 40.3% in 2010. EMR use by otolaryngology practices was not significantly different from other specialties. **Conclusions:** EMR utilization by otolaryngology practices measured by data from NAMCS is similar to other specialties and is more likely in metropolitan areas and larger practice settings. Despite the announcement of incentive programs under Medicare and Medicaid in 2009, no increase in EMR usage was captured by this survey.

8:52 **Manual Dexterity and Surgical Skills in Otolaryngology-Head and Neck Surgery Residents**  
Maya M. Furman, BA, Albany, NY; Jason M. Roberts, MD, Albany, NY; Jason Mouzakes, MD, Albany, NY;  
Stanley M. Shapshay, MD\*, Albany, NY

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss whether or not manual dexterity skills, such as playing a musical instrument, may predict surgical success in otolaryngology residents.

**Objectives:** To evaluate whether a correlation is found among residents with self-identified talents requiring manual dexterity skills and their surgical competency; to determine if such talents can be used as predictors of surgical performance in otolaryngology residents. **Study Design:** Retrospective review of residency applications; evaluation of residents' surgical skills. **Methods:** Electronic Residency Application Service (ERAS) applications of otolaryngology program residents over a fourteen year period were reviewed. Self-identified hobbies involving manual dexterity skills were noted, which included: playing a musical instrument, painting, sketching, carpentry, and automobile repair. Modified objective structured assessment of technical skills (OSATS) based assessments were developed (on a 5 point scale) for otolaryngology-head and neck surgery (OHNS) procedures, including: micro direct laryngoscopy/bronchoscopy, thyroidectomy/parotidectomy, endoscopic sinus surgery, tympanomastoidectomy, tonsillectomy, and myringotomy. Department faculty retrospectively evaluated the residents in each of the procedures and each resident was given a composite score based on overall performance. **Results:** Twenty-six otolaryngology residents were included in the study. The overall faculty rating of the residents showed good interrater reliability. Overall ratings of the residents were compared with application components indicating manual dexterity skills. Regression analysis showed no significant correlation between having talents requiring manual dexterity skills and OSATS scores. **Conclusions:** Engaging in hobbies requiring manual dexterity skills, such as playing a musical instrument, may not be predictive of surgical performance as an otolaryngology resident. Questions still remain about the effectiveness of the residency application process in deciding which factors can be used to screen for the most skilled and competent future surgeons. A multi-center study is planned.

9:00 **The Academic Impact of the Triological Society Theses—Mosher and Fowler Awards: Citations, Impact Factor, and H-Index**  
Karam W. Badran, BS, Irvine, CA; Sari Lahham, BS, Irvine, CA; Roger L. Crumley, MD MBA FACS\*, Irvine, CA;  
Brian J.F. Wong, MD PhD\*, Irvine, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the academic impact of Triological Society theses, Mosher, and Fowler awards.

**Objectives:** The Triological Society requires thesis submission for full membership. Accepted theses (AT) may be recognized with designations of honorable mention (HM), Mosher (MA) and Fowler awards (FA) for excellence. We sought to determine and compare the scholarly impact of Triological theses, their authors, and whether differences exist between AT and those that receive special recognition. **Study Design:** Retrospective analysis of awards and theses compiled by the Triological Society home office from 1998-2011. **Methods:** PubMed, Google Scholar and Thomson Reuters' Data Citation Index were used to determine citations and the author's H-

index. Trend and statistical analysis was performed. **Results:** 256 published theses were identified from a pool of 307 accepted. AT, MA, FA were cited 21.03 +/- 28.08, 19.62 +/- 16.85, and 28.69 +/- 45.47 respectively. No statistical significance was found between the number of citations of AT and those with FA or MA ( $p > 0.05$ ). H-index values for AT, MA, FA authors were 17.56 +/- 9.57, 19.23 +/- 5.61, and 19.23 +/- 5.61 respectively. H-indices of authors with AT and those with FA or MA were found to have no significant difference ( $p > 0.05$ ). Over time, number of AT per year increased from 11 to 31, then declined and stabilized at 15 from 2001 until 2003 and has since remained between 20 and 30. **Conclusions:** The Triological Society cultivates a competitive pool of applicants as membership is highly regarded. Negligible difference in citations and author H-Index were observed between AT, MA, and FA theses indicated that the level of excellence is uniform and thesis submission remains influential and prestigious.

**9:08 Transoral Robotic Surgery for Pharyngoplasty: A Novel Application of a New Technology**  
James K. Byrd, MD, Pittsburgh, PA; Kara S. Davis, MD, Pittsburgh, PA; Joseph E. Losee, MD, Pittsburgh, PA;  
Steven C. Bonawitz, MD, Baltimore, MD; Umamaheswar Duvvuri, MD, Pittsburgh, PA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to apply robotic surgery to challenges involving complex reconstruction of the oropharynx and nasopharynx.

**Objectives:** Restoration of pharyngeal port function and anatomy is a challenging undertaking due to poor visualization and difficulty in precise dissection and suturing. We describe the novel use of the DaVinci surgical robot to treat pharyngeal stenosis and velopharyngeal insufficiency via local mucosal flap reconstruction, taking advantage of the system's advanced optics and instrumentation to overcome these difficulties. **Study Design:** Retrospective case series. **Methods:** A review of the electronic medical record was performed to identify patients who underwent transoral robotic surgery (TORS) at our institution. Patients who underwent surgery for suspected malignancy or obstructive sleep apnea were excluded. **Results:** 148 TORS cases were performed at the institution, 5 pharyngoplasties and 5 facial artery musculomucosal flaps (previously reported). Ages ranged from 8-74 years. Patients were treated with a robotic assisted operation that consisted of bilateral opposing Z-plasties to align mucosal surfaces and facilitate healing. Four patients underwent expansion pharyngoplasty for pharyngeal stenosis, and one patient had a pharyngeal flap for velopharyngeal insufficiency. Length of followup ranged from one month to one year. There was one failure, a 74 year old male with a history of chemoradiation to the area who has required repeated endoscopic balloon dilations. **Conclusions:** Transoral robotic surgery allowed for improved visualization and fine dissection to perform bilateral opposing Z-plasty in a poorly accessible, challenging surgical area. Appropriate patient selection is necessary and long term followup is warranted for the selected cases.

**9:16 Q&A**

**9:20 - 9:50 KEYNOTE ADDRESS**  
**The Joy and Responsibilities of Teaching Well**  
L. Dee Fink, PhD, Norman, OK

**9:50 Q&A**

**10:00 - 10:30 Break with Exhibitors/Poster Viewing**

## 10:30 - Noon Facial Plastic/Reconstructive Surgery

**Moderator: Robert M. Kellman, MD FACS\*, Syracuse, NY**

**10:30 Are Free Flaps Always Necessary? The Role of Submental and Supraclavicular Pedicled Flaps in the Head and Neck**  
Richard E. Hayden, MD\*, Phoenix, AZ; Thomas H. Nagel, MD, Phoenix, AZ; Michael L. Hinni, MD\*, Phoenix, AZ;  
Carrlene B. Donald, PA-C, Phoenix, AZ

**Educational Objective:** At the conclusion of this presentation, the participants should be able to objectively compare the options of free and pedicled flaps for these specific defects and to understand and discuss the relative advantages and disadvantages of each flap for a specific application.

**Objectives:** To compare relatively under-utilized pedicled flaps with free flaps for specific head and neck defects. **Study Design:** Prospective assessment of free and pedicled flaps for targeted head and neck defects in a single institution. **Methods:** Flap success rates, complication rates, operative time, donor morbidity and functional outcomes were compared for specific defects such as those seen following total pharyngolaryngectomy, oropharynx resection, radical facial resection and extensive oral cavity resection. This paper uses clinical examples to demonstrate the anatomy, harvest technique and disadvantages of each flap. These are used to develop a surgical algorithm for flap choice in targeted defects. **Results:** In 1000 consecutive flap reconstructions within the head and neck, an obvious shift away from free flaps towards pedicled submental and supraclavicular flaps has occurred for certain specific defects. Most notably radial forearm free flap (RFFF) utilization has plummeted for oral and oropharyngeal reconstruction, replaced by the pedicled submental flap. The submental flap has also replaced the RFFF and the anterolateral thigh flap for facial re-

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construction given its superior color match with the recipient site. The supraclavicular flap has replaced all free flaps for reconstruction of most pharyngolaryngectomy defects. **Conclusions:** The quest for the ideal flap for each head and neck defect continues. Given the reliability, versatility, low morbidity and positive outcomes associated with submental and supraclavicular pedicled flaps harvested within the head and neck surgical field, there is now questionable benefit to using more complicated free flaps from remote donor sites to reconstruct many defects of the head and neck. Some defects such as the large oromandibular defect still unquestionably benefit from free flap reconstruction.

## 10:38 Improved Wound Healing of Post-Ischemic Cutaneous Flap Tissue with the Use of Bone Marrow Derived Stromal Stem Cells

Melissa S. Hu, MD, Shreveport, LA; David H. Ludlow, MD, Shreveport, LA; Jerry W. McLarty, PhD, Shreveport, LA; Jonathan S. Alexander, PhD, Shreveport, LA; Timothy S. Lian, MD, Shreveport, LA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand that bone marrow derived stem cells may provide a role in enhancing the clinical survival of cutaneous tissue flaps and various other complex cutaneous wounds.

**Objectives:** To determine if the intravascular delivery of mesenchymal stem cells improves wound healing and blood perfusion to post-ischemic cutaneous flap tissues. **Study Design:** Randomized controlled study. **Methods:** A murine model of a cutaneous flap was created based on the inferior epigastric vessels. Mice (n = 14) underwent 3.5 hours of ischemia followed by reperfusion.  $1 \times 10^6$  bone marrow stromal cells (BMSCs) were injected intravenously. Wound healing was then assessed using photographic analysis. Blood perfusion was recorded with a laser Doppler monitor. Tensile strength of the flap was determined after a period of 14 days. Localization of BMSCs was determined with radiolabeled and fluorescent labeled BMSCs. **Results:** Post-ischemic cutaneous flap tissues treated with BMSCs demonstrated significantly less necrosis than control flaps ( $p < 0.01$ ). Beginning on postoperative day 5, BMSC treated flaps demonstrated greater blood perfusion than untreated flaps ( $p < 0.01$ ). Tensile strength of BMSC treated cutaneous flaps was significantly higher ( $p < 0.01$ ) with a mean strength of  $251.6 \pm 118.3$  N/m than control flaps with a mean of  $122.4 \pm 84.8$  N/m. Radiolabeled BMSCs localized to post-ischemic flaps compared to untreated tissues ( $p = 0.002$ ). Fluorescent microscopy revealed incorporation of BMSCs into endothelial and epithelial tissues of post-ischemic flaps. **Conclusions:** This study demonstrates that the intravascular delivery of BMSCs increases wound healing and promotes flap survival following ischemia-reperfusion injury of cutaneous tissue flaps.

## 10:46 Selectin Blockade Decreases Postischemic Recruitment of Bone Marrow Stromal Cells

Brian J. Lawton, MD, Shreveport, LA; Melissa S. Hu, MD, Shreveport, LA; Jennings R. Boyette, MD, Shreveport, LA; Timothy S. Lian, MD FACS, Shreveport, LA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the recruitment and blockade of bone marrow stromal cells (BMSCs) following transient ischemia.

**Objectives:** To compare recruitment of radiolabeled BMSCs in an ischemic flap model treated preoperatively with a pan-selectin blocker, fucoidan, in a murine model. **Study Design:** Controlled laboratory study. **Methods:** A cutaneous flap based on the inferior epigastric artery was elevated and transient ischemia of 3.5 hours using a standard vascular clamp was achieved. Fucoidan was injected intravenously twenty-four hours prior to the ischemic period. Following the period of ischemia, radiolabeled BMSCs were injected intravenously and radioactivity was determined postoperatively. **Results:** Attenuation of the uptake of BMSCs into postischemic tissue was observed in those mice treated with fucoidan as indicated by the Chromium-51 uptake measured in the flaps when compared with controls. **Conclusions:** Decreased uptake of radiolabeled BMSCs into postischemic tissues pretreated with fucoidan indicates selectin mediated BMSC recruitment in a murine cutaneous flap model.

## 10:54 Q&A

## 11:00 - 11:55 COMMON PITFALLS IN FACIAL PLASTIC/RECONSTRUCTIVE SURGERY

**Moderator:** Robert M. Kellman, MD FACS\*, Syracuse, NY  
*Midface Trauma Repair*

**Panelists:** Fred G. Fedok, MD, Hershey, PA  
*Rhinoplasty*  
Wm. Russell Ries, MD FACS\*, Nashville, TN  
*Otoplasty*  
J. Regan Thomas, MD FACS\*, Chicago, IL  
*Scar Revision*

## 11:55 Introduction of President-Elect Jonas T. Johnson, MD FACS\*, Pittsburgh, PA

## Noon Adjourn

## POSTERS

**Allergy/Rhinology, Facial Plastic & Reconstructive****A159. Pediatric Nasal Valve Surgery**

Victor K. Chung, MD, Boston, MA; Andrew R. Scott, MD, Boston, MA; Arnold S. Lee, MD, Boston, MA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the indications and short term outcomes of nasal valve surgery in the pediatric patient.

**Objectives:** To report on eleven cases of pediatric (<16 years old) patients who underwent reconstructive, open nasal valve surgery for symptomatic nasal valve collapse. **Study Design:** Case series and review of the literature. **Methods:** A database of patients who had undergone nasal valve surgery with cartilage grafting at a single tertiary pediatric institution was queried. Charts were reviewed for indications and short term outcomes including patient satisfaction and postoperative complications within the first ninety days following surgery. A literature review was performed to assess similar outcome measures in adult nasal valve surgery patients. **Results:** We present eleven pediatric patients with symptomatic nasal valve collapse who underwent open nasal valve repair surgery utilizing cartilage grafts. Patients ranged in age from seven to fifteen years. Surgical indications included symptomatic nasal obstruction due to previous nasal trauma, congenital nasal deformities, and hemangioma of infancy. All patients expressed satisfaction with the level of improvement of their nasal obstructive symptoms. There was one episode of self-limited epistaxis after splint removal on postoperative day seven. **Conclusions:** This small series suggests that short term results following pediatric open nasal valve repair surgery may be similar to those seen in adult patients. These outcomes have not been previously described in the literature. In the pediatric patient, an obstructive nasal breathing pattern may be caused by nasal valve collapse, which can be addressed with reconstructive nasal valve surgery with cartilage grafting.

**A160. Analysis of Headache Outcomes in Patients Treated with Endoscopic Sinus Surgery**

Melinda V. Davis-Malesevich, MD, Boston, MA; Niranjana Sritharan, MBBS, Boston, MA; Ziad Rohayem, MD, Boston, MA; Rohan C. Wijewickrama, MD, Boston, MA; Peter J. Catalano, MD, Boston, MA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to identify select headache patients that would benefit from functional endoscopic sinus surgery.

**Objectives:** To assess the headache outcomes for patients treated with targeted endoscopic sinus surgery. **Study Design:** Prospective, non-randomized. **Methods:** Consecutive patients (n=50) presenting to our clinic with headache as a feature of their presenting symptoms were recruited. Preoperative SNOT-20 (Sinonasal Outcome Test) scores, HIT-6 (Headache Impact Test, a validated headache related disability index) scores, and computed tomography (CT) analysis of multiple radiological parameters were calculated and compared to postoperative scores. **Results:** Preliminary results for our cohort reveals a mean preoperative HIT-6 score of 60 and post-operative score of 42 ( $p < 0.0001$ , score  $< / = 49$  signifies minimal impact on life, score  $> / = 60$  signifies severe impact on life), and a mean preoperative SNOT-20 score of 49 and postoperative score of 19 ( $p < 0.0001$ ). Patients had an average of 3 contact points identified on CT and average Lund-Mackay score of 5. Median followup was 3 months. **Conclusions:** Targeted endoscopic sinus surgery offers a reliable therapeutic modality in patients with headache as a feature of their presenting symptoms. Correlative CT findings and surgical techniques are discussed.

**A161. Innate Immunity Gene Regulation in Chronic Rhinosinusitis**

Kara Y. Detwiller, MD, Portland, OR; Nathan B. Sautter, MD, Portland, OR; Dennis R. Trune, PhD, Portland, OR; Jeremiah A. Alt, MD PhD, Portland, OR; Jess C. Mace, MPH, Portland, OR; Timothy L. Smith, MD MPH\*, Portland, OR

**Educational Objective:** At the conclusion of this presentation, the participants should be able to compare the levels of innate immunity mucosal gene expression in patients with chronic rhinosinusitis with and without nasal polyposis.

**Objectives:** To evaluate innate immunity mucosal gene expression in patients with chronic rhinosinusitis (CRS) and to determine differential expression in patients with nasal polyposis (CRSwNP) and without nasal polyposis (CRSsNP) as compared to controls. **Study Design:** Prospective cohort study. **Methods:** Patients with CRS according to the 2007 Adult Sinusitis Guidelines with medically refractory disease were prospectively enrolled. Ethmoid mucosa samples were harvested during surgery from patients with CRS as well as controls without CRS or allergy. Quantitative real time polymerase chain reaction was used to determine levels of mRNA expression of interleukin 4 and 13, fibroblast growth factor-2 (FGF2), toll-like receptors-2 and -9 (TLR2, TLR9), and interleukin-22 receptor (IL-22R). The average change in crossover threshold (Ct) and fold change were calculated and differences between controls, CRSwNP, and CRSsNP were compared. Statistical analysis was performed using analysis of variance (ANOVA) and adjusted two tailed t-tests for multiple comparisons. **Results:** All patients with CRSwNP (n=18) demonstrated lower expression of TLR2 ( $p < 0.05$ ) compared to all controls (n=9). Similarly, patients with CRSsNP (n=27) demonstrated statistically less expression of TLR2 compared to controls ( $p < 0.05$ ). In addition, decreased expression of FGF2 was noted in both CRSsNP and CRSwNP groups compared to controls ( $p < 0.05$ ). Patients with CRSsNP demonstrated significantly higher expression of IL-22R ( $p < 0.05$ ) than either CRSwNP or controls. **Conclusions:**

## Posters

TLR2, FGF2, IL-22R and are differentially expressed in CRS compared to controls. TLR2 and FGF2 are expressed significantly less in patients with CRS compared to those without CRS. Only patients with CRSsNP demonstrate increased expression of IL-22R.

### A162. Facial Reanimation Surgery Restores Affect Display

Jacob K. Dey, BS, Baltimore, MD; Masaru A. Ishii, MD PhD, Baltimore, MD; Kofi D.O. Boahene, MD, Baltimore, MD; Patrick Byrne, MD, Baltimore, MD; Lisa E. Ishii, MD MS, Baltimore, MD

**Educational Objective:** At the conclusion of this presentation, the participants should be able to appreciate the impact of facial reanimation surgery on affect display in paralyzed faces, comparing outcomes for faces in smile and repose.

**Objectives:** Provide evidence for the impact of facial reanimation surgery on affect display in facial paralysis patients. **Study Design:** Randomized controlled experiment. **Methods:** Ninety naïve observers completed a survey with pictures of paralyzed faces, smiling and in repose before and after surgery, as well as normal comparison faces. Observers characterized the affect display of each face using eight primary affects from the Derogatis Affects Balance Scale plus one neutral affect. Results were analyzed with latent class analysis and regression using a three class model representing positive, negative, and neutral affect dimensions. **Results:** Preoperatively, paralyzed faces smiling and in repose were most likely to be considered negative. Postoperatively, these same faces smiling and in repose were most likely characterized as positive and neutral, respectively. This improvement in affect display approaches the pattern seen in normal faces. The probability of classifying normal faces in repose as neutral is 63%, positive 22%, and negative 15%. For paralyzed faces in repose, reanimation surgery restored affect display to normal levels; changing the probability of neutral classification from 41% to 54%, positive from 3% to 28%, and negative from 56% to 18%. These results were statistically significant. For paralyzed smiling faces, surgery failed to restore affect display to the degree seen in normal smiling faces; however, it still showed improvement by decreasing negative and increasing positive characterization. **Conclusions:** Facial reanimation surgery improved affect display in patients with facial paralysis. These results provide evidence to support the importance of facial reconstruction to minimize psychosocial dysfunction.

### A163. Prevalence of Bacterial Infection in Adults with Acute Rhinosinusitis

Elisabeth J. Ference, MD MPH, Chicago, IL; Charlesnika T. Evans, PhD MPH, Chicago, IL; Bruce K. Tan, MD, Chicago, IL; Rakesh K. Chandra, MD, Chicago, IL; Robert C. Kern, MD\*, Chicago, IL; Stephanie S. Smith, MD, Chicago, IL

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the prevalence of bacterial infection in adults with clinical, radiographical, and/or endoscopic signs of acute rhinosinusitis and implications for antibiotic prescribing.

**Objectives:** The reported prevalence of bacterial infection as the cause of acute rhinosinusitis (ARS) ranges from 0.5% to over 50%. This study aimed to systematically assess the prevalence of culturable bacteria in adults clinically diagnosed with acute bacterial rhinosinusitis (ABRS). **Study Design:** Systematic review. **Methods:** PubMed and CINAHL databases were queried for English language studies of humans using search terms “acute sinusitis”, “acute bacterial sinusitis”, “acute rhinosinusitis” and “acute bacterial rhinosinusitis”, yielding 1,002 abstracts. Studies 1) without cultures (antrum via puncture or endoscopically guided middle meatus); 2) without experimental study design; 3) with N<10; or 4) with aged 13 were excluded. **Results:** Of the resulting 29 articles, evaluating a total of 9,595 patients with a clinical diagnosis of ARS, 14 (48%) required radiographic confirmation of sinusitis, 1 (3%) required evidence of purulence, 10 (35%) required both for inclusion in the study population, and 4 (14%) required neither. The mean prevalence of bacterial growth on culture was 50.6% (range, 21.7%-100%). The mean prevalence of bacterial growth ranged from 48.4% in studies requiring radiographic confirmation of sinusitis to 60.7% in studies requiring purulence on exam. Among 10 studies requiring both radiographic evidence of sinusitis and purulence, the mean prevalence of positive cultures was 50.7%. **Conclusions:** Few studies evaluate the recovery of bacteria via culture in adults with a diagnosis of ABRS or ARS based on clinical criteria alone. With radiographic and/or endoscopic confirmation, antral puncture and endoscopically guided cultures produce positive bacterial cultures in an average of 50.3% of patients. Opportunities exist to improve diagnostic accuracy for bacterial infection in ARS.

### A164. The Perforation Technique: A Modification to the Frontal Sinus Osteoplastic Flap

David Y. Healy Jr., MD, Boston, MA; Donald A. Leopold, MD\*, Burlington, VT; Stacey T. Gray, MD, Boston, MA; Eric H. Holbrook, MD\*, Boston, MA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to perform the minimally traumatic modification of the frontal sinus osteoplastic flap.

**Objectives:** Describe a variation of the traditional osteoplastic flap approach to the frontal sinus that obviates external fixation, reduces complications, and improves postoperative recovery. **Study Design:** Retrospective case series. **Methods:** Seven consecutive patients who underwent an osteoplastic flap approach to the frontal sinus by two surgeons using the following surgical variation were analyzed. Rather than using a sagittal saw for cuts through the frontal sinus anterior wall, a 1.1 mm wire passing drill bit was used to methodically perforate the bone and create a form fitting beveled cut. The overlying periosteum was preserved. The inferior hinge was created by drilling approximately 4-6 holes across the desired hinge point. An osteotome was used to out-fracture the flap. At the conclusion of the frontal sinus work, the flap was replaced back into its form fitted window without need for fixation. Patients were evaluated for post-

operative ecchymosis, pain, numbness, and cosmetic deformity. **Results:** The average length of hospital stay was one day. There were no complications and no cases of facial ecchymosis or hematoma. Step-off deformities were non-detectable in all seven cases. **Conclusions:** The perforation technique of the frontal sinus osteoplastic flap is a simple modification that reduces complications and improves postoperative recovery and cosmesis.

**A165. Postoperative Magnetic Resonance Imaging Characteristics of Vascularized Nasoseptal Flap Skull Base Reconstructions**

Cristine N. Klatt-Cromwell, MD, Chapel Hill, NC; Matthew G. Ewend, MD, Chapel Hill, NC; Deanna M. Sasaki-Adams, MD, Chapel Hill, NC; Valerie Jewells, DO, Chapel Hill, NC; Adam M. Zanation, MD, Chapel Hill, NC

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the effectiveness of gadolinium enhanced MRI scans for evaluation of nasoseptal flap reconstructions over time.

**Objectives:** The nasoseptal flap (NSF) is well established for skull base reconstruction. While imaging characteristics on gadolinium enhanced MRI scans have previously been described in very small series, no objective tool exists to evaluate vascularity or postoperative changes. The aim of this study was to assess vascularity of NSF compared to native inferior turbinate mucosa (ITM) and quantify rates of flap contracture. **Study Design:** Retrospective review. **Methods:** Patients with NSF reconstruction over a two year period with postoperative gadolinium enhanced MRI scans were included. NSF measurements were obtained and vascularity was assessed by visual observation and objective intrascan pixel intensity compared to ITM. No vascularity and congestion were defined as <10% and <50% compared to ITM respectively based on pixel intensity. Contracture was defined as decrease in size by >3mm. **Results:** Sixty-one patients, 29 males, 32 females, ages 10-79, were identified. All reconstructions demonstrated vascularization. Three patients (4.9%) had congested vascularity and two of three patients showed improvement in vascularity of >30% based on subsequent scans. These patients had no complications. No patients had contracture >3mm and the average contracture for the entire cohort was 0.7mm. Three patients required re-exploration for CSF leak, none with decreased vascularity. No flap deaths were noted in followup. **Conclusions:** The NSF is a reliable option for skull base reconstruction. MRI scans can be used to assess postoperative vascularity and flap appearance over time. Patients with initial NSF congestion significantly improved in vascularity, returning to fully vascularized levels after the initial postoperative period (>8 weeks). Flap contracture was not noted in any patient.

**A166. Medical Management of Chronic Sinusitis in Cystic Fibrosis: A Systematic Review**

Jonathan Liang, MD, Baltimore, MD; Thomas S. Higgins, MD MSPH, Louisville, KY; Stacey Ishman, MD MPH, Baltimore, MD; Emily R. Boss, MD MPH\*, Baltimore, MD; James Benke, BS, Baltimore, MD; Sandra Y. Lin, MD, Baltimore, MD

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the medical treatment options for chronic sinusitis in cystic fibrosis patients and compare the evidence supporting these treatments.

**Objectives:** To systematically review existing literature on the effectiveness of medical management of chronic sinusitis in cystic fibrosis (CF) patients. **Study Design:** Systematic review. **Methods:** We performed a literature search encompassing the last 25 years in PubMed, Embase, and Cochrane CENTRAL. Inclusion criteria included English language papers containing original data, number of subjects  $\geq 5$ , measurable clinical outcomes, and readily available interventions. Data was systematically collected on study design, patient demographics, clinical characteristics and outcomes, and level of evidence. Two investigators independently reviewed all manuscripts. A rigorous quality assessment was performed. **Results:** The initial search yielded 415 abstracts, of which 12 articles were included. These 12 studies included 659 adult and pediatric CF patients who underwent medical therapy. Medical treatment included antibiotics (4/12), topical steroids (4/12), dornase alfa (3/12), and ibuprofen (1/12). Outcome measures included symptom scores (7/12), endoscopic findings (7/12), radiographic findings (4/12), pulmonary function testing (4/12), and rhinomanometry (2/12). Most studies found improvement in at least one of the outcome measures. There was statistical significance in clinical outcomes with dornase alfa, beclomethasone and betamethasone treatments. Most studies had level 3 to 4 evidence (9/12), but 3 studies had level 1 evidence (2 dornase alfa studies, 1 betamethasone study). **Conclusions:** In this systematic review, dornase alfa and topical steroids demonstrated significant benefits in the medical treatment of CF sinusitis. There was a lack of evidence to support antibiotic therapy in the outcomes assessed. Further high quality studies should be carried out in the future to determine the efficacy of various medical therapies for CF related chronic sinusitis.

**A167. Novel Treatment of a Septal Ulceration Using an Extracellular Matrix Scaffold**

Yi-Chun C. Liu, MD, Cleveland, OH; Nipun Chhabra, MD, Boston, MA; Steven M. Houser, MD\*, Cleveland, OH

**Educational Objective:** At the conclusion of this presentation, the participants should be able to demonstrate an understanding of the various treatments of chronic septal ulceration.

**Objectives:** To describe a novel approach to the surgical management of septal ulceration using an extracellular matrix scaffold via an endoscopic approach. **Study Design:** Case series with chart review. **Methods:** This is a nonrandomized case series assessing the feasibility of using an extracellular matrix scaffold, ACell MatriStem® Wound Care Matrix for repair of septal ulceration. Three patients underwent a closed, endonasal approach for repair of their chronic nasal septal ulceration. **Results:** Two out of three patients demonstrated complete closure of their septal ulceration defects, equal to a 66.7% success rate. The third patient continues to have a 5 x 5

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mm ulceration. All three patients had significant improvement of their symptoms following surgical intervention and none required revision surgery for persistent symptoms. **Conclusions:** Septal ulceration is a mucositis involving the mucous membranes of the nasal septum. Patients often complain of nasal irritation, crusting, and epistaxis. There is no gold standard for the treatment of septal ulcerations. Currently described therapies include local debridement, septal dermoplasty, septal flap reconstruction, and cadaveric dermal graft repair but none with consistent improvement of symptoms. Our method described here is a suitable approach for the repair of a unilateral partial septal mucosal defect using an extracellular matrix scaffold.

### A168. **Petrous Apex Mucocele Drainage Using the Ultrasonic Bone Aspirator**

Brendan M. O'Brien, MD, Rochester, NY; Li-xing Man, MSc MD MPA, Rochester, NY

**Educational Objective:** At the conclusion of the presentation, the participants should recognize the advantages of ultrasonic energy as a tool in skull base surgery. They should understand the differential diagnosis, management and workup of petrous apex lesions.

**Objectives:** The ultrasonic bone aspirator uses high frequency ultrasonic waves to emulsify bone with concurrent irrigation and suction. Its non-rotational oscillating tip may allow for fine dissection in skull base surgery with less potential for damage of vital neurovascular structures. We describe the case of a patient with an expansile right petrous apex lesion treated using this technology.

**Study Design:** Case report and literature review. **Methods:** The electronic medical record and imaging of the patient were reviewed and a PubMed literature search was performed. **Results:** A 59 year old male was referred to our rhinology clinic with right retro-orbital headache, conductive hearing loss and dizziness. MRI and CT imaging revealed an expansile right petrous apex lesion with bony dehiscence of the clivus and horizontal petrous internal carotid artery. Access via the lateral temporal bone was not recommended due to potential for facial nerve compromise. The patient underwent an endoscopic endonasal approach to the petrous apex using the ultrasonic bone aspirator. The diagnosis on intraoperative clinical and pathologic evaluation was consistent with a mucocele. **Conclusions:** The ultrasonic bone aspirator is a useful tool for access to the petrous apex. A mucocele should be included in the differential diagnosis of any patient with a petrous apex lesion and symptoms consistent with petrous apicitis.

### A169. **Eustachian Tube Balloon Dilation Surgery: Long Term Results**

Roheen P. Raithatha, MD, New York, NY; Edward D. McCoul, MD, Seattle, WA; Jeffrey C. Bedrosian, MD, Portland, ME; Vijay K. Anand, MD\*, New York, NY

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the clinical significance of balloon dilation surgery of the eustachian tube.

**Objectives:** Balloon dilation of the eustachian tube (BDET) for the treatment of eustachian tube dysfunction (ETD) in adults has shown promising short term results. However, the durability of these results is unknown. The aim of this study was to describe long term results after BDET. **Study Design:** Prospective outcomes study. **Methods:** Consecutive patients undergoing BDET were prospectively enrolled from a tertiary care medical center otolaryngology practice. Inclusion criteria were adults with a diagnosis of ETD based on symptoms and abnormal tympanogram. Patients with craniofacial abnormalities or active infection were excluded. Primary outcome measures included tympanometry, otoscopic appearance, and the 7 item Eustachian Tube Dysfunction Questionnaire (ETDQ-7) score, a validated disease specific symptom score. Institutional review board (IRB) approval was obtained. **Results:** Thirty-eight consecutive patients underwent 70 BDET procedures, with a median followup of 17 months. Significant postoperative improvements were seen in tympanometry and otoscopic appearance ( $p < 0.001$ ). Mean ETDQ-7 scores at 3 months, 6 months, 1 year, and 2 years postoperatively were significantly improved over baseline ( $p < 0.001$ ). Reported complications were minimal. **Conclusions:** BDET is an effective surgical intervention for the treatment of ETD in adults. Lasting postoperative improvements were observed using objective and subjective measures. Randomized clinical trials are warranted to determine superiority of BDET over other interventions.

### A170. **A New Tool for Assessment of Quality of Life in Patients with Chronic Rhinosinusitis: The EQ-5D**

Aaron K. Remenschneider, MD, Boston, MA; Laura K. D'Amico, BA, Boston, MA; Eric H. Holbrook, MD\*, Boston, MA; Stacey T. Gray, MD, Boston, MA; Ralph B. Metson, MD\*, Boston, MA

**Educational Objective:** At the conclusion of this presentation, the participants should understand the growing importance of general health related quality of life research in chronic rhinosinusitis (CRS) and recognize the significance of the European Quality of Life 5-Dimension assessment (EQ-5D) in this research.

**Objectives:** 1) Differentiate disease specific quality of life surveys in CRS from general health related quality of life surveys and determine their respective roles in outcomes research; 2) describe the role of the EQ-5D for patients with CRS; and 3) appreciate how results from the EQ-5D may allow comparative studies using Quality Adjusted Life Years (QALYs). **Study Design:** Literature review, proof of concept. **Methods:** Review of relevant CRS quality of life literature with a focus on validated disease specific and general health related quality of life studies. Extrapolate from the robust European literature using QALYs for other chronic diseases to draw conclusions about their relevance in CRS. Describe our own experience in enrolling over 400 patients in 21 months as part of an institutional quality study using the EQ-5D. **Results:** A review of the English literature using terms "quality of life" and "sinusitis" returned >400 articles. Research focused on "before and after" intervention to demonstrate change in disease specific or general health complaints. When terms "QALY" or "EQ-5D" were added, 6 articles returned, with 4 related to decision making in treatment of acute bacterial sinusitis. There is no published literature on CRS and QALYs, but there are ample data for other chronic disease states,

including diabetes/COPD, that allow comparisons. **Conclusions:** There is a need for general health related quality of life research in patients with CRS. The EQ-5D is a validated, powerful new instrument that allows comparisons between chronic disease states. Obtaining and analyzing these data may be important for health care policy decision making.

**A171. Quality of Life in Patients with Chronic Rhinosinusitis: Comparisons across Disease States using the EQ-5D**

Aaron K. Remenschneider, MD, Boston, MA; Laura K. D'Amico, BA, Boston, MA; Eric H. Holbrook, MD\*, Boston, MA; Stacey T. Gray, MD, Boston, MA; Ralph B. Metson, MD\*, Boston, MA

**Educational Objective:** At the conclusion of this presentation participants should be able to compare the impact of chronic rhinosinusitis (CRS) on general health related quality of life to normal populations and other chronic diseases.

**Objectives:** 1) Establish baseline characteristics of patients with CRS using the EQ-5D assessment; and 2) compare quality of life scores in patients with CRS to the general population and patients with chronic diseases. **Study Design:** Prospective cross-sectional study. **Methods:** Quality of life data were measured using the EQ-5 assessment in patients with CRS (n=399) scheduled to undergo sinus surgery at an academic medical center over a 21 month period. Both the visual analog scores and the five dimensions of health status measured in this survey were compared against healthy and disease controls. **Results:** Patients with CRS reported significantly lower quality of life scores compared to general population as measured by the EQ-5 visual analog scale [72.57 +/- 17.37 vs 78.75 +/- 14.92, respectively, p<0.01, 95% CI (-7.87 to -4.46)]. CRS patients also reported more pain/discomfort than those with heart failure (class III and IV), COPD, and diabetes (p<0.01). Individuals with CRS also suffered from more anxiety/depression than the general population, as well as those with COPD and diabetes (p<0.01). Mobility, self-care and activity level were not significantly impaired in CRS patients. **Conclusions:** Patients with CRS have impaired quality of life when compared to healthy controls. The dimensions of pain/discomfort and anxiety/depression demonstrate the largest decrement when compared to healthy patients and those with other comorbidities. The EQ-5D is a new and powerful health related quality of life tool, and these results appear consistent with previously studied instruments for CRS.

**A172. The Unified Airway: A Systematic Review of Gene Expression Profiling in Allergic Rhinitis, Asthma, and Chronic Rhinosinusitis**

Josef Shargorodsky, MD MPH, Boston, MA; David Y. Healy, MD, Brookline, MA; Michael P. Platt, MD, Boston, MA; Ralph B. Metson, MD\*, Boston, MA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the shared genetic underpinnings of the diseases of the unified airway - allergic rhinitis, asthma, and chronic rhinosinusitis - based on a systematic review of gene expression studies.

**Objectives:** To demonstrate a molecular basis for the diseases of the unified airway hypothesis by describing the differentially expressed genes and dysregulated pathways in nasal, sinus, and bronchial tissue samples of patients with allergic rhinitis, asthma, and chronic rhinosinusitis. **Study Design:** Systematic literature review with pooled data analysis. **Methods:** The published literature of gene expression studies for allergic rhinitis, asthma, and chronic rhinosinusitis was systematically reviewed. Studies using high throughput microarrays of nasal, sinus, and bronchial epithelial tissue were evaluated for differentially expressed genes. The gene expression profiles and pathways analyses of the three diseases of the unified airway were compared. **Results:** A total of 592 dysregulated genes were identified in 14 studies of unified airway diseases - chronic rhinosinusitis (8), allergic rhinitis (3), and asthma (3). Overlap was found in 11 dysregulated genes between at least 2 unified airway diseases. Two genes, periostin and serpin peptidase inhibitor, were differentially expressed in all three diseases. **Conclusions:** The unified airway theory has been described on clinical and epidemiological levels to link allergic rhinitis, asthma, and sinusitis. The current study identifies molecular alterations that provide a molecular basis for the common pathogenesis of these airway diseases. While individual genes show limited overlap, analysis of functional pathways demonstrates significant pathogenic similarities between these diseases that explains the unified airway on a molecular level.

**A173. The Distribution of Human Olfactory Epithelium Changes with Age**

Peter D. Solomon, BA, Boston, MA; James E. Schwob, MD PhD, Boston, MA; Eric H. Holbrook, MD\*, Boston, MA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to appreciate the general location of olfactory epithelium in the human nasal cavity and understand the changes that occur with aging. As a result, this presentation will help surgeons avoid manipulation of areas that may lead to olfactory disturbance after surgery.

**Objectives:** The location of olfactory epithelium (OE) in the human nose is ill defined. A more precise description of its position would allow surgeons to avoid complications of smell loss and provide researchers an opportunity for higher biopsy yield. Our objective is to better define the area of OE in the nasal cavity and describe the changes that occur with aging. **Study Design:** An immunohistochemical analysis of the human nasal cavity. **Methods:** Human nasal cavity autopsy specimens were dissected to separate the lateral wall with turbinates from the septum. The whole intact mucosa was dissected from bone and cartilage. Mucosal sheets were then stained for identification of neurons using immunohistochemical techniques. Dense areas of staining corresponding to olfactory neurons were identified. Measurements of the olfactory epithelial boundaries in relation to anatomic structures and degree of respiratory replacement

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within the olfactory region were correlated with the age. **Results:** The extent of OE in humans is restricted to the region below the cribriform plates extending anteriorly from the attachment of the middle turbinate to the posterior attachment of the superior turbinate and sphenoid face. The OE was never found extending to the free edge of the middle turbinate or lower than the free edge of the superior turbinate. OE area decreased and respiratory replacement increased with increasing age. **Conclusions:** The location of OE is fairly consistent in the adult nasal cavity with limited extension to the medial surface of the middle turbinate. Although the area decreases with age, a relatively large component continues into the late decades.

### A174. The Concha Bullosa Crusher: A Novel Technique

Brian H. Song, MD, Oakland, CA; Christopher G. Tang, MD, Oakland, CA; Ruwanthi S. Campano, MD, Lancaster, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss and compare minimally invasive in-office treatment options for the treatment of symptomatic concha bullosa.

**Objectives:** To describe a novel technique for treatment of concha bullosa. **Study Design:** Charts of 4 patients who had this procedure performed were reviewed including endoscopic imaging, CT scans, and operative reports. **Methods:** After proper anesthesia was applied, a Jansen-Middleton rongeur was used to crush the pneumatized middle turbinate from superior to inferior. **Results:** After one year followup, there has been no regrowth of the middle turbinate, no evidence of viable trapped respiratory epithelium within the concha bullosa. **Conclusions:** Although the respiratory epithelium within the middle turbinate is not removed, simply crushing the middle turbinate in patients with concha bullosa can be a potential in-office procedure to reduce the size of the middle turbinate.

### A175. Acute Angioedema as a Response to Strep Tonsillitis

Catherine C. Weng, MD, Cleveland, OH; Steven M. Houser, MD\*, Cleveland, OH

**Educational Objective:** At the conclusion of this presentation, the participants should be able to report on a case study of an unusual case of acute angioedema response to strep tonsillitis in a 10 year old boy.

**Objectives:** To describe a case report on an unusual presentation of acute angioedema response to strep tonsillitis. **Study Design:** Retrospective case review. **Methods:** Retrospective review of the electronic medical record, CT imaging and photo documentation of the patient's facial edema was performed. Informed consent for release of medical information and photographs for academic medical use was obtained from the patient's parent. **Results:** A 10 year old previously healthy boy diagnosed with strep A pharyngitis developed tender swelling of bilateral parotid and submandibular glands and diffuse facial soft tissue edema. He was started on broad spectrum antibiotics, however his facial swelling continued to worsen. Although his salivary glands were all equally and diffusely swollen, they showed no signs of infection on physical exam or CT scan. The diagnosis of angioedema was made. Intravenous steroids and antihistamines were initiated while antibiotics were continued and the patient experienced reduction of swelling 12 hours later and nearly complete 72 hours later. Several weeks later the patient had complete resolution of angioedema and was scheduled for elective tonsillectomy. **Conclusions:** In this case, radiographic and physical findings of diffuse edema pointed to the diagnosis of angioedema. After ruling out infectious parotitis and given the lack of an appropriate drug or food allergen culprit, infectious immune complex mediated mast cell degranulation was suspected. Definitive treatment for this child will be achieved by tonsillectomy.

### A176. Spontaneous Necrotizing Fasciitis in the Head and Neck: Prognostic Signs and Management

Ryan D. Winters, MD, New Orleans, LA; Joshua M. Levy, MD, New Orleans, LA; Amit Patel, BA, Johnson City, TN; Mary Fazekas-May, MD, New Orleans, LA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to describe the management of spontaneous necrotizing fasciitis in the head and neck, with special emphasis on clinical signs and symptoms with prognostic implications.

**Objectives:** Describe the clinical and radiologic prognostic signs in early and late presentation necrotizing fasciitis in the head and neck in this subset of patients without antecedent surgery or trauma. **Study Design:** Case report and literature review. **Methods:** An example of late presentation spontaneous necrotizing fasciitis in the neck is discussed. An extensive literature review is provided to define clinical and radiologic signs and symptoms with prognostic significance. **Results:** Late presenting necrotizing fasciitis has a nearly uniformly dismal prognosis, and much of the literature emphasizes early recognition for best outcomes. Differentiating necrotizing from non-necrotizing neck infections is extremely challenging, with laboratory or clinical signs having little utility in this regard. The Laboratory Risk Indicator for Necrotizing Fasciitis (LRINEC) and classic clinical sign of subcutaneous emphysema have not been shown to be effective. The latter is often a late finding and may be absent due to tissue edema. Likewise, patients without a history of trauma or antecedent surgery present yet another challenge, with dental origin most often postulated in these patients. **Conclusions:** Existing standardized tools for risk assessment in necrotizing fasciitis appear to be unreliable in the head and neck and further investigation is warranted. If any suspicion exists, early biopsy should be strongly considered.

**A177. Endoscopic Resection of Orbital Hemangiomas**

Arthur W. Wu, MD, Boston, MA; Nipun Chabra, MD (Presenter), Boston, MA; Jonathan Y. Ting, MD, Boston, MA; Aaron Fay, MD, Boston, MA; Ralph Metson, MD\*, Boston, MA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the application of endoscopic techniques for the treatment of orbital tumors.

**Objectives:** Cavernous hemangiomas are the most common orbital tumors in adults. Although the intraconal location of these masses makes their surgical resection challenging, the endoscopic transnasal approach offers the potential for enhanced surgical access and reduced patient morbidity compared to conventional orbitotomy. The objective of this study is to investigate the application of endoscopic techniques for the treatment of orbital tumors. **Study Design:** Retrospective case series. **Methods:** The records of seven consecutive patients who underwent endoscopic resection of orbital hemangiomas from November 2007 through December 2011 were reviewed. Tumor size ranged from 1.2 to 2.9 cm in largest dimension. All tumors were located in the medial orbit deep to the extraocular muscles with optic nerve displacement. **Results:** Preoperative findings included decreased visual acuity (100%), proptosis (100%), diplopia (71%), and diminished color vision (57%). Surgery included removal of the entire lamina papyracea with mobilization of the medial and inferior rectus muscles to access the intraconal space. Total tumor resection was performed in five patients and subtotal resection in two patients. There were no intraoperative complications. Postoperative complications included one patient with persistent diplopia treated with corrective lenses and two patients with enophthalmos, one of whom required surgical correction. Visual acuity improved or remained stable in all cases. **Conclusions:** This study represents the largest reported series of orbital hemangiomas removed through an endoscopic approach. The demonstrated safety and efficacy of this technique suggests that it may be applicable for treatment of other intraconal tumors of the medial orbit.

**General/Clinical Fundamentals/Sleep Medicine****A178. A Unifying Theory of Tonsillitis, Intratonsillar Abscess and Peritonsillar Abscess**

Reginald F. Baugh, MD, Toledo, OH; Alex B. Blair, BA, Toledo, OH; Robert L. Booth, MD, Toledo, OH

**Educational Objective:** At the conclusion of this presentation, the participants should be able to 1) recognize the presenting symptoms of tonsillitis, PTA and ITA; 2) understand the lymphatic ultrastructure of the tonsil; 3) describe the classification system of ITAs; and 4) understand a model for the development of the development and progression of tonsillitis, peritonsillar abscess and intratonsillar abscess.

**Objectives:** Review existing models of the pathogenesis of peritonsillar abscess (PTA) and intratonsillar abscess (ITA) and present a novel unifying model based upon observed histopathology and lymphatic ultrastructure of the tonsil. **Study Design:** Histopathologic examination of 9 cases of ITA, 10 representative cases of PTA and acute tonsillitis. **Methods:** The histopathology of cases of acute tonsillitis, ITA and PTA were reviewed and classified. **Results:** Prevailing models of ITA were able to account for only a minority of cases. Evidence of hematologic spread of infection as the cause of ITA or PTA is weak. **Conclusions:** A novel unifying model of tonsillitis, ITA and PTA is presented. We postulate that acute tonsillitis represents a cellulitis of the tonsillar epithelium. The lack of subepithelial lymphatic channels in the tonsil allows rapid transport of bacterial antigens, but not bacteria. Rapid lymphatic transport quickly involves regional lymph nodes in antigenic processing. When direct extension of infection penetrates the surface epithelium into core lymphatics channels, rapid intratonsillar lymphatic transit makes true ITA unusual. Local infectious agent factors and relative lymphatic channel obstruction caused by rapid swelling of tonsillar follicles may combine to foster development of PTA and much less commonly ITA. Lymph flow may be less superiorly than more dependent inferior routes accounting for the superior location of many PTA. The development of PTA further compromises lymphatic flow within the tonsil predisposing the patient to ITA development. The model accounts for the frequent association of PTA and ITA, the development of both crypt and true ITAs, and the location of PTA.

**A179. Performing a Tracheotomy with Thyroid Cartilage and Tracheal Calcification**

Sonia H. Chen, MD, Oakland, CA; Michael R. MacDonald, MD FACS FRCSC, Oakland, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to explain an approach for performing a tracheotomy in a patient with a calcified trachea.

**Objectives:** To describe an approach for performing a tracheotomy in a patient with a calcified trachea. **Study Design:** A 56 year old male with history of thalidomide exposure in utero with cerebral palsy and multiple congenital skeletal malformations including micrognathia, limb reductions, and cervical spine kyphosis was admitted to the ICU and intubated for respiratory distress secondary to pneumonia. A decision to perform a tracheotomy was made due to prolonged intubation and difficulty weaning from the vent. The sternal notch was palpable and the other anterior neck landmarks were replaced by hard bone. A calcified thyroid cartilage and trachea was seen on CT. A tracheotomy was performed in the OR. **Methods:** A periosteal elevator and 4mm straight osteotomes were used to make a tracheal window to enter the airway. Rongeurs and rasps were used to remove sharp edges of bone along the tracheal window. A size 6 Bivona tracheostomy tube was placed. **Results:** The use of a novel technique in the face of abnormal and calcified tracheal anatomy allowed for a successful tracheotomy. **Conclusions:** A PubMed literature search did not reveal any published case reports or descriptions of patients with a calcified thyroid cartilage and trachea requiring tracheotomy. There have been no established

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techniques of performing a tracheotomy in this setting. Our case report provides a safe and time efficient approach to perform a tracheotomy in a patient with a calcified thyroid cartilage and trachea.

### A180. Congenital Right Thyroid Hemiagenesis in a Male: A Case Report

William Marshall Guy, MD, Houston, TX; Donald T. Donovan, MD\*, Houston, TX

**Educational Objective:** At the conclusion of this presentation, the participants should be able to appreciate the clinical and intraoperative implications of thyroid hemiagenesis as well as the postoperative management requirements.

**Objectives:** To appreciate the clinical, intraoperative, and postoperative implications of thyroid hemiagenesis. **Study Design:** Case report and review of the literature. **Methods:** A patient was identified preoperatively to have right thyroid hemiagenesis. This was confirmed intraoperatively and photodocumentation provided. A review of the literature was performed to evaluate the rarity of right sided thyroid hemiagenesis in a male. **Results:** A 50 year old male presented with a left sided compressive neck mass causing dysphagia. Radiographic imaging demonstrated a large, left substernal goiter and absent right thyroid lobe. Laboratory evaluation showed he was euthyroid, but given his compressive symptoms, the gland was removed confirming multiple adenomatous nodules. Postoperatively he now requires thyroid supplementation. **Conclusions:** Right sided thyroid hemiagenesis in a male is extremely rare with initial workup and postoperative implications discussed.

### A181. Management of Obstructive Sleep Apnea in the Indigent Population: A Case Report and Discussion

John S. Hamblin, BS, Houston, TX; Vlad C. Sandulache, MD PhD (Presenter), Houston, TX; Alexander H. Gelbard, MD, Houston, TX; Masayoshi Takashima, MD, Houston, TX

**Educational Objective:** At the conclusion of this presentation, the participants should be able to identify and discuss the systems based issues involved in the medical versus surgical treatment of the uninsured, low income severe obstructive sleep apnea (OSA) patient in the public county hospital setting.

**Objectives:** To highlight for discussion the problematic medical and surgical management of the patient with severe OSA in the county hospital setting. **Study Design:** Case report. **Methods:** Chart and literature review. **Results:** A 47 year old female presented to clinic with symptoms and polysomnogram indicative of severe OSA (AHI 103.7). Patient did not have health insurance. Currently, the county system does not cover continuous positive airway pressure therapy (CPAP). Due to these factors the patient was unable to obtain CPAP and elected for surgical treatment. Patient underwent uvulopalatopharyngoplasty (UPPP) followed by overnight admission for monitoring of respiratory status. Throughout the night, severe nocturnal bradycardia was recorded which rebounded on arousal and was not associated with desaturation events. Inpatient initiation of CPAP resulted in complete resolution of bradycardic events. Following a seven day hospital course, the patient acquired sufficient funds to purchase CPAP out of pocket. Following discharge, her symptoms improved and she remained compliant with CPAP utilization. Postoperative polysomnogram demonstrated residual AHI of 29.3 and AHI of 0 on CPAP. **Conclusions:** Cardiac arrhythmias are associated with severe OSA. In this patient UPPP was not effective in completely resolving residual bradycardia, requiring postoperative initiation of CPAP. Initial treatment of OSA with CPAP in this CPAP compliant patient would have resulted in greater benefit and less morbidity at a reduced cost to the hospital system. Cases such as this one should prompt reevaluation of current county/public hospital coverage of OSA treatment options. More broadly, increased consideration must be given to appropriate treatment of severe OSA in the uninsured population.

### A182. Operative Room Airway Management for Advanced Oropharyngeal Angioedema

Alexander T. Hillel, MD, Baltimore, MD; Zhen Gooi, MD, Baltimore, MD (Presenter); Christina M. Miller, MD, Baltimore, MD; Lynette J. Mark, MD, Baltimore, MD; Nasir I. Bhatti, MD, Baltimore, MD

**Educational Objective:** At the conclusion of this presentation, the participants should be able to consider the option of airway management in an operating room for oropharyngeal/supraglottic edema.

**Objectives:** Oropharyngeal/supraglottic angioedema often presents with upper airway obstruction that benefits from otolaryngology involvement. Tongue and/or soft palate edema is correlated with the need for intubation. Fiberoptic nasotracheal intubation (NTI) is recommended; however, when rapidly progressive, management may require cricothyroidotomy. We present a series of severe angioedema patients who activated the difficult airway team at an academic hospital with a subset managed in the operating room. **Study Design:** Retrospective review. **Methods:** Airway edema patients managed by the difficult airway response team from 2008-2011 were assessed. Patient demographics, etiology, airway assessment and plan, intubation methodology and location were assessed. **Results:** There were a total of 13 patients (7M, 6F, mean age 59 years). Etiology included ACE inhibitor (n=4), IV contrast/shellfish (n=3), idiopathic (n=3), postoperative (n=2) and penicillin (n=1). Sites of involvement included lips/face (n=3), soft palate/uvula (n=3), tongue (n=9), supraglottic (n=2) and glottis (n=3). 7 patients were managed in the operating room (OR). There were no surgical airways performed. **Conclusions:** While fiberoptic NTI is usually successful in intensive care unit and emergency room environments, most of their rooms do not have physical space, equipment, and nursing/anesthesia support. If a patient is stable for transport, rapid triage to the OR provides the safest environment to manage the airway, and provides a skilled nursing team, optimal illumination, access to specialized equipment in the event of unsuccessful initial airway management plan, and the physical space for a video monitoring of intubation. Application of algorithms for severe oropharyngeal edema may be applied for safe management of less severe cases requiring intubation.

**A183. Airway Algorithm for the Management of Patients with King LT**  
Sobia F. Khaja, MD, Iowa City, IA; Kristi E. Chang, MD, Iowa City, IA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss an algorithm for managing the airway in patients presenting with a King LT in place.

**Objectives:** To discuss an algorithm for managing the airway in patients presenting with a King LT in place. **Study Design:** A retrospective single institution case series review. **Methods:** This study followed the management of three patients who presented to a tertiary academic medical facility emergency department following placement of a King LT at an outside hospital or in the field. Clinical history at admission as well as each patient's hospital course was evaluated. We discuss the management of the airway in each of these cases and use these to help design an algorithm for improving outcomes in patients with a King LT in place. **Results:** In each of the three cases presented, the otolaryngology department was consulted for definitive airway management. In two of these patients, the airway was successfully secured using endotracheal intubation. Only one patient required tracheostomy. We discuss an algorithm for managing these patients to try to avoid tracheostomy, which includes assessing the airway with flexible endoscopy and then proceeding with intubation by Seldinger technique or intubation using a videolaryngoscope. In some cases, tracheostomy may still be required. **Conclusions:** The King LT is a valuable tool available in the field to help to temporarily secure the airway. Otolaryngologists should have an appropriate airway algorithm for managing patients with a King LT in place in order to minimize the need for a tracheostomy.

**A184. Institute of Health Improvement Methodology Used to Improve Sedation Wean Protocol following Laryngotracheal Reconstruction**  
Elliott D. Kozin, MD, Boston, MA; Derek J. Rogers, MD, Boston, MA; Alexandra S. Epstein, MD, Boston, MA; Brian M. Cummings, MD, Boston, MA; Christopher J. Hartnick, MD\*, Boston, MA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to: 1) explain key issues related to sedation wean protocols following laryngotracheal reconstruction; and 2) discuss Institute of Health improvement methodology used to improve patient safety and quality outcomes.

**Objectives:** Few data exist on sedation wean protocols following laryngotracheal reconstruction (LTR). Following two adverse events relating to sedation weans in LTR patients, we describe our multidisciplinary experience in applying the Institute of Health improvement (IHI) methodology, centering upon a focus workgroup step-wise process to identify key issues regarding transitions of care and active communication to improve sedation wean outcomes. **Study Design:** Using IHI methodology, a multidisciplinary team, including attending pediatric otolaryngologists and intensivists, fellows, residents, nurses, pharmacists, and social workers, reviewed our LTR experience in 2012. Key breakdowns occurred during transfer of care from the operating room to pediatric intensive care unit (PICU) and PICU to the floor. **Methods:** We formulated an IHI based action plan, and developed a protocol to address: 1) prolonged hospitalizations; 2) unanticipated transfer from floor to ICU; and 3) confusion among providers regarding sedation wean. **Results:** During 2012, our center performed 12 LTRs. Of these, 11/12 (91.6%) patients were placed on sedation infusions, for a mean of 8.0 +/- 0.19 days. All 11 patients had sedation wean plans in transfer or discharge notes; however, 2/11 (18.2%) were nonspecific. The mean duration of sedation weans was 18.45 +/- 4.03 days and ranged from 9-46 days. **Conclusions:** Few published studies exist in patient safety and outcomes literature regarding efficacy and implementation of sedation wean for LTR patients. Using IHI methodology, we identified key concerns of lack of clarity and variability in sedation wean practice, and implemented system wide changes with the goal to improve patient safety. Future studies will examine outcomes of aforementioned changes.

**A185. A Nasal Mucocele Originating from Complex Facial Fractures**  
Yi-chun C. Liu, MD, Cleveland, OH; Nipun Chhabra, MD, Boston, MA; Steve M. Houser, MD\*, Cleveland, OH; Andrea M. Jarchow, MD, Chapel Hill, NC

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the various causes of nasal and sinus mucocele and demonstrate understanding of both open and endoscopic treatment options.

**Objectives:** To present the diagnosis and treatment approach of a rare case of a nasal mucocele in a 37 year old man arising from a remote history of maxillofacial trauma. **Study Design:** Single case report with literature search. **Methods:** A 37 year old man presented with nasal congestion and facial swelling and was diagnosed with a mucocele secondary to trauma. The mucocele was successfully removed via a direct, external approach with subsequent repair utilizing septal cartilage. **Results:** On postoperative followup, the patient noted significant improvement in his nasal breathing and decreased facial swelling. He has remained asymptomatic and without recurrence of the mucocele at the 2 month followup. **Conclusions:** Mucoceles are benign, epithelial lined mucous cysts which commonly form secondary to obstruction of a sinus outflow tract or from mucosal entrapment related to chronic infection, inflammation, trauma, or neoplasm. This is the first reported case in the English language literature of a mucocele arising as a sequela of nasal bone fracture. There have been reports of ectopic mucosa entrapment leading to mucoceles in the orbit and pterygomaxillary space, but none secondary to complex nasal trauma. We highlight the current diagnostic workup and management of the nasal mucocele. Otolaryngologists should be aware of this rare but potential complication of nasal bone fractures.

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- A186. Bilateral Hypoglossal Paralysis: An Unreported Risk following Crowe-Davis Retraction**  
Whitney A. Pafford, MD, New York, NY; Kenneth J. Andrews, MD, New York, NY; Jessica W. Lim, MD, New York, NY

**Educational Objective:** At the conclusion of this presentation, the participants should understand the pathophysiology of tongue paralysis following Crowe-Davis retraction, identify patients who are at increased risk for this complication and implement steps to prevent this devastating outcome.

**Objectives:** To discuss the pathophysiology of tongue paralysis following Crowe-Davis retraction, identify patients who are at increased risk for this complication and implement steps to prevent this devastating outcome. **Study Design:** Case presentation. **Methods:** Case presentation. **Results:** The Crowe-Davis retractor is used in a large number of procedures involving the oropharynx. A significant subgroup of these surgeries involves patients with sleep apnea who are classified as morbidly obese. Unilateral tongue paralysis has been reported in a few case reports following Crowe-Davis retraction during tonsillectomy, however bilateral paralysis has not been reported to date. We describe a case of a 32 year old morbidly obese male who underwent repair of an oropharyngeal laceration following traumatic attempted intubation and subsequent tracheostomy. The repair was performed transorally using a Crowe-Davis retractor. Postoperatively the patient reported dysarthria and dysphagia. He was noted to have bilateral tongue paralysis confirmed on EMG. His tongue mobility returned to normal after three months of therapy. The pathophysiology of this injury, identification of patients at increased risk for this complication from oral retraction and how to implement steps in preventing this devastating outcome are discussed. **Conclusions:** Ischemia and crush injury to tongue musculature can occur in a short time period with devastating outcomes. Obese patients with redundant oropharyngeal tissues and difficult surgical exposures are at an increased risk for this catastrophic complication. Appropriate measures should be taken preoperatively and intraoperatively to minimize this risk.

- A187. Superwarfarin Ingestion Causing Airway Obstruction: A Case Report and Review of the Literature**  
Megha N. Parekh, MD, San Francisco, CA; Anna K. Meyer, MD, San Francisco, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the importance of including superwarfarin ingestion as a cause of severe floor of mouth and tongue swelling with isolated markedly elevated coagulopathy. This is especially important in a difficult airway situation where surgical management is being entertained. The review of the literature will explain the various presentations, with a focus on the head and neck, of superwarfarin ingestion and discuss management strategies and outcomes.

**Objectives:** Bromadiolone and other superwarfarins are long acting poisons, with half lives of weeks to months, that are up to 100 fold more potent than warfarin in inhibiting vitamin K dependent clotting factor production. Superwarfarins are easily obtainable as they are found in many pesticides. The incidence of superwarfarin ingestion has been increasing since its introduction. Since they are very long acting, patients may not remember to report ingestion. Additionally, some patients may not want to report ingestion. This case report will describe a patient with significant floor of mouth swelling and tongue swelling cause airway obstruction. The otolaryngology service was consulted for management and possible tracheotomy. Only after further questioning did the patient reveal ingestion of a bromadiolone containing rodenticide four weeks prior to presentation in an attempted suicide. **Study Design:** Case report and literature review. **Methods:** Case report and literature review. **Results:** Her laboratory studies revealed an extremely elevated international normalized ratio (INR) and activated partial thromboplastin time. Fresh frozen plasma (FFP) and intravenous vitamin K were administered prior to fiberoptic nasal intubation in the operating room. Initial computed tomography scan showed marked enlargement of tongue, floor of mouth, epiglottis, aryepiglottic folds and submandibular glands without a discrete hematoma or fluid collection. During her seventeen day hospitalization, she was managed conservatively, initially with intravenous vitamin K and FFP and eventually transitioning to oral vitamin K. **Conclusions:** Superwarfarin ingestion is an important diagnosis to keep in mind when a patient presents with oropharyngeal swelling and an isolated markedly elevated coagulopathy. This is especially important in a difficult airway situation where surgical management is being entertained.

- A188. Otolaryngology Faculty and Residents' Attitudes towards Interactions with the Pharmaceutical Industry**  
Rounak B. Rawal, BA, Chapel Hill, NC; Adam M. Zanation, MD, Chapel Hill, NC

**Educational Objective:** At the conclusion of this presentation, the participants should be able to describe otolaryngology programs' standards in regards to interactions with the pharmaceutical industry and current opinions towards this interaction.

**Objectives:** Much attention has been brought to the pharmaceutical industry's influence on physician behaviors. No study has compared otolaryngologists' opinions to their department policies and guidelines regarding this interaction. **Study Design:** Online survey questionnaire. **Methods:** Faculty from eight otolaryngology departments disseminated online surveys to their respective faculty and residents. Programs chosen represented various geographic locations, department sizes, and academic focus. Original faculty members then answered a followup survey. **Results:** Eighty-six responses were received, with thirty-seven responses collected from residents and fellows and forty-nine responses collected from faculty. When asked to rate the statement, "pharmaceutical representatives influence my prescribing" (1 = strongly disagree, 5 = strongly agree), respondents returned a mean score of 1.43; this was not dependent on year of training ( $p = 0.45$ ). Although 74% of respondents stated they have never changed prescribing behavior based on interactions with pharm-reps, 57% of respondents also believe that pharm-reps can influence other otolaryngologists' behavior. In addition, although 82% of respondents stated that there are policies regarding interactions with pharm-reps in their departments, only

26% stated that they have received formal training in this area. Six responses were collected in a followup questionnaire sent to the original faculty. Half of the respondents stated they were either unsure or that there were no specific restrictions in their programs about resident interaction with the pharmaceutical industry. **Conclusions:** Otolaryngologists believe that others may be more influenced by the pharmaceutical industry than themselves. Formal training and department policy on interactions with the pharmaceutical industry are variable. Standardization of departmental policies may be helpful.

**A189. Development and Validation of a Computer Model of the OSA Airway**

Brian W. Rotenberg, MD MPH FRCSC, London, ON Canada; Hanif Ladak, PhD, London, ON Canada; Terry Moschandreou, PhD, London, ON Canada; Alireza Rohani, PhD, London, ON Canada; Sumit K. Agrawal, MD FRCSC, London, ON Canada

**Educational Objective:** At the conclusion of this presentation, the participants should be able to explain the need for computer modelling of the pharynx, discuss the role of simulation in surgical planning, and compare computer modelling to other methods of diagnosis in the setting of OSA.

**Objectives:** Identification of the precise site(s) of airway collapse in the setting of obstructive sleep apnea (OSA) remains a challenge. Awake endoscopy (AE) is hampered by intrarater variability; drug induced sleep endoscopy (DISE) is costly of time and resources; and no OSA specific animal experimentation models exist. Our pilot study objective was to develop and establish construct validity of a novel patient specific 3 dimensional computer model of the OSA airway. **Study Design:** Basic science - prospective computer model development. **Methods:** Patients scheduled for OSA surgery underwent AE and DISE. 3Tesla triplanar-MRI sequences were obtained of the pharynx, images were outlined with Geomagic software, and resulting 3D geometry imported into COMSOL Multiphysics Finite Element (FE) software for model development. COMSOL simulated airflow characteristics and pressure distribution in the modeled airway during inspiration/expiration. Calculated stresses of air wall interface deformations, and resulting partial/complete pharyngeal collapse, were compared to the observed AE and DISE results. **Results:** Five patients formed the pilot dataset. Qualitative analysis was performed. Patient specific anatomy was seen in all cases, with predicted sites of collapse correlating closely with observed collapse sites. None of the calculated displacements exceeded the physical dimensions of the model. **Conclusions:** Development of a 3D nonlinear patient specific computer model of the OSA airway is feasible and our pilot data showed strong construct validity. Sites of airway collapse were predicted in good agreement with observation. Our novel FE modelling strategy is robust and can now be applied to a larger OSA population for a more stringent validation study.

**A190. The Necessity of Overnight Hospitalization following Multilevel Sleep Apnea Surgery**

Marissa A. Schwartz, BS, Chestnut Hill, MA; Jeffrey H. Spiegel, MD\*, Chestnut Hill, MA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to 1) understand the incidence of complications following sleep apnea surgery; and 2) make better determination of the need for hospital monitoring following different combinations of sleep apnea procedures.

**Objectives:** Several authors have published that uvulopalatopharyngoplasty can safely be performed as an outpatient procedure. However, it is uncertain if multilevel sleep surgery requires an overnight stay. We will demonstrate the safety of outpatient multilevel sleep surgery. **Study Design:** Retrospective chart review. **Methods:** Medical records from a single institution regarding sleep apnea surgery were reviewed. The combinations of procedures (including UPPP and tongue base or nasal airway surgery) were tallied along with incidence and timing of adverse events. **Results:** We present the incidence and safety of multilevel sleep apnea surgery without hospitalization. The timing of adverse events is reviewed. **Conclusions:** Clinicians can use this data to determine the appropriate monitoring status for patients undergoing multilevel sleep apnea surgery and can use this information in appropriate discussion with their anesthesiology colleagues regarding patient dispensation.

**A191. Planning, Executing, and Providing followup for a Multi-Specialty Surgical Based Medical Mission in a Third World Country**

Robert T. Stranding, MD, Detroit, MI; Syed F. Ahsan, MD, Detroit, MI; Tamer A. Ghanem, MD, Detroit, MI; Lamont R. Jones, MD, Detroit, MI; Hamad M. Chaudhary, MD, Detroit, MI; Elizabeth A. Studley, CRNA, Detroit, MI

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the planning, execution, and post-mission followup needed for a successful multi-specialty surgical medical mission trip to third world countries.

**Objectives:** The objective of this presentation is to discuss the planning, execution, and post-mission followup needed for a successful multi-specialty surgical medical mission trip to third world countries. The discussion will also include creating a plan for potential complications from surgery in an environment without adequate resources. **Study Design:** A retrospective case series review of a medical mission trip to Migori, Kenya. **Methods:** Six hundred and ninety native Kenyan's were pre-screened and evaluated by primary care physicians and surgeons for surgical pathology over 3 days. Eighty patients underwent surgical procedures by three otolaryngologists, two general surgeons, and two otolaryngology residents. Medical and surgical interventions were performed and outcomes recorded for various otolaryngologic and general surgical pathology. **Results:** There were 690 patients screened by seven surgeons, two primary care physicians, and an audiologist. There were six CRNAs, seven nurses and scrub techs, and one non-medical personnel that were paramount to the success of the mission. Eighty patients underwent surgery consisting of 28 thyroidectomies, 10 otologic

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surgeries, seven midface/cleft palate/mandible procedures, six superficial face/scalp lesions, and 29 general surgery cases. There were two patients that required hospitalization postoperatively, for hemorrhage and pneumothorax, but were later discharged in good condition. **Conclusions:** Planning a multi-specialty surgical mission to a third world nation requires adequate funding, supplies, and patient screening. Executing surgical cases requires sufficient anesthetic and nursing personnel for intraoperative and direct postoperative care. There also needs to be an emergency plan in place for possible operative complications. Lastly, there should be reliable postoperative care set up for after the mission team departs.

### A192. **COOL: Tracheostomy and Laryngectomy Educational Initiative**

Douglas J. Stanley, MD, Houston, TX; Ronda E. Alexander, MD, Houston, TX

**Educational Objective:** At the conclusion of this presentation, the participants should be able to recognize educational deficits in hospital staff and be able to incorporate COOL learning modules into their staff.

**Objectives:** Surgical airways are commonplace in acute care hospitals and are often seen as a routine part of care for critically ill patients. In the same way, many physicians view the care of tracheostomies as routine for the nurses and ancillary staff. But, many members of the hospital staff who see and care for patients with surgical airways have a knowledge deficit that can create reluctance to providing high level care to this patient population. For this reason there is a need for educational initiatives to close this knowledge gap on surgical airways. **Study Design:** Prospective educational study. **Methods:** Using the educational module, COOL: Tracheostomy and Laryngectomy, ICU and floor nurses at an academic tertiary care hospital were educated through an oral presentation given by a department of otorhinolaryngology-head and neck surgery house officer. A pre-teaching assessment was given prior to the educational presentation followed by a post-teaching assessment given to the same nursing units 5 months later. **Results:** Comparison of the responses from the pre-teaching assessment from each nursing unit were scored and compared to post-teaching responses with an increase of correct responses by 12% ( $p = 0.0326$ , CI -22.35 to -2.5292). Based on objective measure of knowledge as well as subjective self-assessment, the teaching increased knowledge about surgical airways amongst the nursing staff. **Conclusions:** Educational initiatives, such as COOL, can significantly reduce the knowledge deficit of the nursing staff so that they can confidently care for patients with surgical airways and provide high level of care.

### A193. **Analysis of Roles for an Emergency Medicine Physician versus Role for a Consulting Otolaryngologist in Management of Patients with Suspected Peritonsillar Abscess**

Daniel J. Stein, BA, Boston, MA; William E. Baker, MD, Boston, MA; Kenneth M. Grundfast, MD\*, Boston, MA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to describe patterns of care and potential opportunities for providing care more efficiently and economically in peritonsillar abscess.

**Objectives:** Analyze management of patients with peritonsillar abscess (PTA) to identify opportunities for providing care more efficiently and economically. **Study Design:** Retrospective chart review. **Methods:** Adult PTA cases evaluated at an urban academic hospital from 2006-2010 were reviewed. Demographics, years of experience of the managing ED physician, insurance, disposition, consultations and intervention were recorded. **Results:** 285 cases were managed. Average age of patients was 35.9 years (range 22-93), and average ED length of stay (LOS) 4.4 hours. LOS averaged 1.3 hours longer in patients receiving a consult ( $p=0.0084$ ). 39.4% were uninsured. For 68.4% of patients an otolaryngology consultation was requested. 71.3% had their abscess drained and 11.6% were admitted. An ED physician or resident drained the abscess in 54 (26.6%) of cases, with the others 149 (73.4%) drained by an otolaryngologist. 25/48 (52.1%) ED physicians drained at least one PTA. Time in practice was not a determinant for an ED physician deciding to I&D an abscess. The average physician length in practice was 12.4 years for admitted vs. 8.4 for not admitted patients ( $p=0.006$ ). All patients seen by a nurse practitioner (NP) who required drainage had the procedure performed by an otolaryngologist ( $p=0.0045$ ), but the overall rate of consultation was lower (47.7% vs. 72.2%,  $p=0.0024$ ). **Conclusions:** Most PTA patients receive an otolaryngology consultation. Half of ED physicians performed one or more drainages, indicating their comfort with the procedure. However, ED physicians drained only 27% of PTAs overall. Patients evaluated by NPs receive fewer consults, but none of the NPs performed I&D of a PTA.

### A194. **Assessing the Magnitude and Costs of Instrument Utilization in Otolaryngology Surgical Instrument Trays**

Emily W. Stockert, MBA, Chicago, IL; Alexander J. Langerman, MD, Chicago, IL

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss both the benefits and disadvantages of eliminating infrequently used instrumentation from routine otolaryngology surgical instrument trays.

**Objectives:** This study aimed to quantify the percent utilization of instruments among the most commonly used instrument trays in surgical cases for otolaryngology and three related surgical services (plastic surgery, bariatric (endoscopic) surgery, and neurosurgery). **Study Design:** This was a single site, observational study conducted on the surgical instrumentation used at a large academic medical center. Data were collected through direct observation by a trained investigator. **Methods:** Operating room instrument usage data were collected from routine (weekday, non-emergent) surgical procedures over a period of 8 weeks and analyzed using descriptive statistics and linear regression. Labor time required for cleaning and repacking instrument trays in central sterile processing was tracked during peak volume shifts for 2 weeks. **Results:** 49 procedures and 237 individual trays were observed. The average instrument utilization was 13.0% for otolaryngology ( $\pm 4.2\%$ ), 15.5% for plastic surgery ( $\pm 2.9\%$ ), 18.2% for bariatric surgery ( $\pm 5.0\%$ ), and 21.9% for

neurosurgery ( $\pm 1.7\%$ ). Of the 237 trays opened, 40 (17%) of these trays had one or zero instruments used after opening with otolaryngology the most frequent offender (16/73 trays, 22%). Using recorded labor time, we calculated the cost of cleaning and re-packaging an unused instrument to be \$0.10 per instrument and up to \$0.24-\$0.29 per instrument. **Conclusions:** Our study demonstrates that the percent utilization of instruments in otolaryngology surgical trays is low, and this trend is consistent across other specialties. Attention to tray composition may result in immediate and significant cost savings in the form of reduced central sterile processing labor.

**A195. Treatment Outcome of Tonsillectomy for Patients with Pustulotic Arthrosteitis (PAO)**

Miki Takahara, MD, Asahikawa, Hokkaido Japan; Yuki Kobayashi, MD, Asahikawa, Hokkaido Japan;  
Isamu Kunibe, MD, Asahikawa, Hokkaido Japan; Akihiro Katada, MD, Asahikawa, Hokkaido Japan;  
Tatsuya Hayashi, MD, Asahikawa, Hokkaido Japan; Yasuaki Harabuchi, MD, Asahikawa, Hokkaido Japan

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the effectiveness of tonsillectomy for the patients suffering from pustulotic arthrosteitis (PAO).

**Objectives:** A sterile arthrosteitis, especially in sternocostoclavicular joint, are often associated with palmoplantar pustulosis (PPP), which is known as typical tonsillar focal disease. Those are defined as pustulotic arthrosteitis (PAO). The cases in which pain of PAO improved after tonsillectomy have been reported. We investigated the clinical outcome of tonsillectomy in 35 patients with PAO. **Study Design:** We analyzed 35 patients with PAO who underwent tonsillectomy between 1990 and 2008. All 35 patients were suffering from the pain of sternocostoclavicular joint as well as PPP rash. Thirteen patients were male and 22 patients were female. Age ranged from 25 to 74 with a median age of 50. Duration of followup was 3-180 months. **Methods:** Improvement of pain after tonsillectomy was evaluated by self-scoring method using visual analogue scale (VAS). Score 10 showed complete disappearance of pain after tonsillectomy and 0 showed no changes before and after tonsillectomy. **Results:** Disappearance of pain (VAS 10) was seen in 26 patients (74%), marked improvement (VAS 8-9) was 4 patients (11%), and none of the patients suffered the same pain after tonsillectomy (VAS 0-1). There was significant positive correlation between improvement of pain and that of skin lesion. **Conclusions:** Tonsillectomy is very effective for pain of PAO and should be recognized as one of the major treatments of PAO.

**A196. The Coccidiomycosis Conundrum: A Rare Parotid Abscess**

Christopher G. Tang, MD, Oakland, CA; Balaram Puligandla, MD, Oakland, CA; Brian A. Nuyen, BS, San Diego, CA; Barry M. Rasgon, MD, Oakland, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to describe the clinical presentation of a coccidiomycosis abscess in the parotid.

**Objectives:** To describe a rare case of coccidiomycosis abscess in the parotid. **Study Design:** A 62 year old male presents to clinic with a 2 week history of increased non-tender, nonerythematous, indurated right sided parotid swelling. A 4cm x 6cm firm, well circumscribed mass was palpated in the right parotid gland. Pus was not expressed from Stensen's duct. Patient had a history of pulmonary coccidiomycosis/valley fever several years ago which resolved after 18 months of fluconazole. During that time he had complicated ICU stay secondary to his pulmonary manifestations. **Methods:** A fine needle aspirate was performed on the parotid mass with aspiration of 1/2 cc of purulent fluid with some blood. **Results:** Cultures from the aspirate revealed coccidioides immitis confirmed by DNA probe. Pathology slides reveal fungal spores. MRI was performed and showed a 2x2x3cm ill defined fluid collection in the superficial lobe as well as associated matted lymphadenopathy extending from the parotid into levels IIb and V. The patient was treated with 800mg of fluconazole every day for 3 months with resolution of the parotid swelling, however persistent cervical adenopathy remains. **Conclusions:** A PubMed literature search did not reveal any published case reports of coccidiomycosis in the parotid. Although this is a very rare case of acute parotid swelling, it should be considered in the differential diagnosis in a patient with previous coccidiomycosis. To the author's knowledge, this is the first case report of a coccidiomycosis abscess of the parotid. Long term antifungal therapy is essential for control.

**A197. Prevalence of Central Apneic Events in Children with Obstructive Sleep Apnea**

Seckin O. Ulualp, MD, Dallas, TX; Kamal Naqvi, MD, Dallas, TX

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the prevalence of central apneic events in children with obstructive sleep apnea.

**Objectives:** Central sleep apnea (CSA), characterized by cessation of airflow more than 10 seconds without respiratory effort during sleep, may occur in association with a variety of disorders. Aims of the present study were to determine prevalence of CSA and effect of tonsillectomy and adenoidectomy on CSA in children with obstructive sleep apnea (OSA) following surgery. **Study Design:** Retrospective chart review. **Methods:** The medical charts of children who underwent tonsillectomy and adenoidectomy for obstructive sleep apnea were reviewed to obtain information on history and physical examination, past medical history, polysomnogram findings, and surgical management. Number of central apneic events and central apnea index were evaluated before and after tonsillectomy and adenoidectomy. **Results:** Six hundred sixty-even children (age range: 1 to 18 years, mean: 5.8 $\pm$ 3.4) with polysomnogram documented obstructive sleep apnea were identified. CSA events occurred in 609 of 667 (8%) patients. Number if CSA events ranged from 1 to 121 (9.1 $\pm$ 13.4). CSA index ranged from 0.1 to 31.9 events/hour. In 104 patients who had postoperative polysomnogram, number of CSA

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events after surgery (4.9+5.3) was less compared to number of CSA events before surgery (9.4+14.9) ( $p<0.001$ ). CSA index after surgery (0.9+0.1) was less than CSA index before surgery (2.4+0.6) ( $p<0.01$ ). **Conclusions:** Central apneic events and central sleep apnea occur in children with obstructive sleep apnea. Number of central apneic events and central sleep apnea index improves after surgical treatment.

**A198. Pulling on all Oars: Working towards Obtaining Economic Sustainability in Hearing Implants**  
Jessica M. Van Beek-King, MD, Augusta, GA; Brian J. McKinnon, MD MBA\*, Augusta, GA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the importance of proper billing and coding in any medical practice, identify target areas of concern within their own practices and discuss possible ways to work towards economic sustainability.

**Objectives:** Cochlear implantation and osseointegrated hearing devices have clearly established benefits in auditory rehabilitation. However, financial constraints often prevent patients who would greatly benefit from such technology from having access. Reimbursement for these procedures is a major contributor to this challenge, hence proper coding and billing by the surgeon and billing personnel are critical to keeping programs economically viable. **Study Design:** Retrospective chart review. **Methods:** A review was completed of all patients who had undergone hearing implant surgery at a tertiary academic medical center between January 1, 2010, and May 12, 2011. Twenty patients were identified and a retrospective investigation performed of operative reports, claims forms and other related documents. Actual billing was compared against operative notes and other pertinent documentation completed during that time period. **Results:** Either major or minor billing errors were identified in all billing records. Errors included inconsistent pricing for similar procedures, billing for incorrect procedures, not billing for all procedures, increased complexity, or only billing for single side in bilateral cases. Billing often did not reflect accurately procedure or difficulty of procedure as dictated in the operative report. **Conclusions:** Proper coding and billing is essential to obtaining financial sustainability in any medical practice. In order to maximize efficiency, it is important to periodically review records and billing procedures with accounts personnel. In this way, patients may continue to have access to this life changing technology.

**A199. Untreated Head and Neck Surgical Conditions in Sierra Leone: A Cluster Randomized, Cross-Sectional, Countrywide Survey**  
Nicholas C. Van Buren, MD, Salt Lake City, UT; Reinou S. Green, MD, Baltimore, MD; Adam L. Kushner, MD, New York, NY; Jeremy D. Meier, MD, Salt Lake City, UT

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand how the Surgeons Overseas Assessment of Surgical Need (SOSAS) can be used to identify the burden of head and neck surgical disease in developing countries and realize the reasons for untreated disease in the third world country where this survey was piloted.

**Objectives:** 1) Demonstrate how the Surgeons Overseas Assessment of Surgical Need (SOSAS) can be used to determine the burden of head and neck (H&N) surgical disease in developing countries; and 2) identify the reasons for untreated disease in Sierra Leone. **Study Design:** Cluster randomized, cross-sectional countrywide survey. **Methods:** The survey was administered to 75 of 9671 enumeration areas (smallest administrative unit) in Sierra Leone between January 9 and February 3, 2012. The areas were randomly selected for the study clusters and in each cluster 25 households were randomly selected for the survey. A household representative was initially interviewed; then two randomly selected household members underwent a head to toe verbal examination. Need for surgical care was based on participant's responses to whether they had a head, face, or neck condition that they believed needed surgical assessment or care. **Results:** Of 1875 targeted households, data were analyzed for 1843 (98%), with 3645 total respondents. A H&N surgical condition needing attention was reported in 701 of the 3645 respondents (19.2%). The most common H&N sites requiring consultation were head (34.7%), eyes (22.3%), lips/mouth/dental (21.3%), neck (12.1%), and ears/nose/throat (9.6%). The most common reasons participants provided for not seeking medical care included: no money (60.1%), no need (24.1%), and no doctor/nurse (6.1%). Their condition was considered disabling by 41.2% of participants. **Conclusions:** These results show significant untreated surgical disease of the head and neck in Sierra Leone. This survey could be used in other countries as global healthcare professionals assess surgical needs throughout the world.

**A200. Perceived Benefits of Electronic Tablet Technology in Clinical Care and Resident Education**  
Bryan K. Ward, MD, Baltimore, MD; Amit Kochhar, MD, Baltimore, MD; Dane J. Genther, MD, Baltimore, MD; Howard W. Francis, MD MBA, Baltimore, MD; David W. Eisele, MD\*, Baltimore, MD; Simon R. Best, MD, Baltimore, MD

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss methods of implementing a tablet computer into clinical residency training.

**Objectives:** The present study explores the potential utility of iPads for improving clinical efficiency and resident education in an otolaryngology program. **Study Design:** Cross-sectional survey. **Methods:** All otolaryngology-head and neck surgery residents at a tertiary academic referral center were provided with an electronic tablet computer (iPad, Apple Inc.) and asked to explore the potential of clinical and educational tools to enhance residency training. Prior to distribution, a survey was administered to assess perceived future clinical and educational benefits. Pilot projects were then initiated based on resident feedback. **Results:** 16 residents completed

the survey. 56% perceived clinical activities as the area most likely to benefit, followed by education (37%). Specifically, residents anticipated improved efficiency in the storage and retrieval of clinical information not well captured by current electronic medical records. This includes laryngoscopic examinations, serial documentation of free flaps, and photographs of clinical findings on daily rounds and consults. Residents also anticipated utilizing electronic resources such as lecture notes, textbooks, or manuscripts to enhance resident education. **Conclusions:** Otolaryngology residents perceive the iPad as a tool to improve clinical care and resident education. Based on these findings, several quality improvement projects are currently underway, including the improvement of resident to resident hand-off, free flap monitoring, rounding time efficiency, and electronic documenting of flexible laryngoscopy.

**A201. Functional Rhinoplasty: A Potential Cure for Obstructive Sleep Apnea**

Adam W. Weisstuch, MD, Albany, NY; Jessica L. Winkler, MD, Albany, NY; Allison D. Lupinetti, MD, Albany, NY; Robert J. Defatta, MD, Baldwin, WI

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the role that functional nasal surgery has as a primary treatment modality for obstructive sleep apnea.

**Objectives:** The objective of this study was to investigate what role that functional nasal surgery, specifically rhinoplasty, may play in the treatment of obstructive sleep apnea (OSA). The goal was to demonstrate, with objective data, whether or not functional nasal surgery can be used as a primary treatment modality in patients with nasal obstruction and OSA. **Study Design:** Retrospective chart review. Patients who underwent functional rhinoplasty in a VA medical center from July 1, 2010—July 30, 2011, for symptoms consistent with nasal obstruction and/or obstructive sleep apnea were enrolled in the study. Each patient was sent for a preoperative polysomnogram, and if the study showed evidence of OSA, they were included in the study and a postoperative study was performed at least 6 months following their surgery. Only the objective data from the polysomnograms were processed for the results of the study. All patients who underwent functional rhinoplasty at this institution during the above time period were included, unless their preoperative sleep study showed no evidence of OSA or if they had a medical contraindication to a polysomnogram. **Methods:** Once all data was acquired, a retrospective chart review was performed for patients at the VAMC who underwent functional nasal surgery and had a presumptive pre-operative diagnosis of OSA caused by nasal obstruction based on history, physical and/or polysomnography study. A postoperative polysomnogram was performed and reviewed. Results from the postoperative study were compared to the preoperative studies. Objective criteria were used to analyze the studies result. **Results:** The average age in patients was 53.5 years and the average BMI was 34.02. All patients reported a subjective improvement on quality of breathing, daytime fatigue and witnessed apneic events. Regarding objective data, all measurements related to respiratory sleep activity improved when comparing the preoperative and postoperative study values. More specifically, in patients with complete data there was a decrease in AHI from 22.38 preoperatively to 13.07 postoperatively as well as a decrease in RDI from 23.15 preoperatively to 14.07 postoperatively. **Conclusions:** This study demonstrated objective polysomnographic improvement in the study population. Given the retrospective nature of the study and the amount of patients enrolled, it serves as an excellent pilot study for investigating the role of functional nasal surgery as a potential cure for OSA. Future, larger, prospective studies are necessary in order to demonstrate what role, if any, this intervention has in treating obstructive sleep apnea.

**A202. Pre and Postop Protocols and Challenges in an Adult Patient with Von Willebrand's Disease and PFAPA Who Developed Postop Hyponatremic Seizures**

Ling Zhou, MD, New York, NY; David R. Edelstein, MD\*, New York, NY

**Educational Objective:** At the end of this presentation, the participant should understand the different presentation and treatment of PFAPA versus chronic tonsillitis, the pre and postoperative workup of Von Willebrand's disease in adult patients, the pre and postoperative protocols for use of the different forms of DDAVP for bleeding avoidance, the postoperative diagnosis and care of hyponatremia and the differences in the care of the pediatric versus adult patient with these problems.

**Objectives:** Symptomatic hyponatremia is a well known but rare complication of DDAVP. We present the case of a 19 year old female with type I Von Willebrand's disease who underwent tonsillectomy for periodic fever, aphthous stomatitis, pharyngitis and adenitis (PFAPA). The patient received intranasal DDAVP prior to an uncomplicated tonsillectomy, but developed severe hyponatremia with seizures on postoperative day #1. This case highlights the complexity Von Willebrand's disease can add to any surgical case and the need for a more thorough and standardized approach to both pre and postoperative care in this patient population. We discuss the issues and challenges regarding PFAPA, DDAVP usage in adults and children, Von Willebrand's disease and the potential pre and postop protocols for adults versus children with this constellation of multiple complex syndromes. **Study Design:** Case presentation and literature review. **Methods:** Case review. **Results:** Not applicable. **Conclusions:** This 19 year old patient presented with several distinct complex problems making the pre and postoperative care of a routine tonsillectomy more complicated and risky. PFAPA is a distinct disease process from chronic tonsillitis necessitating different medical and surgical care. Von Willebrand's disease is well known in adults but the different therapies used to prevent postoperative bleeding may predispose to a multitude of complications. We discuss how to approach these different diseases separately and as a multivariable process needing distinct pre and postoperative protocols and followup.

# Posters

## Head & Neck

### A203. Parotid Involvement in Merkel Cell Carcinoma Patients

Kristine E. Day, MD, Birmingham, AL; William R. Carroll, MD, Birmingham, AL; Eben L. Rosenthal, MD\*, Birmingham, AL

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the possible prognostic implications of parotid gland involvement by Merkel cell carcinoma.

**Objectives:** Merkel cell carcinoma (MCC) is a cancer of neuroendocrine cell origin occurring frequently on the head and neck (H&N). It carries a poor prognosis with five year disease specific survival approximately 60%. We seek to determine the prognostic implication of parotid gland involvement. **Study Design:** Retrospective chart review. **Methods:** We reviewed a series of 14 patients (1 female, 13 male, aged 62-87) who underwent parotidectomy for the diagnosis of MCC between 2002-2010. Mean followup was 12.4 months. There were 10 primary skin lesions of the H&N while 4 patients presented with parotid masses and unknown primary lesions. There were 13 patients who had parotid involvement and one who underwent parotidectomy with negative pathology. All patients received adjuvant radiation except for one patient who expired postoperatively due to other comorbidities. No patient received adjuvant chemotherapy. **Results:** 13 patients (92.9%) had positive parotid disease at the time of surgery either by direct extension into the gland or positive intraparotid lymph nodes. 10 patients also received neck dissections, 6 of whom (60%) had cervical lymph node metastasis on pathologic examination. At last followup, 11 of 13 evaluable patients had died; the single patient without positive parotid disease remains alive (two patients were lost to followup). Patients with parotid and neck involvement had an average time to death of 17.4 months. **Conclusions:** These findings are consistent with other reports demonstrating decreased survival in patients with MCC of the H&N with nodal metastases. In this series, parotid involvement predicted worse survival than reported with cervical node involvement.

### A204. Transoral Robotic Repair of Recurrent Oronasal Fistula following Composite Facial Transplantation

Matthew M. Dedmon, MD PhD, Boston, MA; Kyle J. Chambers, MD MS, Boston, MA; Ahmad R. Sedaghat, MD PhD, Boston, MA; Daniel S. Roberts, MD PhD, Boston, MA; Bohdan Pomahac, MD, Boston, MA; Donald J. Annino, MD DMD, Boston, MA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to explain the etiology of oronasal fistula in maxillofacial reconstruction and discuss the use of robotic techniques to achieve closure in cases of difficult exposure.

**Objectives:** Oronasal fistula represents a challenging problem resulting in speech difficulties, velopharyngeal insufficiency, and aberrant nasal drainage. While commonly associated with cleft palate defects, oronasal fistula may also arise with any maxillofacial reconstruction due to asymmetry between donor and native tissue. Repair of oronasal fistulas in this setting can be particularly difficult due to postoperative sequelae, such as trismus, restricting transoral exposure of the palate. In such cases, a transoral robotic approach may be advantageous. **Study Design:** We report a case of recurrent oronasal fistula in a patient following composite facial transplantation secondary to mismatch between donor maxilla and native palate. **Methods:** Initial attempts at transoral closure of this 2x0.5cm midline palatal fistula were limited by incomplete exposure due to trismus. Subsequent fistula recurrence was addressed with a transoral robotic approach for improved palatal access. Maryland forceps and monopolar cautery were used to raise a submucosal flap on the soft palate posterior to the fistula. Subperiosteal dissection was then used to raise an opposing bipediced flap on the hard palate anterior to the defect. A two layered closure was achieved whereby the soft palate flap spanned the fistula to form the nasal lining while the hard palate flap recreated the oral mucosa. **Results:** Transoral robotic repair achieved complete closure that remains intact at one month followup. **Conclusions:** This case highlights the utility of robotic surgery in repair of defects with difficult oral exposure. Such approaches may be required with increasing frequency as composite facial transplantation techniques become more widespread.

### A205. Transoral Robotic Assisted Approach to the C1-C2 Cervical Spine

Tamer A. Ghanem, MD PhD, Detroit, MI; Naomi H. Fei, BSc, Detroit, MI (Presenter); Muwaffak M. Abdulhak, MD, Detroit, MI

**Educational Objective:** At the conclusion of this presentation, participants should be able to understand the advantages and techniques of this pioneering approach to the ventral craniocervical junction and the clivus using transoral robotic surgery.

**Objectives:** A case study will be used to demonstrate the technique used and advantages implied in using TORS to expose the midline cervical spine. **Study Design:** Case presentation. **Methods:** The technique describing a novel application of TORS to obtain a transpalatal approach to the clivus and C1-C2 for spine surgery is presented. **Results:** A 62 year old female patient with severe rheumatoid arthritis had severe symptomatic ventral cervicomedullary compression secondary to extreme case basilar invagination. A transoral approach was planned for lower clival and C1-C2 junction. The da Vinci SI robot was utilized in obtaining a transpalatal midline split and a superiorly based pharyngeal flap elevation. The neurosurgical procedure was done using a microsurgical technique in standard fashion. Robotic assistance was utilized for the pharyngeal flap closure and reapproximating the soft palate in 2 layers. Unlike conventional transoral approach, this approach had improved visualization and the use of an assistant provided an additional two hands to work in the limited space of the nasopharynx. **Conclusions:** This study demonstrates the feasibility and techniques of robotic assisted surgery in the transoral/transpalatal approach to C1-C2 in patients.

- A206. BRAF Mutation Does Not Predict Aggressive Features in Pediatric Papillary Thyroid Carcinoma**  
 Daniel J. Givens, MD, Salt Lake City, UT; Luke O. Buchmann, MD, Salt Lake City, UT; Archana M. Agarwal, MD, Salt Lake City, UT; Johannes F. Grimmer, MD, Salt Lake City, UT; Jason P. Hunt, MD, Salt Lake City, UT; Brandon G. Bentz, MD, Salt Lake City, UT

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the pathogenesis and prevalence of the BRAF V600E mutation in pediatric papillary thyroid cancer, and that it is not correlated with aggressive disease characteristics.

**Objectives:** This study aimed to review the prevalence of the BRAF V600E mutation in pediatric thyroid cancer and to determine a possible association with aggressive tumor behavior. **Study Design:** This is a retrospective chart review using archived tumor tissue, which was then submitted for post-hoc BRAF V600E mutational analysis. **Methods:** Patients between the ages of 0 and 18 years who underwent surgery for papillary thyroid carcinoma (PTC) from 1999-2012 were selected for a retrospective chart review to assess for aggressive disease characteristics. Microdissection was performed on archived tumor tissue, which was then analyzed for the BRAF V600E mutation by pyrosequencing. **Results:** Archived tumor specimens were available for 19 of 27 pediatric patients who initially fit inclusion criteria. Age ranged from 2.8 to 18 years (median 13.7). Thirteen patients (68.4%) had metastases to the central neck, eight (42.1%) to the lateral neck, and five (26.3%) had pulmonary metastases. The BRAF mutation was present in seven patients (36.8%). Eleven patients had classic PTC, seven had a follicular variant of PTC, and one oncocytic variant. Seven (63.6%) of the samples with classical PTC were BRAF positive. All samples with variant pathology were negative. Patients 15 and older were more likely to be BRAF positive (57.1% vs 25%,  $P=0.09$ ). BRAF significantly correlated with PTC histology ( $p=0.007$ ). Presence of lymphatic or pulmonary metastases, large tumor size, age, lymphovascular or extracapsular invasion, and MACIS score did not correlate with BRAF positivity. **Conclusions:** BRAF mutations may be more prevalent than previously thought in pediatric patients with PTC, but do not correlate with aggressive disease characteristics.

- A207. A Practical System for Recording Instrument Contacts and Collisions during Transoral Robotic Surgery**  
 Ernest D. Gomez, BS BSE, Philadelphia, PA; Gregory S. Weinstein, MD FACS\*, Philadelphia, PA; Bert W. O'Malley Jr., MD FACS\*, Philadelphia, PA; William McMahan, MS, Philadelphia, PA; Liting Chen, BSE, Philadelphia, PA; Katherine J. Kuchenbecker, PhD, Philadelphia, PA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss a technique for recording vibrations resulting from instrument contacts and collisions during transoral robotic surgery (TORS).

**Objectives:** To develop a system that records instrument interactions during TORS to determine the potential utility of haptic feedback in TORS. **Study Design:** Case series. **Methods:** A novel instrument sensing system was developed to record the mechanical vibrations that characterize robotic end effector interactions during TORS. Accelerometers relayed vibration signals from the end effectors of a da Vinci Si robot to a DVD recorder's audio track in synchrony with operation video. Recordings were examined by two reviewers to identify etiologies of instrument contacts and collisions. Percentage of robotic operation time during which detectable vibrations occurred was calculated for each instrument and compared. **Results:** The vibration recording system was implemented in five TORS tumor resections with no effect on robot setup or operative time. Video review led to identification of four common causes of vibrations: bedside instrument contacts, electrocautery spatula cleaning, tool repositioning, and tool insertions/removals. The electrocautery spatula experienced detectable instrument vibrations during  $16.2\% \pm 2.3\%$  of robotic operation time, while the Maryland forceps experienced vibrations during  $23.4\% \pm 2.6\%$ . This difference was significant ( $p=0.008$ ) and held true regardless of instrument laterality, which was determined by tumor site. **Conclusions:** End effector instrument contacts are a common occurrence during TORS, and the observed frequency of instrument vibrations can match expectations from knowledge of the operation, suggesting that vibrotactile haptic feedback may be of value in TORS. This work presents the first haptographic recordings of live TORS procedures. Future work will determine the effects of haptic feedback on TORS education and performance.

- A208. Computed Tomography Sestamibi Scan Directed Parathyroid Exploration: Does Localizing Imaging Decrease Operative Time?**  
 Evan J. Harlor, DO, Danville, PA; Phillip K. Pellitteri, DO\*, Sayre, PA; Timothy L. Lindemann, MD, Danville, PA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to explain the advantages of the implementation of a targeted parathyroid exploration in patients with positive preoperative SPECT/CT imaging.

**Objectives:** To elucidate the difference in operative times in patients who had positive localizing preoperative SPECT/CT imaging compared to those patients with negative preoperative SPECT/CT imaging. **Study Design:** Retrospective chart review. **Methods:** Review of 290 consecutive patients diagnosed with primary hyperparathyroidism who underwent preoperative SPECT/CT scan. Demographic data, preoperative and intraoperative laboratory, preoperative imaging, surgical findings and operative times were retrospectively collected and analyzed. Specific attention was paid to the operative times of patients with localizing and non-localizing imaging. **Results:** Two hundred fifty-six patients (88.3%) had a positive preoperative localizing imaging study and the remaining 34 (11.7%) were non-localizing. The operative times in the positive localization group was significantly less by a median of nine minutes (95% CI). Specifically, the positive localization group's median operative time was 15 minutes compared to 24.5 minutes for the negative localization group. **Conclusions:** Preoperative localization of hyperfunctional parathyroid tissue with SPECT/CT imaging and

# Posters

the use of a targeted parathyroid exploration significantly decreases operative time.

- A209. Pleomorphic Adenoma of the Major Salivary Glands: Diagnostic Utility of FNA and MRI**  
Chase M. Heaton, MD, San Francisco, CA; David W. Eisele, MD FACS\*, Baltimore, MD; Christine M. Glastonbury, MBBS, San Francisco, CA; Annemieke Van Zante, MD PhD, San Francisco, CA; Joseph L. Chazen, MD, San Francisco, CA; Eric J. Kezirian, MD MPH FACS\*, San Francisco, CA 94123

**Educational Objective:** At the conclusion of this presentation, the participants should be able to recognize important cytopathology and radiology characteristics of major salivary gland pleomorphic adenomas and understand their relevance in preoperative diagnosis.

**Objectives:** Pleomorphic adenoma (PA) is the most common, benign tumor of the major salivary glands. Surgical resection is the treatment of choice. Preoperative workup of major salivary gland neoplasms often includes fine needle aspiration cytology (FNA) and magnetic resonance imaging of the head and neck (MRI). Our objective was to assess the positive predictive value of FNA and MRI in the evaluation of major salivary gland PA. **Study Design:** Retrospective chart review. **Methods:** All patients with an FNA report with a diagnosis of PA of the major salivary glands and who underwent surgical excision at our institution from 2001-2011 were identified. Cytology slides were then re-reviewed by a cytopathologist for specific findings suggestive of PA: fibrillary stroma, mesenchymal elements, plasmacytoid cells, epithelial ducts or tubules, and nuclear atypia. MRI studies were reviewed by a neuroradiologist for specific findings consistent with PA: T2 hyper-intensity, well circumscribed borders, and homogenous post-contrast enhancement. The positive predictive value (PPV) of FNA and MRI findings was calculated using final pathology report, based on chi-squared testing. **Results:** One hundred forty-eight patients met inclusion criteria and 68 had preoperative MRI. PPV of FNA diagnosis of PA was 97.1%. Specific PA characteristics on FNA (fibrillary stroma, mesenchymal elements, plasmacytoid cells, epithelial ducts or tubules, and nuclear atypia) and MRI (T2 hyper-intensity, well circumscribed borders, and homogenous post-contrast enhancement) all demonstrated PPVs of 95% or greater in patients with FNA diagnosis of PA. **Conclusions:** PPV of an FNA diagnosis of PA in the major salivary glands is high. Among patients with an FNA diagnosis of PA, specific MRI characteristics also have high PPV.

- A210. Voice and Swallowing Complaints before and after Thyroidectomy**  
Theresa A. Holler, MD FRCS, Toronto, ON Canada; Griet Laurenys, MD, Brussels, Belgium; Gwen Merrick, MHS Reg CASLPO, Toronto, ON Canada; Marta Deluca, MCISc Reg CASLPO, Toronto, ON Canada; Chunzi J. Jin, BSc, Toronto, ON Canada; Jennifer Anderson, MD FRCS, Toronto, ON Canada

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss voice and swallowing outcomes as they relate to thyroid surgery.

**Objectives:** To assess the prevalence and severity of compressive symptoms in thyroidectomy patients both pre and postoperatively, and to evaluate their relationship with laryngopharyngeal reflux, gland size, disease type or inflammatory pathology. **Study Design:** Prospective cohort study. **Methods:** All patients consented for a thyroidectomy procedure were invited to participate. Those with prior neck surgery or radiation, underlying voice or swallowing disorders or age > 75 years were excluded. All subjects completed 3 questionnaires (Voice Handicap Index [VHI], Modified Swallowing Impairment Score [MSIS], Reflux Symptom Index [RSI]) and underwent acoustic voice analysis preoperatively, at one month postop and at  $\geq 3$  months postoperatively. Videostroboscopy and perceptual voice analysis (GRBAS) were performed at each visit. **Results:** Forty-three patients aged 19-73 years were included in this study (33 females, 10 males; 24 total thyroidectomy, 18 subtotal thyroidectomy). Both the VHI and MSIS showed worse scores at 1 month postoperatively followed by an improvement to near normal levels by  $\geq 3$  months postop. However, acoustic voice measures and GRBAS scores did not significantly change pre to postop ( $p > 0.05$ ). Evidence of LPR on the RSI was present in 58.8% and 61.5% of patients with voice and swallowing complaints, respectively. Residual voice and swallowing symptoms at  $\geq 3$  months postop were found in 37% and 20% of patients, respectively. **Conclusions:** To our knowledge, this is one of the only studies in the literature examining LPR in thyroidectomy patients with voice and swallowing complaints. All patients should have a thorough evaluation for LPR preoperatively and should be counselled about the possibility of residual symptoms postop.

- A211. Prevalence of Dual Thyroid Ectopy**  
Brittany E. Howard, MD, Phoenix, AZ; Sharon H. Gnagi, MD, Phoenix, AZ; Michael L. Hinni, MD\*, Phoenix, AZ

**Educational Objective:** At the conclusion of this presentation, the participants should be able to appreciate the prevalence of dual thyroid ectopy and the importance of assessment for multiple foci of ectopic thyroid tissue.

**Objectives:** To report dual thyroid ectopy as a frequent occurrence in patients presenting with an ectopic thyroid. **Study Design:** Retrospective case series. **Methods:** Surgical records from 1994-2012 at three tertiary academic referral centers were searched to identify patients undergoing or scheduled for ectopic thyroid excision. Medical records and radiographic studies were reviewed by two independent reviewers. **Results:** During the study period 10 patients were identified for surgical excision of ectopic thyroids. Dual foci of ectopic thyroid tissue occurred in 40% of patients. Demographic analysis revealed all patients with dual ectopy were female with an average age of 47 years (range 28-52). Ectopic tissue was located at the base of the tongue and anterior to the hyoid in all cases. No patients had an orthotopic gland. Dual thyroid ectopy was found in 2 patients at the time of diagnosis, and 2 had a history of thyroglossal duct excision representing a second focus of thyroid dysgenesis. **Conclusions:** A higher prevalence of dual thyroid ectopy was identified in our patient population than previously described in the literature. This highlights the importance of a thorough investigation

for additional foci when evaluating a patient with an ectopic thyroid.

- A212. Adaptation of Swallowing Gesture Coordination after Oropharyngeal Chemoradiation Therapy**  
 Katherine A. Kendall, MD, Salt Lake City, UT; Kristine M. Tanner, PhD, Salt Lake City, UT; Steven R. Kosek, MS, Minneapolis, MN

**Educational Objective:** At the conclusion of this presentation, the participants should be able to describe the changes made by patients in the timing of swallowing gestures relative to bolus movement through the pharynx after chemoradiation therapy compared to normal control subjects.

**Objectives:** To determine if changes occur in the timing of bolus movement and bolus movement coordination with swallowing gestures after treatment of oropharyngeal carcinoma with chemoradiation therapy. **Study Design:** Patients seen for followup at least one year after treatment for oropharyngeal carcinoma with chemoradiation therapy were sequentially approached and asked to participate in the study. **Methods:** The duration of bolus pharyngeal transit was measured for three liquid bolus size categories from modified barium swallowing studies in a group of 31 patients. The timing of bolus arrival in the vallecula and at the upper esophageal sphincter (UES) was determined. The timing of the 13 swallowing gestures, relative to the onset of the entrance of the bolus head into the oropharynx, was measured for each bolus size category. The mean and standard deviation of each measure was calculated. Study subject results were compared to those from an historical group of age matched controls without complaints of swallowing difficulty. **Results:** Mean bolus pharyngeal transit timing in the study population was unchanged for smaller bolus sizes. Mean transit time for the 20cc bolus category was significantly faster in the treatment group compared to controls. Analysis of gesture timing revealed significantly earlier opening of the UES in the patient population. **Conclusions:** Despite tissue changes and xerostomia resulting from exposure to chemoradiation therapy, patients are able to move a liquid bolus through the pharynx in a timely manner, likely by developing early UES opening.

- A213. Objective Measures of Swallowing Function Compared to Quality of Life Scores after Oropharyngeal Chemoradiation Therapy**  
 Katherine A. Kendall, MD, Salt Lake City, UT; Steven R. Kosek, MS, Minneapolis, MN

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss differences in actual swallowing physiology compared to patient perception of swallowing function and how that perception relates to quality of life scores.

**Objectives:** To compare objective measures of swallowing function with patient reports of swallowing related quality of life one year after treatment of oropharyngeal cancer with chemoradiation therapy. **Study Design:** Patients seen for followup at least one year after treatment of oropharyngeal carcinoma with chemoradiation therapy were sequentially approached and asked to participate in the study. **Methods:** Maximum pharyngeal constriction, hyoid elevation, upper esophageal sphincter (UES) opening size and bolus pharyngeal transit time were measured from modified barium swallowing studies in a group of 31 patients at least one year after chemoradiation therapy for the treatment of oropharyngeal carcinoma. Measures were made for a liquid 1cc, 3cc and 20cc bolus. Objective measure results were compared to scores from the MD Anderson Dysphagia Inventory and The University of Washington Swallowing Quality of Life Questionnaire results from the same patients. **Results:** No strong correlation was identified between any of the objective measures of swallowing physiology and quality of life scores. **Conclusions:** Patient perception of the impact of swallowing function on quality of life does not correlate well with actual physiologic functioning.

- A214. Hypotympana-Pharyngeal Fistula as a Complication of Temporal Bone Osteoradionecrosis**  
 Elton M. Lambert, MD, Houston, TX; Ron J. Karni, MD, Houston, TX; Sancak Yuksel, MD, Houston, TX

**Educational Objective:** At the conclusion of this presentation, the participants should be able to 1) understand the pathophysiology of osteoradionecrosis of the temporal bone; 2) describe the sequelae that can result from osteoradionecrosis of the temporal bone; and 3) describe the general management of osteoradionecrosis of the temporal bone and the associated sequelae.

**Objectives:** To present a rare case involving osteoradionecrosis of the temporal bone that resulted in the formation of fistulous tracts between the hypotympanum and posterolateral pharyngeal wall. **Study Design:** Case report. **Methods:** 61 year old male with a history of oropharyngeal cancer treated with chemoradiation nine years prior to his presentation of right ear pain and associated otorrhea. He was found to have osteoradionecrosis of the temporal bone and underwent lateral temporal bone resection. Fistulous tracts were found between the hypotympanum and the posterolateral pharyngeal wall at the level of the oropharynx. Necrotic bone was resected within the temporal bone and the hypotympanum that was obliterated with muscle and Tisseel. **Results:** Upon followup laryngoscopy the fistulous tracts appeared to be healing well with no apparent communication as evidenced by methylene blue test. **Conclusions:** Temporal bone osteoradionecrosis can be a serious complication of radiation to the head and neck. To our knowledge this is the first report of this entity resulting in fistulization between the tympanic cavity and pharynx. When managing temporal bone osteoradionecrosis one must not only keep in mind pathology related to the temporal bone but related structures including the pharynx, intracranial cavity and great vessels.

## Posters

### A215. Resection of Neurilemmoma of Left Sympathetic Chain

Jessica A. Lorenzana, BS, Lubbock, TX; Akhil J. Khosla, BS, Lubbock, TX; James C. Wang, BS, Lubbock, TX; Joehassin Cordero, MD FACS, Lubbock, TX

**Educational Objective:** At the conclusion of this presentation, the participants should be able to explain the rarity of a neurilemmoma of the left sympathetic chain and its diagnosis, treatment, and complications.

**Objectives:** Describe a rare case of resection of a neurilemmoma of the sympathetic chain. **Study Design:** Case report of a 59 year old male who presented with a mobile mass of the left neck. **Methods:** CT and MRI of the left neck were performed revealing a left neck mass within the left carotid space. Angiogram noted no blood supply to the mass and location just deep to the carotid bifurcation. A transverse incision was made through the subcutaneous tissue to the platysma, which was retracted superiorly. Dissection was done to level 1, retracting the submandibular gland superiorly. After exposure and lateralization of the sternocleidomastoid, the carotid sheath was opened. The common carotid was skeletonized using intermittent cauterization allowing for clear visualization of the bifurcation. Retraction of the hypoglossal nerve superiorly and carotid artery medially exposed a mass mediosuperior to the bifurcation. Exposure of all margins revealed inferior attachment to the sympathetic chain. Dissection around capsular adhesions maintained nerve preservation. Debridement resulted in complete excision of the mass. The remaining capsule was carefully stripped away retaining its deep portion to prevent injury to the nerve. **Results:** The outcome of the resection was a deep pale mass measuring 3 cm in diameter. Sections reveal a well encapsulated neoplasm composed of cells with spindle shaped nuclei arranged in intersecting bundles. Staining was strongly positive for S-100 suggestive of neurilemmoma. **Conclusions:** Neurilemmomas are benign schwannomas and involvement of the sympathetic chain is extremely rare. We would like to add this unique finding to the current literature.

### A216. Sentinel Node Biopsy Provides a Useful Way of Deciding on Neck Dissection in Early Stage Tongue Cancer

Takashi Matsuzuka, MD, Fukushima, Japan; Masahiro Suzuki, MD, Fukushima, Japan; Wataru Okano, MD, Fukushima, Japan; Satoshi Saijo, MD, Fukushima, Japan; Koichi Omori, MD, Fukushima, Japan

**Educational Objective:** Sentinel node biopsy provides a useful way of deciding on neck dissection in early stage of tongue cancer.

**Objectives:** Sentinel node (SN) biopsy has been used in decision making for neck dissection for early tongue cancer in our department since 2000. **Study Design:** In this study, the prognosis of early stage of tongue cancer patients with sentinel node (SN) biopsy in was compared with those without SN biopsy. **Methods:** On the day before surgery, Tc-labeled phytate is prepared as a radiotracer. SN is then diagnosed pathologically in the frozen section during surgery. When In cases where metastasis in SN is positive, neck dissection is performed. And when metastasis in SN is negative, neck dissection is not performed. From 1987 to 2007, there were 178 cases of tongue cancer, with the numbers of stage I and stage II cases being 47, 47, respectively. These 94 cases were enrolled in this study. The five year overall survival (5yOS) rate of stage I and II patients was 87% (stage I: 95%, stage II: 87%). **Results:** Among the 94 cases, 29 patients (stage I: 14 cases, stage II: 15 cases) underwent SN biopsy and their 5yOS rate was 96%, with a mean observation period of 6.1 year. The 5yOS rate of the rest of the patients (n=65) without SN biopsy was 85%, with a mean observation period of 6.0 years. **Conclusions:** Although elective neck dissection has been recommended for early stage tongue cancer in several studies, our concept could avoid unnecessary neck dissection. SN biopsy provides a useful way of deciding on neck dissection in early stage of tongue cancer.

### A217. Transoral Resection of Deep Parotid Lobe Pleomorphic Adenoma

Anthony McDowell, BS, Lubbock, TX; James C. Wang, BS, Lubbock, TX (Presenter); Ashley Mekala, DO MS, Lubbock, TX; Joehassin Cordero, MD FACS, Lubbock, TX

**Educational Objective:** At the conclusion of this presentation, the participants should be able to observe the surgical benefits of a completely transoral resection of a deep parotid lobe pleomorphic adenoma.

**Objectives:** Describe a unique case of complete transoral resection of a pleomorphic adenoma in the deep lobe of the parotid, allowing easier access and removal of the mass. **Study Design:** Case report. **Methods:** An ultrasound, followed by an MRI of the neck without contrast on a 28 year old male revealed a bilobed mass in the right parotid region. In surgery, a hard mass could be palpated and an incision was made at the level of anterior tonsillar pillar and lateral soft palate. Exposure of all margins and careful dissection revealed a deep lobular mass. Gold laser and bipolar cautery was utilized throughout the case for mobilization, hemostasis, and complete removal of the tumor. **Results:** Transoral resection revealed a 6 cm x 5 cm, multilobular, hard deep mass in the parotid histologically confirmed as pleomorphic adenoma. Two weeks postoperatively, patient had no complaints of pain except for soreness with mouth opening. Patient stated no difficulties talking and noted occasional right base of tongue numbness and tingling with acidic food intake and heaviness of his tongue. Through this technique there was no significant bleeding, no facial scarring, and normal nerve function was noted on the facial nerve monitor. **Conclusions:** We report a successful transoral approach for complete resection of a deep parotid lobe pleomorphic adenoma. This approach allows for ease of access and removal of the mass; additional benefits include but are not limited to preservation of the facial nerve, minimal bleeding, and no facial scarring.

**A218. Prostate Cancer Presenting as a Neck Mass**  
Ryan K. Meacham, MD, Memphis, TN; Francisco Vieira, MD, Memphis, TN

**Educational Objective:** At the conclusion of this presentation, the participants should be able to identify locations within the head and neck to which prostate cancer may metastasize.

**Objectives:** 1) Discuss an unusual case of previously undiagnosed prostate cancer presenting as a neck mass; and 2) review other reported cases of prostate cancer presenting in the head and neck. **Study Design:** Chart review. **Methods:** A clinical chart is reviewed of a patient presenting with a neck mass, which was diagnosed as metastatic prostate cancer. PubMed is searched for articles in the English language with terms “prostate cancer” AND “metastasis” AND “head” AND “neck”, and relevant articles are reviewed. **Results:** A 53 year old male presented with a 1 year history of a painless mass in the left supraclavicular fossa. He denied any urological symptoms. Incisional biopsy showed metastatic prostate carcinoma. Prostate specific antigen (PSA) was 991 ng/mL (normal 0-4 ng/mL). CT scans showed an 8 x 6 x 3.8 cm lobulated left neck mass as well as enlarged paraaortic, paracural, and pelvic lymph nodes. Bone scan showed abnormal uptake throughout the pelvic girdle, spine, ribs, and skull. Literature review showed that prostate cancer infrequently metastasizes to supraclavicular locations including cervical lymph nodes, salivary glands, cranial nerves, the orbit, and calvarium. **Conclusions:** Prostate cancer may present as a neck metastasis prior to the development of urinary symptoms. Prostate cancer may metastasize to a multiplicity of seemingly unrelated sites within the head and neck.

**A219. Small Cell Carcinoma of the Larynx**  
Satoshi Ohno, MD PhD, Wakayama, Japan; Shigeru Hirano, MD PhD, Kyoto, Japan; Makoto Miura, MD PhD, Wakayama, Japan

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the clinical and pathologic features of small cell carcinoma of the larynx. Treatment options should be discussed in order to manage this poor prognosis cancer.

**Objectives:** Small cell carcinoma arises commonly in the lung and rarely in the head and neck, especially in the larynx. Small cell carcinoma tends to be very aggressive and metastasize widely, leading to very poor prognosis. We describe our experience with a systematic review and discuss treatment options of this rare tumor. **Study Design:** Case report and literature review. **Methods:** A case report is described with fiberoptic images, positron emission tomography computed tomography (PET-CT) and histopathologic images. A literature review is presented and treatment options are discussed to achieve better prognosis. **Results:** A 70 year old man presented with discomfort of throat. Fiberoptic laryngoscopy revealed ulcerative tumor in the right false vocal fold of the larynx. PET-CT demonstrated the tumor, invading the thyroid cartilage, and metastatic lymph nodes swelling in the right neck, however there was no evidence of metastasis in other organs. The patient underwent total laryngectomy and right modified radical neck dissection. Histopathologic analysis confirmed the diagnosis of small cell carcinoma of the larynx. Chemotherapy (cisplatin/etoposide) was delivered four times, according to the therapeutic regimen for pulmonary small cell carcinoma. **Conclusions:** Small cell carcinoma of the larynx is a very rare and aggressive tumor with high rate and early tendency for distant metastases. Systemic chemotherapy should be delivered as soon as possible to prevent distant metastases. Surgical resection of primary tumor might be one of therapeutic options to achieve quick local control and deliver systemic chemotherapy quickly, leading to better prognosis.

**A220. The Impact of Demographic and Socioeconomic Factors on Thyroid Malignancies**  
Lucia S. Olarte, MD, New York, NY; Uchechukwu C. Megwalu, MD, New York, NY

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss and compare how demographic and socioeconomic factors impact survival in patients with thyroid gland malignancies.

**Objectives:** To investigate how demographic and socioeconomic factors impact survival in patients with thyroid gland malignancies. **Study Design:** Population based study using the Surveillance, Epidemiology, and End Result (SEER) cancer database. **Methods:** Relative survival data and the SEER computer software (SEER\*Stat 7.0.9) were used for statistical analysis, a p value <0.05 was considered statistically significant. **Results:** There was a higher 5 year relative survival for women (96.8% vs 93.0%, p<0.0002) and for married patients (97.3% vs 93.3%, p=0.0000). No significant difference in 5 year relative survival was observed between blacks and whites (93.9% vs. 96.1%, p=2.0), or between whites compared with other defined as: American Indian, AK Native, Asian/Pacific Islander (95.4%, p=0.2602), however a significantly worse 5 year relative survival rate was seen between blacks and other defined as: American Indian, AK Native, Asian/Pacific Islander (p<0.0004). There was a significant decrease in 5 year relative survival rates with increasing age (p<0.01 for all comparisons) except between the age groups 20-29 and 30-39 (99.6% vs. 99.4%, p<0.4629). Significantly better 5 year relative survival rates were demonstrated for patients residing in counties with higher median household incomes (96.1% vs 94.7%, p=0.0000) and higher rates of high school completion (95.9% vs 94.8%, p=0.0000). **Conclusions:** Our study suggests a survival benefit for younger, female, married patients, and patients of white or of American Indian/Native/Asian/Pacific Islander descent, living in counties with higher median household income and higher rate of high school education. This highlights the significance of socioeconomic and demographic information on survival outcomes for patients with thyroid gland malignancies.

# Posters

## A221. Role of Senescence in Head and Neck Squamous Cell Carcinoma

Kyra M. Osborne, MD, Cleveland, OH; Janalee K. Holmes, MD, Cleveland, OH; Abeba Demelash, PhD, Cleveland, OH; Brian R. Gastman, MD, Cleveland, OH

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the definition of senescence and its role in head and neck squamous cell carcinoma.

**Objectives:** Senescence is a form of cell cycle arrest in which cells are incapable of further proliferation, but have continued metabolic activity. Some evidence suggests that senescence is a barrier to tumor progression, which malignant tumor cells have overcome. Senescence markers have been identified in post-chemotherapy lung, prostate, and breast tumors and have been associated with treatment success. Recently, it was shown that downregulation of the tumor survival factor Mcl-1 improves chemotherapy induced senescence, preventing tumor growth. We plan to determine the levels of senescence in head and neck squamous cell carcinoma, correlating them with the expression of Mcl-1. **Study Design:** Basic science. **Methods:** Tissue was collected from patients diagnosed with primary and recurrent head and neck squamous cell carcinoma between July 2010 and August 2012. Patient demographics, tumor histology, previous treatment, and outcomes were evaluated. Specimens were sectioned and stained for senescence markers including p53, p16, and senescence associated-beta-galactosidase (beta-gal) as well as Mcl-1. **Results:** beta-gal was identified in primary and recurrent head and neck tumors. There was an association between increased expression of beta-gal and decreased expression of Mcl-1, regardless of p53 levels. p16 expression correlates with beta-gal levels. **Conclusions:** Potential exists to use senescence as a target for chemotherapy agents in head and neck cancer. Chemotherapy induced senescence can be induced at lower doses, reducing toxicities. Our interim data suggests that inducing senescence potentially through the simultaneous targeting of Mcl-1 may be a realistic strategy for these aggressive cancers and may be an indicator of prognosis. Further studies will support this.

## A222. Salivary C Reactive Protein Reduction after Leukoplakia Treatment with Pioglitazone

Brendan H. Pierce, MD, Minneapolis, MN; Beverly R. Wuertz, BS, Minneapolis, MN; Nelson L. Rhodus, DMD, Minneapolis, MD; Eva E. Szabo, MD, Bethesda, MD; Frank G. Ondrey, MD, Minneapolis, MN

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the potential value of CRP as a biomarker of inflammation in oral rinses.

**Objectives:** Determine if oral rinse CRP can be used as noninvasive biomarker for inflammatory marker of precancerous lesions. **Study Design:** We performed a successful clinical trial with pioglitazone (Actos) where over 70% of patients with leukoplakia had clinical responses to pioglitazone treatment. In the present study we analyzed salivary rinse specimens obtained before and 12 weeks after leukoplakia treatment with pioglitazone. We investigated whether CRP was present in salivary rinse specimens of patients treated for high risk leukoplakia with the PPAR gamma activator pioglitazone and hypothesized it may be reduced as a function of the anti-inflammatory effects of PPAR gamma activation. **Methods:** Pre and post-treatment oral cavity rinse specimens were obtained from 21 patients who underwent 12 weeks of treatment with 45 mg daily oral pioglitazone. Patients were given 10 cc of phosphate buffered saline for 30 second rinses which were then frozen at -70 degrees Celsius until analysis. Specimens were analyzed in triplicate by ELISA for CRP. **Results:** We found on pre/post paired T tests that pioglitazone treatment resulted in significant reductions of CRP in salivary saline rinse specimens with approximately 40% reductions in salivary CRP after treatment ( $P < 0.05$ ). **Conclusions:** This study demonstrates that CRP is present locally in the milieu that harbors precancerous changes in the mouth. Further, PPAR gamma activation can result in significant reductions in CRP in oral specimens derived from patients treated for high risk leukoplakia. This is the first in vivo head and neck cancer study to analyze this noninvasive biomarker as a putative measure of treatment response.

## A223. Transoral Resection of Supraglottic Alveolar Soft Part Sarcoma

Trey Sertich, BS, Lubbock, TX; James C. Wang, BS, Lubbock, TX; Michael Hanna, MD, Lubbock, TX; Joehassin Cordero, MD FACS, Lubbock, TX

**Educational Objective:** This case report serves to review the rare malignancy, alveolar soft part sarcoma (ASPS), and highlight the efficacy of the LF-40 GOLD laser in the resection of ASPS. After this presentation, participants should be able to know how to identify ASPS and understand its management and prognosis. Additionally, the benefits of the GOLD laser system should be understood, and it should be considered a legitimate option for laryngeal surgery.

**Objectives:** Describe a novel approach, microsuspension laryngoscopy with a Lightforce-40 GOLD laser, for an established procedure, transoral resection of a supraglottic mass, an ASPS. **Study Design:** Case report of a 59 year old male who presented with a left sided mass obstructing his airway upon inspiration. **Methods:** Analysis using published literature and the medical record. The GOLD laser is a 980nm laser containing indium, arsenide phosphate, and gallium; its delivery system combines suction with the laser for concurrent cutting/coagulation and blood/smoke removal. Soft tissue/thin bone may be cut with the chisel tip of the fiber in contact mode, while hemostasis requires noncontact mode. **Results:** ASPS is an extremely rare and highly vascular malignancy of the head and neck. It is slow growing, but the incidence of metastasis is high early in the progression of the disease. Microscopic analysis showed large pink cells arranged in an alveolar pattern. Periodic acid-Schiff positive diastase resistant material was noted that represented the crystalline structures seen in ASPS. **Conclusions:** The limited surgical field, proximity of vital structures, and degree of vascularity of ASPS demand excellent technique and equipment. Transoral resection using the GOLD laser provides increased precision, reduced collateral damage, and more rapid hemostasis than classic CO2 lasers. Electrical conduction is not necessary like the Bovie, and the apparatus

is not as unwieldy as the bipolar (the tip is 2mm). Although rare, ASPS should always be considered for a laryngeal mass, and the use of the GOLD laser should be considered along with an open procedure, traditional CO2 laser techniques, bipolar and Bovie electrocautery.

**A224. Naso-Oropharyngeal Choristoma in an Adult: Reliving the Controversy**

Ramanuj Sinha, DLO MS DNB, Kolkata, West Bengal India; Mainak Dutta, MS, Kolkata, West Bengal India (Presenter); Soumya Ghatak, MS, Kolkata, West Bengal India; Soham Roy, MD FACS FAAP, Houston, TX

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the embryological fundamentals of the teratoma/dermoid complex in the head and neck, especially in the naso-oropharyngeal region where they are commonly seen in the infants. However, a comparative discussion would also ensue when such a lesion is encountered in an adult, which is a rare phenomenon, limited to a handful of reports in the medical literature. Presentation of this representative case in an adult would help to analyze the existing dilemmas related to the origin, terminologies and histogenesis of the choristomatous lesions, and would help the audience explore for an answer to any new controversy. The presentation would help realize that discussion on new cases like this in an adult would be important as a legacy to any clinician who happens to encounter in future a similar case for management.

**Objectives:** We present a rare case of naso-oropharyngeal choristoma in an adult and discuss its origin from an embryological perspective. **Study Design:** Case report. **Methods:** Case report with review of literature. **Results:** A 42 year old woman presented with gradually progressive dysphagia and sleep apnea for 4 years, with right sided nasal obstruction for 2 years. On examination, a large, pedunculated smooth walled, non-tender mass, free on all sides except superiorly, was seen to occupy the entire oropharynx, more towards the right. Nasal endoscopy revealed the lesion to be attached to the right eustachian tube orifice and the adjacent epipharyngeal surface of the soft palate. Imaging was non-contributory. The mass was excised by a combined naso-endoscopic and transoral approach. Histopathology suggested bigeminal teratoma with no evidence of dysplasia, leading to the diagnosis of a naso-oropharyngeal choristoma. The patient recuperated well and was disease free on 8month followup. **Conclusions:** The naso-oropharynx is the most common site for teratoid lesions in the head and neck region, and these mostly are seen in the neonates and in early infancy producing symptoms related to mass effect. However, though this group of non-neoplastic lesions presenting as choristoma in this region in adults is rare, this has questioned the genesis of the dermoid/teratoma complex in terms of origin, nomenclature, and histology. This report deals with the embryology of these lesions and the related controversies through the presentation of a rare yet representative case in an adult.

**A225. Recurrent Submandibular Gland Pleomorphic Adenoma Transforming into a Metastatic Myoepithelial Carcinoma to the Clivus: A Case Report and Discussion**

Pavlina P. Suchanova, MD, Houston, TX; Nadia G. Mohyuddin, MD, Houston, TX; Masayoshi Takashima, MD, Houston, TX

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the broad differential diagnosis of a clival mass, explain the clinical and histopathological challenges of myoepithelial carcinomas and also demonstrate a heightened awareness of possible malignant differentiation with metastatic potential in a setting of a benign salivary gland pleomorphic adenoma.

**Objectives:** To highlight the clinical and histopathological diagnostic difficulties of myoepithelial carcinomas and the need for increased awareness of possible malignant differentiation with metastatic potential in a setting of a benign salivary gland pleomorphic adenoma. **Study Design:** Case report. **Methods:** Chart and literature review. **Results:** 43 year old otherwise healthy woman who underwent a right submandibular gland pleomorphic adenoma resection in June of 2011 presented in September of 2012 to an emergency room with severe headache, left cranial nerve VI palsy and a new 1 cm painless right submandibular mass. Brain MRI revealed a 1.8 cm T1/T2 isointense clival mass eroding into the sphenoid sinus and a right neck mass. Fine needle aspiration of the neck mass revealed a pleomorphic adenoma with evidence of myoepithelial differentiation. Patient underwent transsphenoidal debulking of her clival mass. Intraoperative pathology revealed a pituitary adenoma. Due to the friability and fibrotic nature of the tumor, surgery was stopped in order to await final pathological diagnosis. After a comprehensive interdepartmental review of the pathology, the final diagnosis was metastatic myoepithelial carcinoma, originating from the right submandibular pleomorphic adenoma. **Conclusions:** Myoepithelial carcinoma is a rare and locally aggressive neoplasm originating from the salivary gland. Very limited reports are available in the literature about its metastatic behavior. We are presenting a case of a recurrent submandibular gland pleomorphic adenoma differentiating into a myoepithelial carcinoma that metastasized to the sella/clivus, mimicking a pituitary adenoma. This case demonstrates the need for heightened awareness of the potential for metastatic myoepithelial carcinoma transformation from pleomorphic adenomas.

**A226. Molecular Detection for Cervical Lymph Node Metastases in Head and Neck Squamous Cell Carcinoma Using One Step Nucleic Acid Amplification Assay**

Masahiro Suzuki, MD, Fukushima, Japan; Takashi Matsuzuka, PhD, Fukushima, Japan; Koichi Omori, PhD, Fukushima, Japan

**Educational Objective:** At the conclusion of this presentation, the participants should be able to explain molecular detection for lymph nodes metastases, a one step nucleic acid amplification with CK19mRNA, is useful in intraoperative diagnosis for cervical lymph

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nodes metastases in patients with head and neck squamous cell carcinoma.

**Objectives:** Molecular detection for lymph nodes metastases, a one step nucleic acid amplification (OSNA) with CK19mRNA, has been clinically used for breast cancer. We demonstrated that OSNA assay is useful in intraoperative diagnosis for cervical lymph nodes (CLNs) metastases in patients with head and neck squamous cell carcinoma (HNSCC), 2012. This study evaluated the diagnostic value of OSNA assay in comparison to the results of histopathological examinations in patients with HNSCC. **Study Design:** Retrospective study. **Methods:** A total of 54 CLNs dissected during surgery from 21 HNSCC patients at our university were used. Each CLN sample was sectioned into four equal parts, with two used for OSNA assay and two for histopathological examinations including hematoxylin-eosin (H.E.) stain and CK19 immunostain. This study compared the detection of CK19 mRNA from OSNA assay for each CLN with these histological examinations. **Results:** OSNA assay showed acceptable efficacy in the detection of histopathological CLN metastases. Sensitivity of the OSNA assay for H.E. stain was 77.8% (7/9). Specificity of OSNA assay for H.E. stain was 97.8% (44/45). Sensitivity of OSNA assay for CK19 immunostain was 100% (6/6). Specificity of OSNA assay for CK19 immunostain was 95.8% (46/48). **Conclusions:** Molecular detection of CLN metastasis using OSNA assay is almost equal to histopathological detection of CLN metastasis. OSNA assay would have a high intraoperative diagnostic value for CLN metastasis in HNSCC patients.

### A227. Treatment Outcomes in Head and Neck Sarcomas

Bobby A. Tajudeen, MD, Los Angeles, CA; Jennifer Fuller, Los Angeles, CA; Chi Lai, MD, Los Angeles, CA; Maie St. John, MD PhD\*, Los Angeles, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the various factors that affect treatment outcomes in the management of head and neck sarcomas.

**Objectives:** To evaluate the clinical presentation, subtype distribution, and treatment results of head and neck sarcomas at a single institution over an 11 year period. **Study Design:** A retrospective review. **Methods:** Data was collected by examining the records and reviewing the pathology of 218 patients with head and neck sarcomas treated at a tertiary care institution from 2000 to 2011. **Results:** 125 males and 92 females with an age range of 1 to 93 years (mean, 50 years) were treated. Mean followup time was 40.5 months with a range of 1 to 193 months. The most common presenting symptom was a mass lesion in 51% of patients. The nasal cavity/sinus was the most common presenting site (20%). Solitary fibrous tumor/hemangiopericytoma (SFT/HPC) was the most common subtype (22%) followed by osteosarcoma (13.4%), rhabdomyosarcoma (10.2%), and angiosarcoma (9.6%). 31.6% of tumors were high grade. Lymph node metastasis was rare at 4%. Surgery alone was performed in 33.5% followed by surgery+RT (23.9%), and surgery+RT+chemo (20.6%). Overall, sarcomas of the head and neck demonstrated a 2 year recurrence free survival rate of 69% and a 5 year survival rate of 86%. Positive margins and the presence of perineural invasion adversely affected recurrence free survival. **Conclusions:** There are few published studies on the treatment outcomes of head and neck sarcomas. We report that these sarcomas tend to be high grade, with a high incidence of local recurrence. Our results indicate that recurrence free survival is closely linked to tumor type as well as the presence of positive margins and perineural invasion.

### A228. Spindle Cell Thymoma and Parathyroid Adenoma: Rare Combination of Two Distinct Pathologies

Benjamin F. Walton, MD, Galveston, TX; David M. Gleinser, MD, Galveston, TX; Nahal Boroumand, MD, Galveston, TX; Tammara L. Watts, MD PhD, Galveston, TX; Michael P. Underbrink, MD MBA, Galveston, TX

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the embryology of both the parathyroid and thymus gland. Participants should also understand the various locations a parathyroid adenoma may be found.

**Objectives:** While there is an intimate anatomical and embryological relationship between the inferior parathyroid gland and thymus, concurrent pathology is rare. 3 cases have been reported in the literature of a parathyroid adenoma in conjunction with a thymoma. We present a new case of concurrent pathology. **Study Design:** We present a case report along with a literature review of previous cases of parathyroid adenoma in association with a thymoma. We have also performed a literature review of mediastinal parathyroid adenomas and thymomas. **Methods:** We present a case report with a literature review performed utilizing PubMed utilizing key words "parathyroid adenoma" and "thymoma." **Results:** We present a case report of a 60 year old female with a past medical history of hypercalcemia subsequently found to have primary hyperparathyroidism. Sestamibi scan of the parathyroid revealed increased uptake in the lower left neck consistent with a parathyroid adenoma. A standard transverse neck incision was performed with exploration of the lower left thyroid pole. Further dissection was required to identify the parathyroid gland which was intimately associated with thymic tissue in the superior mediastinum. Both thymic tissue and the parathyroid gland were sent for pathology. Permanent pathology subsequently revealed a parathyroid adenoma with an incidental spindle cell thymoma. **Conclusions:** The embryological relationship of the inferior parathyroid glands and the thymus is well known as both are derived from the third branchial pouch. However, there are only 3 other previous reports of parathyroid adenoma associated with a thymoma in the current literature. Interestingly, up to 16% of parathyroid adenomas are found in the mediastinum, and the current literature states the incidence of thymoma varies from 10-42%.

**A229. Comorbidity and Performance Status Are Independent Prognostic Factors in Head and Neck Squamous Cell Carcinoma Patients**

Jennifer R. Wang, MD, Toronto, ON Canada; Steven Habbous, MSc, Toronto, ON Canada; Osvaldo Espin-Garcia, Toronto, ON Canada; Fei-fei Liu, MD, Toronto, ON Canada; David P. Goldstein, MD MSc, Toronto, ON Canada; Geoffrey Liu, MD MSc, Toronto, ON Canada

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the prognostic impact of comorbidity and performance status in head and neck squamous cell carcinoma.

**Objectives:** To evaluate the impact of comorbidity and performance status on head and neck squamous cell carcinoma (HNSCC) survival, and to determine whether comorbidity and performance status provide independent prognostic data in HNSCC. **Study Design:** Retrospective analysis on a prospectively followed HNSCC cohort. **Methods:** Six hundred prospectively recruited patients with histologically confirmed primary invasive squamous cell carcinoma of the oral cavity, oropharynx, larynx, and hypopharynx were included in the study. Comorbidity and performance status were assessed using the Charlson Comorbidity Index (CCI) and the Eastern Cooperative Oncology Group (ECOG) Scale. Main outcome measures were overall survival (OS) and disease specific survival (DSS). **Results:** The overall survival rates at 1, 2, 3, and 4 years were 93%, 85%, 80%, and 77%, respectively. 46.3% of patients had at least one comorbidity on CCI. The majority of patients (57.7%) had an ECOG score of 0 at the time of diagnosis. There was no correlation between CCI and ECOG (Spearman's rho=0.033, p=0.42). CCI and ECOG scores were not associated with DSS. In multivariate analysis adjusted for age, anatomical subsite, stage, and treatment intent, CCI score was associated with OS. There was no association between ECOG score and OS in this base multivariate model. However, ECOG score became significant in predicting OS after adjusting for CCI score. **Conclusions:** HNSCC outcome studies should include assessment of both comorbidity and performance status. CCI and ECOG provide independent prognostic information in predicting overall survival in HNSCC.

**A230. Intramuscular Myxoma of the Neck in Mazabraud Syndrome**

Yi-Hsuan E. Wu, MD, Boston, MA; Jagdish K. Dhingra, MD, Boston, MA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the presentation, pathophysiology, and management of Mazabraud syndrome.

**Objectives:** Describe the first reported case of intramuscular myxoma of the neck in a patient with polyostotic fibrous dysplasia, a rare association known as Mazabraud syndrome. Review the literature to better understand the pathophysiology of this rare disorder. **Study Design:** Case report and literature review. **Methods:** A 46 year old man with polyostotic fibrous dysplasia presented with a slowly enlarging, but otherwise asymptomatic neck mass of 6 weeks duration, with no response to oral antibiotics. After appropriate workup and excision, the mass showed features consistent with intramuscular myxoma. Clinical, radiological, cytological, pathological, and immunochemical findings are described. **Results:** Clinical examination showed a discrete, round, firm, non-tender deep neck mass with limited mobility measuring 2.5 cm across. CT of the neck revealed a homogenous solid lesion with minimal contrast enhancement. Fine needle aspiration demonstrated clusters of spindle cells without lymphocytes. The mass was fully excised and histological examination revealed fibromyxoid features with nodular myxoid separated by collagenous areas. Immunohistochemistry was positive for vimentin and CD 34, and negative for MUC4. A diagnosis of juxta-articular intramuscular myxoma was made. Literature review revealed this to be the first reported case of Mazabraud syndrome with a myxoma of the neck. **Conclusions:** Since 1926, approximately 80 cases of Mazabraud syndrome have been reported. Myxomas most frequently involve the lower limbs. Compared to patients with fibrous dysplasia alone, patients with Mazabraud syndrome have a higher risk of malignant transformation of fibrous dysplasia to osteosarcoma. Myxomas can also locally recur. Long term followup is recommended.

## **Laryngology/Bronchoesophagology**

**A231. KTP Laser in the Treatment of Early Glottic Cancer: A Viable Alternative**

Matthew S. Broadhurst, BMBS FRACS, Fortitude Valley, QLD Australia

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the concept of photoangiogenesis. They should be able to explain the technique of KTP laser treatment of early vocal cord cancer and discuss the outcome for the patient in comparison to the other accepted techniques including radiation therapy and transoral laser microsurgery.

**Objectives:** To assess the validity of potassium titanyl phosphate (KTP) laser in the treatment of early glottic cancer. **Study Design:** Retrospective chart review of consecutive patients treated with KTP laser for early glottic cancer under a single treating surgeon. Ethics approval was granted. **Methods:** Patients were classed as glottic T1a or T1b NOMO squamous cell carcinoma. All underwent routine tumor board workup followed by biopsy at microlaryngoscopy and definitive staged KTP laser treatments 6 weeks apart. Followup was conducted at 2 weeks, monthly for the first year, and 2nd monthly for the second year. At each visit videostroboscopy was performed and the voice handicap index (VHI) and patient quality of life QF36 forms were completed before surgery and at 1 year following completion of KTP laser treatment. Videostroboscopy was analyzed preoperatively and compared to 1 and 2 years postoperatively. **Results:** Sixteen patients (15 male, 1 female) presented with squamous cell cancer of the glottis classed as T1N0M0. There were 11 T1a and 6 T2b with one patient having bilateral T1a lesions. All patients completed followup at 2 years and remained disease free. The VHI was 77 preoperatively improving to 19 postoperatively at 1 year. Similarly the QOL SF36 improved postoperatively.

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**Conclusions:** KTP laser provides a reasonable alternative to radiation or CO2 laser excision for T1N0M0 glottic cancer. The success rates are comparable to existing treatment methods and voice outcomes are encouraging. In this study, this new treatment option appears valid with X 2 year disease free survival and with the appealing benefit of improved voice outcomes at 1 year.

**A232. Laryngeal Papillomatosis Associated Dysplasia in the Adult Population; Prevalence and HPV Subtyping**  
Taryn Davids, MD FRCSC, Newmarket, ON Canada; Susan Muller, DMD MS, Atlanta, GA; Justin C. Wise, PhD, Atlanta, GA; Michael M. Johns, MD FACS FRCS\*, Atlanta, GA; Adam M. Klein, MD FACS, Atlanta, GA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the current prevalence of dysplasia in the adult laryngeal papilloma population and the association of high/low risk HPV subtypes.

**Objectives:** To determine the prevalence of laryngeal dysplasia and associated human papilloma virus (HPV) subtypes in adult patients, 18 years or older, suffering from laryngeal papillomatosis at a tertiary care institution. **Study Design:** Retrospective cohort. **Methods:** Patients with biopsy proven laryngeal papillomatosis were identified via chart review. All available pathology specimens were reviewed by a dedicated head and neck pathologist to confirm/refute the diagnosis of laryngeal dysplasia and grade the level of dysplasia. Inter-rater agreement was compared using cross-tabulation methods. Specimens identified to be positive for dysplasia underwent further testing via in-situ hybridization for low (6/11) or high (16/18) risk HPV subtypes. **Results:** Of the 85 subjects identified to have laryngeal papillomatosis, 24 (28%) demonstrated laryngeal dysplasia. There was good inter-rater agreement on the presence of dysplasia, however, there was only fair agreement on the grade of dysplasia. Of the pathology specimens tested for HPV subtype, the majority of patients (62%) were positive for HPV 6/11 including all high grade dysplasia patients. Three (12%) dysplasia specimens were negative for both high and low risk HPV subtypes. **Conclusions:** We found a 28% prevalence of dysplasia in our patient population with the majority of patients positive for low risk HPV subtypes indicating that high risk HPV subtypes do not predispose laryngeal papilloma patients to dysplasia.

**A233. Longitudinal Incidence of Vocal Fold Paralysis after Thyroidectomy for Well Differentiated Thyroid Carcinoma and Impact of Intraoperative Nerve Monitoring**  
David O. Francis, MD MS, Nashville, TN; Elizabeth C. Pearce, MD, Nashville, TN; Shenghua Ni, PhD, Nashville, TN; C. Gaelyn Garrett, MD\*, Nashville, TN; David F. Penson, MD MPH, Nashville, TN

**Educational Objective:** At the conclusion of this presentation, the participants should understand the longitudinal incidence of unilateral vocal fold paralysis after thyroidectomy in Medicare patients with well differentiated thyroid cancer. They will also know the impact of intraoperative monitoring on rate of vocal fold paralysis.

**Objectives:** Longitudinal incidence of unilateral vocal fold paralysis (UVFP) after thyroidectomy for well differentiated thyroid carcinoma (WDTC) is not known. This study aimed to measure the longitudinal UVFP incidence and the impact of intraoperative nerve monitoring (IONM) in the Medicare population. **Study Design:** Retrospective cohort study. **Methods:** All complete SEER-Medicare data (1991 - 2006) were used to identify patients with WDTC who underwent thyroidectomy. Incident UVFP was identified from Medicare claims. IONM was extracted from claims and its effect on UVFP rates compared. **Results:** Of 4,056 total thyroidectomies identified, 7.9% were complicated by UVFP. UVFP incidence rates did not change significantly over the 16 year period studied (range 5.9% - 11.6%, P=0.52). IONM did not reduce the rate of UVFP: 6.5% with vs. 8.4% without monitoring (p=0.33). **Conclusions:** Incidence of post-thyroidectomy UVFP has remained stable, affecting between 1/10 - 1/20 Medicare patients with WDTC. While promising, IONM did not reduce UVFP rates in this population.

**A234. Sarcoidosis Presenting as Bilateral Vocal Cord Paralysis**  
Sharon H. Gnagi, MD, Phoenix, AZ; April M. Landry, MD, Phoenix, AZ; David G. Lott, MD, Phoenix, AZ

**Educational Objective:** At the conclusion of this presentation, the participants should be able to acknowledge bilateral vocal cord paralysis as a presentation of sarcoidosis. Additionally, the participant should be able to discuss the laryngeal manifestations of sarcoidosis including presentation, diagnosis, pathophysiology and management.

**Objectives:** Review sarcoidosis as a rare, but important etiology of bilateral true vocal cord (TVC) paralysis, as well as the presentation, pathophysiology, and treatment of this disease. **Study Design:** Case report and literature review. **Methods:** A case report of sarcoidosis presenting as bilateral TVC paralysis is discussed with a review of the literature. **Results:** A 49 year old African American female presented to the emergency department with a two day history of progressive dyspnea and inspiratory stridor. Over the previous five months, the patient had been evaluated at an outside facility for chronic cough. This workup included a CT scan of the chest which revealed subcarinal lymphadenopathy. Subsequent biopsy via endobronchial ultrasound (EBUS) revealed no evidence of malignancy or granulomatous disease. At the time of our examination, the patient had bilateral TVC paralysis on flexible laryngoscopy and moderate respiratory distress requiring a tracheostomy. A replicate of both a CT scan and EBUS at our institution revealed similar results, necessitating a surgical mediastinal lymph node biopsy for diagnosis. Final pathology revealed sclerosing non-necrotizing granulomatous inflammation consistent with sarcoidosis. The patient was subsequently treated with appropriate steroid therapy, however did not regain function over the next three months. A review of the literature demonstrates sarcoidosis as a rare etiology of TVC paralysis via compressive lymphadenopathy most commonly, and/or neurosarcoidosis affecting one or multiple cranial nerves. **Conclusions:** Sarcoidosis is a rare etiology of bilateral TVC paralysis by compressive lymphadenopathy and/or neural involvement. It remains an

important consideration for the otolaryngologist's differential diagnosis.

**A235. Primary Care Provider Management of Chronic Cough Prior to Referral to a Specialist**

Jason C. Goodwin, MD, Columbia, MO; Woodson W. Smelser, BS, Columbia, MO; Keith J. Basler, BS, Columbia, MO; Matthew P. Page, MD, Columbia, MO

**Educational Objective:** At the conclusion of this presentation, the participants should be able to recognize the most common treatments for chronic cough. The participants should be able to recognize when a patient has been properly treated prior to referral to a specialist.

**Objectives:** Chronic cough is a common complaint in primary practice and is likewise a common reason for patient referral to pulmonologists, otolaryngologists and gastroenterologists. Clinical practice guidelines for managing chronic cough were published in 2006 by the American College of Chest Physicians (ACCP). Use of the ACCP guidelines should allow many of these patients to be managed effectively in the primary care setting. Our goal was to analyze management of chronic cough in the primary setting prior to referral to a specialist and compare this with ACCP guidelines. **Study Design:** Retrospective chart review. **Methods:** All chronic cough referrals to otolaryngology, pulmonology, and gastroenterology from 2007-2012 were reviewed. Data were collected on primary care provider use of medication trials, imaging, and other testing prior to referral to a specialist. The pre-referral patient workup was then compared to the ACCP guidelines. **Results:** 2590 records were examined. We identified 107 pulmonary, 61 otolaryngology, and 19 gastroenterology referrals that met criteria. Only 28% were managed according to ACCP guidelines prior to referral. **Conclusions:** Chronic cough generates a significant number of referrals to specialists. Clinical practice guidelines exist to facilitate cost effective care of most patients with chronic cough in the primary setting. We found a lower than expected rate of adherence to ACCP guidelines among primary care physicians prior to specialist referral. This is a potential area for significant healthcare cost savings. A decision support mechanism integrated into the electronic medical record may help PCPs manage most chronic cough patients without costly specialist involvement.

**A236. The Utility of Histopathology in Identifying Structural Differences among Layers of the Lamina Propria**

Scott A. Infusino, BA, Boston, MA; Peter M. Sadow, MD PhD, Boston, MA; William C. Faquin, MD PhD, Boston, MA; Christopher J. Hartnick, MD\*, Boston, MA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the difficult and subjective nature of identifying structural indications of 1, 2, or 3 layers in the lamina propria from laryngeal vocal fold histology.

**Objectives:** The purpose of this study is to 1) assess the modality of laryngeal histopathology in identifying 1, 2, or 3 layers in the lamina propria; and 2) evaluate whether a more quantifiable and objective measure might provide additional discriminatory information. **Study Design:** Cross-sectional validation study. **Methods:** Blinded analysis was performed, with a set of histopathologic slides where the magnification and localized regions shown were all standardized. Two senior pathologists with experience reviewing laryngologic histopathology were asked to assess whether the vocal fold lamina propria they evaluated contained 1, 2, or 3 layers. The first pathologist evaluated 17 specimens. Due to poor results, the second received three of these specimens before the evaluation as gold standard referents of 1, 2, and 3 layers. Their ability to accurately assess this was calculated. **Results:** The first pathologist correctly identified 4 of 17 (24%) specimens. The second identified 8 of 14 (57%) specimens after receiving gold referents before the test. **Conclusions:** Our results show the difficulty of using histopathology to distinguish layers in the lamina propria even when the reviewers are senior pathologists. These findings imply that more objective modalities for such analyses may be beneficial.

**A237. Establishing an Animal Model for Tracheal Reconstruction - Biomechanical Properties of the Normal Adult Rabbit Trachea**

Matthew C. Jones, MS, Augusta, GA; Paul M. Weinberger, MD, Augusta, GA (Presenter); Don J. Mettenburg, AS, Augusta, GA; Aaron J. Cunningham, BS, Augusta, GA; Jennifer L. Waller, PhD, Augusta, GA; Frederick A. Rueggeberg, DDS, Augusta, GA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to describe the biomechanical properties of the normal rabbit trachea and how these will inform future airway research using this model.

**Objectives:** Surgical advancements rely heavily on validated animal models. The New Zealand White rabbit (NZWR) is a widely used model for airway research, including regenerative medicine applications. Currently, the biomechanical properties of the normal rabbit trachea are not known. **Study Design:** Laboratory based study. **Methods:** Fresh tracheas from four adult NZWRs were dissected into 20 segments. To examine the biomechanical properties, segments were subjected to uniaxial tension (n=9) and compression (n=11) testing. Yield and maximum load (tension) and force at 50% displacement (compression) were recorded. **Results:** Normative data for native rabbit trachea show mean maximum load=6.44 N, yield load=5.93 N, and compressive strength=2.10 N. In addition to establishing the baseline measurements, we identified statistically significant differences in tensile measures based on location along the trachea and diameter. Proximal segments had significantly higher maximum load (p=0.0029) and yield load (p=0.0062) than distal segments. This may be confounded by diameter changes along the trachea; we observed an association between diameter and both maximum load (p=0.0139) and yield load (p=0.0082). **Conclusions:** The adult NZWR trachea is intrinsically less able to withstand tensile and compressive forces, compared to other airway models such as sheep, or cadaveric human. Establishment of normative values will enable future research into changes in tracheal biomechanical properties during regenerative medicine manipulation and processing.

## Posters

### A238. **Assessment of Dysphagia after Surgical Treatment of Zenker's Diverticulum Using the Eating Assessment Tool**

Grace G. Kim, MD, Chapel Hill, NC; Cristine N. Klatt-Cromwell, MD, Chapel Hill, NC; Rupali N. Shah, MD, Chapel Hill, NC; Robert A. Buckmire, MD, Chapel Hill, NC

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the durability of surgical swallowing outcomes for patients with Zenker's diverticulum using the Eating Assessment Tool.

**Objectives:** The Eating Assessment Tool (EAT-10) is a validated self-administered survey that provides a subjective assessment of dysphagia that may be used to evaluate symptoms and surgical outcomes in patients with Zenker's diverticulum. We evaluate the durability of swallowing outcomes using the EAT-10 assessment tool in relation to time from surgical intervention and surgical technique.

**Study Design:** Retrospective chart review. **Methods:** This study examines patients who underwent surgical treatment for Zenker's diverticulum at a tertiary academic center. Demographic and clinical data were collected in retrospective chart review. Followup was obtained by telephone interviews using a previously validated EAT-10 questionnaire. **Results:** Followup data from 32 patients undergoing surgical treatment for Zenker's diverticulum from 2003-2011 was collected (response rate=55.2%). Demographics of this group included 21 males and 11 females with a mean age 69 years. Surgical techniques included: endoscopic laser (n=10), endoscopic stapler (n=17), and open techniques (n=5). The mean followup period was 34 months with a range of 1 month to 103 months. We found no correlation between swallowing outcomes assessed by EAT-10 and post-surgical followup times. There is no significant difference in EAT-10 swallowing outcomes over time comparing between different surgical approaches. **Conclusions:** Our experience showed that postoperative EAT-10 swallowing outcomes did not change, regardless of the time elapsed from surgery or the surgical technique utilized.

### A239. **Longitudinal Assessment of Voice Outcome Measures following Gore-Tex Medialization Thyroplasty**

Cristine N. Klatt-Cromwell, MD, Chapel Hill, NC; Grace G. Kim, MD, Chapel Hill, NC; Rupali N. Shah, MD, New York, NY; Robert A. Buckmire, MD, Chapel Hill, NC

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the course of voice outcome measures longitudinally in patients following gore-tex medialization thyroplasty (GTP).

**Objectives:** Glottic incompetence (GI) is characterized by incomplete closure of true vocal folds and is caused by a variety of disorders. Management of patients includes temporizing injections or definitive procedures such as GTP. Based on reported outcomes from previous studies, patients report improvement of voice quality during the immediate postoperative period. We aim to evaluate the voice outcomes GTP patients longitudinally with respect to postoperative duration and cause of GI. **Study Design:** Retrospective review.

**Methods:** GI patients found to have been treated with medialization thyroplasty were identified. Patients were followed after surgery with voice related quality of life (VRQOL) surveys obtained at sequential appointments. Individual longitudinal data was assessed and compared to overall patterns within the entire GI cohort. **Results:** Forty-eight patients, 27 females, 21 males, ages 12-86 were identified. Ninety-five percent (46/48) of cohort reported overall QOL improvement. The cohort reported an average 30 point improvement in their voice outcomes at their final postoperative appointment. Thirty-one patients (64%) reported improvement at each followup appointment, while 16/48 (33%) patients reported initial improvement and then decline in their VRQOL measures. At 3 months, patients had an average 30 point improvement, 38 point at 6 months, and 11 points at greater than one year postop. **Conclusions:** Based on QOL measures, patients demonstrate an overall improvement in their QOL after GTP surgery. Longitudinal data suggests that the magnitude of improvement may lessen over time from surgery. Differences between the longitudinal courses of discrete diagnostic subgroups within the GI cohort will be presented.

### A240. **Vagal Neuropathy Secondary to Neurosyphilis**

Travis A.L. Klein, BS, Tampa, FL; Marion B. Ridley, MD, Tampa, FL

**Educational Objective:** At the conclusion of this presentation, the participants should be able to 1) recognize potential presentations of syphilis to otolaryngology practices; and 2) be aware of the increasing incidence of syphilis in the United States.

**Objectives:** We report a rare case of vagal neuropathy secondary to neurosyphilis. Symptoms at presentation included changes in voice and swallowing. The growing incidence of syphilis in the United States and the increasing likelihood of cases presenting to otolaryngologists are discussed. **Study Design:** Case report and review of the literature. **Methods:** A detailed case study was conducted of the presentation, physical and electromyographic findings, laboratory results, treatment, and outcome of neurosyphilis in a patient who presented with voice and swallowing changes. **Results:** The diagnosis was made by lumbar puncture which revealed a positive VDRL pathognomonic for neurosyphilis. A primary infection 20 years previously had apparently been treated unsuccessfully. The patient was retreated with intramuscular and intravenous penicillin resulting in improvement of his symptoms. **Conclusions:** Among the myriad of clinical presentations of syphilis one of the rarer manifestations is vagal neuropathy. This report describes a case of neurosyphilis presenting as vocal fold paresis and velopharyngeal incompetence, and represents only the second reported case of neurosyphilis presenting as vagal neuropathy in the antibiotic era. The increasing incidence of syphilis in the United States underscores its importance in the differential diagnoses of cranial neuropathies seen by otolaryngologists.

**A241. Early Thyroplasty in the Management of Unilateral Vocal Fold Paralysis**

Paul E. Kwak, MD, Houston, TX; Andrew G. Tritter, BA, Houston, TX; Donald T. Donovan, MD FACS\*, Houston, TX; Julina Ongkasuwan, MD, Houston, TX

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the advantages of early thyroplasty in the management of unilateral vocal fold paralysis in patients following aortic arch surgery.

**Objectives:** Injury to the recurrent laryngeal nerve (RLN) and unilateral vocal fold paralysis (UVFP) can occur after surgery on the aortic arch. Management options include temporary injection laryngoplasty while awaiting return of function versus definitive management with a type 1 thyroplasty. At our institution, the practice has been to proceed directly to thyroplasty to aid in pulmonary clearance and hasten recovery. The study was undertaken to examine the rate of revision procedures and voice outcomes following early thyroplasty in the setting of injury following aortic arch surgery. **Study Design:** Retrospective review with patient interview. **Methods:** 300 patients with UVFP following surgery on the aortic arch were identified; 50 were available for followup. The number of revision procedures following initial thyroplasty was ascertained, and the Voice Handicap Index (VHI) was administered. **Results:** 3 out of 50 (6%) patients required revision following initial thyroplasty; average VHI was 37.6 (SD 27.8). **Conclusions:** In the setting of aortic arch surgery with injury to the RLN, early thyroplasty can reduce the number of procedures and produces voice outcomes comparable to those achieved in the literature with repeated injection and delayed thyroplasty.

**A242. Treatment of Intractable Neurogenic Cough with Cricopharyngeal Myotomy**

Anne L. Durstenfeld, BS, Philadelphia, PA; Joseph R. Spiegel, MD\*, Philadelphia, PA; Maurits S. Boon, MD, Philadelphia, PA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to describe an appropriate patient presentation of refractory chronic cough in which to consider cricopharyngeal myotomy.

**Objectives:** Neuropathic cough that is incompletely responsive to medical therapy may be due to cricopharyngeal hypertonicity. The objective was to describe the utility of cricopharyngeal myotomy in alleviating symptoms of intractable neuropathic cough. **Study Design:** Retrospective review. **Methods:** A retrospective chart review was performed for three patients who underwent cricopharyngeal myotomy for intractable cough. Trigger phenomena, previous evaluation and treatment, and outcomes after surgery, namely patient perception of improvement and medication use after surgery, were assessed and documented. **Results:** After cricopharyngeal myotomy, all three patients noted symptomatic improvement and were weaned off medication. Continued improvement was noted at followup, with a mean length of 22 months (range: 7-36 months). **Conclusions:** Cricopharyngeal myotomy may be an alternative treatment for chronic cough in patients for whom workup is negative and medical management, dilation, and botulinum toxin have failed to provide long term relief.

**A243. Staged Laryngotracheoplasty for the Reconstruction of Laryngotracheal Stenosis: A 12 Year Experience**

Isabelle Y. Liu, MD, Los Angeles, CA; Harry H. Ching, BS, Los Angeles, CA; Dinesh K. Chhetri, MD\*, Los Angeles, CA; Jennifer L. Long, MD, Los Angeles, CA; Gerald S. Berke, MD\*, Los Angeles, CA; Abie H. Mendelsohn, MD, Los Angeles, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the role and efficacy of open multi-staged laryngotracheoplasty in reconstruction of severe laryngotracheal stenosis.

**Objectives:** Laryngotracheal stenosis is a complicated problem without a straightforward solution. In recent years many centers have performed staged laryngotracheoplasty (LTP) with the ultimate goal of attaining long term airway patency without restenosis. We set out to study our experience of patients who have undergone staged LTP in order to identify its utility in treating laryngotracheal stenosis. **Study Design:** Retrospective cohort. **Methods:** IRB approval was obtained. From January 1, 2000 to December 31, 2011, patients presenting with diagnoses of laryngeal or tracheal stenosis were identified through billing records (CPT codes 478.74 or 519.19). Medical records from adult patients were then inspected for the finding and severity of laryngotracheal stenosis as well as basic patient demographics. Patients undergoing multistaged LTP were included. Patients with current head and neck malignancy were excluded. **Results:** A total of 58 patients were included. Patient mean age was 45.6 ( $\pm$  16.5) at time of first stage LTP and had a mean followup of 3.3 ( $\pm$  2.9) years from the first stage reconstruction. Etiology of stenosis included 43% intubation trauma, 16% autoimmune disease, 17% direct laryngeal trauma, 14% idiopathic, and 10% other. Primary surgical success was measured by tracheostomy decannulation and secondary success by the absence of additional procedures. Surgical efficacy is analyzed by demographic, surgical, and postoperative factors. **Conclusions:** Multi-staged laryngotracheoplasty is an excellent option for the reconstruction of severely stenosed airways. At our institution we have achieved excellent decannulation rates in patients with laryngotracheal stenosis who have often failed other treatment modalities. Further prospective studies are indicated.

# Posters

## A244. Management of Acquired Distal Tracheal Stenosis with Transtracheoscopic Microdebrider Assisted Excision and Balloon Dilation

Rachel M. Regone, BS, Houston, TX; Elton M. Lambert, MD, Houston, TX (Presenter); Soham Roy, MD, Houston, TX

**Educational Objective:** At the conclusion of this presentation, the participants should be able to 1) appreciate the various methods for management of tracheal stenosis; 2) recognize technologies such as the microdebrider and airway balloon as adjuncts to airway management; and 3) appreciate the advantages and limitations of technologies for airway management and how their combined use can be complimentary in some cases.

**Objectives:** To present an unusual case of an intubation induced long segment tracheal stenosis and combined management with transtracheal microdebrider and balloon dilation. **Study Design:** Case report. **Methods:** A previously intubated thirty-three year old woman presented with progressive stridor and dyspnea secondary to tracheal stenosis post-extubation. An emergent tracheostomy was performed with ECMO standby. Transtracheal tracheoscopy revealed necrotic granulation tissue extending to the carina and obstructing her airway. A 10mm balloon was initially passed to dilate both proximal and distal portions of the obstruction. Granulation tissue was excised using a microdebrider and zero degree telescope through the tracheostomy, and the segment was subsequently dilated with a 14 mm balloon. **Results:** Repeat dilation was performed one week later, and followup at two months revealed no recurrence of the tracheal stenosis. **Conclusions:** Numerous reports have described post-intubation tracheal stenosis and options for urgent management. Successes in relief of tracheal airway obstruction by balloon dilation and microdebrider bronchoscopy have been described; however, combined use of these tools with transtracheal endoscopic visualization has never been reported. This combined therapy is a viable option for the surgical management of distal tracheal stenosis, especially in emergency situations. Compelling video and photographs will be presented.

## A245. Suction Modulation for the Laryngeal Microdebrider

Paul C. Walker, MD, Iowa City, IA; Henry T. Hoffman, MD, Iowa City, IA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the advantage of suction modulation during microlaryngeal surgery and be able to use this novel technique to increase safety and efficacy of the microdebrider.

**Objectives:** The laryngeal microdebrider is an effective tool used to surgically remove papilloma and other lesions of the upper aerodigestive tract. The apparatus is a hollow metal tube through which a stream of fluid is passed as suction is applied to remove tissue drawn to a rotating blade exposed through a distal opening. Dynamic modulation of the speed as well as the type of rotation or oscillation of the cutting blade is manipulated by the surgeon with a foot pedal. Similar sophistication is lacking in technology to modulate the suction. The amount of suction is important in determining the degree to which tissue is brought into contact with the microdebrider blade. **Study Design:** We present a simple apparatus using common materials to modulate the degree of suction applied to tissue at the tip of the microdebrider. This system allows the surgeon to instantaneously modify the suction in graded amounts within the range from fully open to completely occluded. This technique dramatically increases the sensitivity of the microdebrider to delicately remove abnormal tissue without damaging adjacent normal tissue. It also offers the surgeon dynamic control in moving from one operative site requiring high suction to another site requiring low suction. **Methods:** A 3/8th inch rubber tubing is connected to the suction port of the microdebrider and looped into a figure of eight over the handpiece. This assembly is secured with tape to permit the surgeon to compress the tubing with his thumb or finger. This compression functions as a pinch valve to modulate the degree of suction with digital pressure. Digital pressure applied by the surgeon to the tubing compresses it against the underlying handle of the microdebrider. The tubing has optimal properties that permit easy deformability to permit refined adjustment in the amount of suction passing through it with compression. The compressible tubing readily immediately re-expands to its normal opening to restore suction as the pressure is removed. **Results:** Since initiation of surgeon controlled dynamic suction modulation the ease, refinement, and speed of surgical debriement of laryngeal papillomas with the microdebrider has increased. **Conclusions:** The laryngeal microdebrider is a valuable tool in the management of papillomas and other lesions of the upper aerodigestive tract. Advances in microdebrider technology to date have not adequately addressed the need to provide the surgeon with a finessed control of the amount of suction. Inability to control the amount of suction can contribute to major complications and morbidity in laryngeal surgery. We have addressed this problem with a simple yet effective solution for surgeon modulated dynamic suction control. Expansion of this technique to other microdebrider uses is anticipated with development of the foot pedal flow modulator we have under development.

## A246. Does Over-Adduction of the Healthy Vocal Fold Really Compensate Vocal Function in Patients with Unilateral Vocal Fold Paralysis?

Eiji Yumoto, MD, Kumamoto, Japan; Tetsuji Sanuki, MD, Kumamoto, Japan; Yoshihiko Kumai, MD, Kumamoto, Japan; Kohei Nishimoto, MD, Kumamoto, Japan

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss vocal function in patients with unilateral vocal fold paralysis.

**Objectives:** To determine whether over-adduction of the healthy vocal fold contributes to improve vocal function in patients with unilateral vocal fold paralysis (UVFP) and to examine the relation of over-adduction with clinical characteristics of UVFP. **Study Design:** Retrospective analysis. **Methods:** Subjects included 101 patients with UVFP who underwent computed tomographic (CT) ex-

amination of the larynx. Three dimensional endoscopic images seen from oral and tracheal sides during phonation were produced utilizing CT data. Maximum phonation time (MPT) and mean airflow rate (MFR) were measured within 11 days from CT scanning. Clinical data were reviewed from medical record. The presence of over-adduction of the healthy vocal fold and gap between the vocal processes were evaluated by two laryngologists. **Results:** Over-adduction was observed in 47 patients. MPT and MFR were  $4.9 \pm 2.94$  seconds (mean  $\pm$  standard deviation) and  $653 \pm 504$  mL/s, respectively. The remaining 54 did not show over-adduction. MPT and MFR were  $4.7 \pm 2.67$  seconds and  $574 \pm 384$  mL/s, respectively. There were no significant differences in MPT and MFR between the two groups. Of the 47 patients with over-adduction, only nine showed closure of the posterior glottis during phonation. Vocal function of these nine was not significantly different compared with that of 54 patients without over-adduction. There were no apparent differences in clinical characteristics (age, etiology, and duration of paralysis) between the two groups. **Conclusions:** Over-adduction of the healthy vocal fold did not compensate vocal function in patients with UVFP. The presence of over-adduction was not related with age, etiology, or duration of paralysis.

## Otology/Neurotology

### A247. Intrascalar ECoG in Cochlear Implant Recipients

Oliver F. Adunka, MD, Chapel Hill, NC; Baishakhi Choudhury, MD, Chapel Hill, NC; Adam P. Campbell, MD, Chapel Hill, NC; Mathieu Forgues, BA, Chapel Hill, NC; Craig A. Buchman, MD\*, Chapel Hill, NC; Douglas C. Fitzpatrick, PhD, Chapel Hill, NC

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the potential utility of electrocochleography (ECoG) during cochlear implantation to assess the neural substrate for electrical stimulation as well as the future clinical application of this recording algorithm for a real time monitoring system during electrode insertion.

**Objectives:** Recently, we demonstrated the availability of intraoperative round window (RW) electrocochleography (ECoG) during cochlear implantation and its potential clinical utility to assess the neural substrate required for electric stimulation. As such, we showed good correlations between certain components of the ECoG and postoperative CI performance. To further refine this technique, intrascalar recording options might provide an even better signal so that intracochlear electrode placement can be optimized via real time intraoperative feedback. Since the recording probe (CI electrode) could be brought in close proximity to the source generators within the cochlea, this technique might also provide a means to record from various locations and thus discern cochlear regions based on their residual functional capacity. **Study Design:** Prospective evaluation of cochlear implant patients. **Methods:** Seventeen subjects underwent extensive electrophysiologic testing to acoustic stimuli via an insert earphone placed in the ear canal. ECoG signals were obtained at the RW and within scala tympani using both flexible and rigid probes. In 4 subjects, temporary CI electrodes were used to record from more various cochlear regions including the middle turn. All signals were analyzed and compared using various signal processing algorithms. Postoperative CI performance was correlated with intraoperative findings. **Results:** Round window as well as intrascalar ECoG allows recording of robust early auditory potentials. Real time signal processing algorithms can identify the various components of the ECoG signal, namely the cochlear microphonic (CM) from hair cells, the compound action potential (CAP) from the spiral ganglion, the auditory nerve neurophonic (ANN, phase locked neural potential) and the summing potential (SP). Recordings at the round window membrane demonstrated robust potentials in most patients. With an intrascalar electrode positioning, however, signals showed markedly better amplitudes than at the RW in 14/17 patients. **Conclusions:** Each ECoG signal component (CM, CAP, ANN, SP) provides information about a specific component of the peripheral auditory system. Together, they can further provide clinically useful information on the status of the auditory nerve, the position of the electrode (in relation to still functional cochlear regions), and information on insertion related cochlear trauma. Further intrascalar experiments will likely identify patterns that will help to improve intracochlear electrode placement.

### A248. Bilateral Radical Mastoidectomies as a Treatment of Recalcitrant Otorrhea due to Kartagener's Syndrome

Kyle P. Allen, MD MPH, Dallas, TX; J. Walter Kutz, MD, Dallas, TX

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the usage of a radical mastoidectomy to manage persistent otorrhea due to Kartagener's syndrome.

**Objectives:** To describe a case of bilateral otorrhea due to Kartagener's syndrome which resolved with radical mastoidectomies. **Study Design:** Case report. **Methods:** A retrospective review of the medical record of a patient with Kartagener's syndrome and otorrhea was performed. **Results:** A 27 year old female with Kartagener's syndrome presented with years of bilateral otorrhea. She had previously undergone bilateral canal wall down mastoidectomies and had T tubes in both tympanic membranes. She had chronic bilateral otorrhea unresponsive to prolonged therapy with topical, parenteral or intravenous antibiotics. She had a maximal conductive hearing loss at presentation. She underwent staged, bilateral radical mastoidectomies, removal of disease mucosa, and skin grafting of the cavities. Her otorrhea has resolved to great patient satisfaction. **Conclusions:** In cases of recalcitrant otorrhea in patients with Kartagener's syndrome, radical mastoidectomy with removal of the diseased mucosa can result in dry cavities free of otorrhea.

## Posters

### A249. WITHDRAWN—Effects of Gonadal Steroids and Electrical Stimulation on Cell Survival following an Intracranial Facial Nerve Crush Injury

Muhamad A. Amine, MD, Maywood, IL; Gina N. Monaco, PhD, Maywood, IL; Ryan C. Burgette, MD, Maywood, IL; Brent J. Benscoter, MD, Maywood, IL; Sam J. Marzo, MD\*, Maywood, IL; Eileen M. Foecking, PhD, Maywood, IL

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the effects of injuries on the facial nerve at various sites along its course. Participants will also be able to discuss the potential benefits of novel treatments on crush injuries of the facial nerve.

**Objectives:** The purpose of this study was to assess 1) the degree of motoneuron cell loss; 2) the effects of electrical stimulation (ES) and testosterone propionate (TP) on cell survival following an intracranial facial nerve crush injury; and 3) to compare these results to distal injuries. **Study Design:** Prospective, randomized, controlled animal study. **Methods:** Sprague-Dawley rats were randomly divided into three groups: intracranial sham surgery or intracranial crush injury with or without ES and TP treatments. The intracranial sham group underwent exposure of the meatal segment of the right facial nerve. The intracranial crush groups underwent a 60 second crush of the meatal segment following exposure with or without ES and TP treatment immediately following the injury. Animals were euthanized at 8 weeks. Brain sections were thionin stained and facial motor nuclei (FMN) were counted using light microscopy. The contralateral FMN was used as the uninjured control for comparison. Results were compared to an intratemporal and extracranial facial nerve crush injury. **Results:** Intracranial crush injury resulted in a significant decrease in cell survival of 65.6% as compared to the sham group (99.4%). The treatments increased cell survival to 93.8%. The cell loss in the intracranial facial nerve injury is more substantial than the intratemporal (85.8%) and extracranial (103.3%) injuries. **Conclusions:** Intracranial injury results in a more profound cell loss compared to the distal injuries; however, combinatory treatments improve facial motoneuron survivability regardless of injury location.

### A250. Long Term Health Related Quality of Life Outcome in Adult Cochlear Implant Patients

Christoph A. Arnoldner, MD, Toronto, ON Canada; Hosam A. Amodi, MD, Toronto, ON Canada; David B. Shipp, MA FAAA, Toronto, ON Canada; Julian M. Nedzelski, MD\*, Toronto, ON Canada; Vincent Y. Lin, MD, Toronto, ON Canada; Joseph M. Chen, MD, Toronto, ON Canada

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the outcomes in quality of life over time and its impact on cost utility analysis in cochlear implant patients.

**Objectives:** To evaluate the long term quality of life outcome and satisfaction in cochlear implant patients as it relates to short form 36 (SF 36) standardized measures. **Study Design:** Prospective, longitudinal study. **Methods:** 326 adult patients underwent cochlear implantation between 1984 and 2011. 136 recipients had 10 year clinical audiological data, in whom 58 (43%) subjects also completed a health related quality of life (HRQL) assessment using the short form 36 questionnaire (SF36) administered preoperatively, 1 year postoperatively, and 10 year postoperatively. The results in each of the 8 domains were compared amongst the three timelines. The results were also converted to short form 6D (SF6D) to establish an indirect measure of utility. Clinical data included HINT sentence scores, and Consonant Nucleus Consonant (CNC) word scores. **Results:** Patients with 10 year post-implant SF36 results scored significantly higher than their pre-implantation scores in five of the eight domains: role limitations due to physical problems (RP) ( $p=0.034$ ), vitality (VT) ( $p=0.013$ ), social functioning (SF) ( $p=0.0001$ ), role limitations due to emotional problems (RE) ( $p<0.001$ ) and mental health (MH) ( $p=0.0001$ ). There was no significant difference between the mean scores of the 8 domains comparing 1 year with 10 year outcomes ( $p > 0.05$ ). When the SF36 data was converted to SF6D using the prescribed formulae to derive indirect utility values as quality adjusted life years (QALY). The average preoperative/1 year/10 year utility outcomes were 0.591/0.634/0.640. HRQL outcomes were also compared with clinical data. **Conclusions:** Cochlear implantation appears to demonstrate both short term and long term benefits. Using the multi-dimensional SF36 questionnaire in a prospective fashion, the benefit in the HRQL following cochlear implantation is significant after the first year and appears sustained after 10 years. These results translate well into indirect utility values by conversion and compare well with other utility measures obtained in cohorts with different instruments. These results combined with clinical data suggest that CI provides consistent improvement in the quality of life in patients with severe to profound hearing loss over time. The sustained outcomes and the associated external gains are important determinants in utility estimates in the context of cost utility analysis and should be taken into consideration.

### A251. Langerhan Cell Histiocytosis of the Temporal Bone with Otic Capsule Involvement: A Case Series

Jeffrey M. Blumberg, MD, New Haven, CT; Ajay Malhotra, MBBS, New Haven, CT; Elias M. Michaelides, MD, New Haven, CT; John F. Kveton, MD\*, New Haven, CT

**Educational Objective:** At the conclusion of this presentation, the participants should be able to demonstrate an understanding of Langerhans cell histiocytosis as it applies to the temporal bone, specifically the otic capsule, and clinical otolaryngology.

**Objectives:** To clearly demonstrate destructive lesions of the temporal bone and otic capsule by Langerhans cell histiocytosis (LCH) causing both audiologic and radiographic findings can be reversed with adequate treatment. To suggest a hypothesis about how LCH produces such reversible destructive lesions. **Study Design:** Retrospective case review and analysis of clinical and imaging data in patients with LCH of the temporal bone. **Methods:** With IRB approval, the cases of collaborating neurotologists and oncologists in conjunction with our institutional radiographic database were searched for examples of LCH involving the temporal bone. Criteria for

inclusion was histologic diagnosis of LCH and pre-treatment imaging demonstrating temporal bone and/or otic capsule involvement and post-treatment followup CT/MRI scans obtained at least six months after starting treatment. **Results:** We report 12 cases of LCH of the temporal bone with three demonstrating otic capsule involvement, both clinically and radiographically. Review of post-treatment imaging revealed all three patients had restoration of the bony labyrinthine architecture. Furthermore, all of the patients for which an audiogram could be obtained demonstrated near or complete restoration of their hearing. **Conclusions:** Though LCH of the temporal bone is a common site within the spectrum of the disease, involvement of the otic capsule remains rare. Here, we report, to our knowledge, the largest series of otic capsule involvement by LCH and demonstrate both architecture and hearing is recovered with appropriate treatment. Lastly, restoration of the bony architecture of the labyrinth suggests the radiographic changes seen with LCH may be caused by demineralization and not ablation.

**A252. Rural Pediatric Hearing Healthcare Disparity: Factors in Delayed Congenital Hearing Loss Diagnosis and Intervention**

Matthew L. Bush, MD, Lexington, KY; Kristin M. Bianchi, BS, Lexington, KY; Lara Mariel Osetinsky, BS, Lexington, KY; Jennifer B. Shinn, PhD, Lexington, KY

**Educational Objective:** At the conclusion of this presentation, the participants should be able to 1) identify medical and social factors present in children with congenital hearing loss in rural regions; and 2) discuss risk factors for delayed pediatric hearing loss diagnosis in regions of hearing healthcare disparity.

**Objectives:** Congenital pediatric hearing loss is common and early identification and intervention is critical to rehabilitation. Children from rural regions often face a disparity of hearing healthcare. The purpose of this study was to examine medical and social factors present in children with congenital hearing loss in rural regions with hearing healthcare disparity. **Study Design:** Retrospective review from a tertiary medical center. **Methods:** We examined the medical and social history of children with congenital sensorineural hearing loss from a region of hearing healthcare loss disparity to identify barriers to diagnosis. The effect of these factors on the timing of diagnosis and intervention was examined. **Results:** Children from a rural hearing healthcare disparity region were found to have social and family barriers to diagnosis in 44% and hearing loss in these children was identified at a median age of 64 weeks after birth. Prematurity along with subsequent NICU stay was present in 44% of patients. Multiple medical diagnoses were present in 55% of patients and major surgical procedures were performed in 20% of patients. **Conclusions:** Children from rural regions with hearing healthcare disparities face many barriers to timely diagnosis and treatment. Social and medical complications may play a significant role in delayed care. Clinicians should be aware of these potential risk factors and be vigilant to intervene for children in areas of healthcare inequity.

**A253. Hemorrhage from a Large Mastoid Emissary Vein: Pedicled Rotated Indented Periosteal-Galeal Flap**

Jason P. Calligas, MD, Atlanta, GA; Norman W. Todd, MD MPH\*, Atlanta, GA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to demonstrate another technique in the management of a large mastoid emissary vein hemorrhage.

**Objectives:** Presenting another technique in the management of a large mastoid emissary vein hemorrhage. **Study Design:** NA. **Methods:** Retrospective case study involving two patients where the use of a pedicled rotated indented periosteal-galeal flaps were instrumental in the management of large mastoid emissary hemorrhages when other methods of management had failed. **Results:** Adjacent to the encountered large mastoid emissary vein, a periosteal-galeal flap at least 10 mm wide and 15 mm long is raised such that it extends at least 15 mm beyond the bleeding site. Nearest the base of the flap, the flap tissue is indented into the bleeding site, and the tip of the flap is rolled so as to fit into the indented flap, and packed until tight. A suture may then be used to secure the flap to prevent migration. **Conclusions:** Pedicled rotated indented periosteal-galeal flap should be a tool in an otolaryngologist's armamentarium for the management of a mastoid emissary vessel bleeds when the more traditional methods of management (electrocauterization and bone wax) are not effective.

**A254. Development of a Cognitive Screening Test for the Severely Hearing Impaired**

Janet Chung, MD, Toronto, ON Canada; David B. Shipp, MA, Toronto, ON Canada; Lendra Freisen, PhD, Toronto, ON Canada; Sandra Black, MD FRCP, Toronto, ON Canada; Mario Maselli, MD FRCP, Toronto, ON Canada; Vincent V.Y. Lin, MD FRCSC, Toronto, ON Canada

**Educational Objective:** At the conclusion of this presentation, the participants should be able to 1) understand the evolving demographics of cochlear implant recipients; 2) understand the need for a cognitive screening tool in patients with significant hearing impairment; and 3) demonstrate the use of the Modified Montreal Cognitive Assessment to identify mild cognitive impairment for patients with significant hearing impairment.

**Objectives:** With the aging of our population, we are increasingly encountering patients with mild cognitive impairment (MCI). However, current and commonly utilized validated screening tools for cognitive testing rely on the ability for the patients to follow auditory verbal instructions. No clinical screening test for MCI is available for patients with severe hearing loss. Our objective is to validate a modified version of the Montreal Cognitive Assessment (MoCA) for use in patients with hearing impairment (MoCA-H). **Study Design:** Prospective validation study. **Methods:** Older aged subjects were recruited from outpatient otolaryngology clinics. Subjects first took a

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battery of cognitive screening tools. Subjects who passed the screen were then administered the MoCA-H. The MoCA-H was performed on 55 normal hearing subjects and 50 subjects with severe to profound hearing loss (HL). The regular MoCA was retested 6 months after MoCA-H was administered in a subset of normal hearing subjects. **Results:** The average score of patients who underwent the MoCA-H was 26.6 (SD = 2.04), consistent with the accepted normal cutoff of >26/30. No significant difference was demonstrated between the MoCA-H scores in those with and without HL. Similar scores were noted between the MoCA-H and MoCA in the subset of normal hearing subjects that were retested. Further subanalysis of test categories revealed small differences between the MoCA-H and MoCA. **Conclusions:** The MoCA-H results of normal cognitively screen subjects have a high correlation to MoCA results. The MoCA-H is the only tool to detect MCI in patients with hearing impairment. This will lead to early detection and treatment of MCI in the hearing impaired elderly.

### A255. Surgical Resolution of Pulsatile Tinnitus from Sigmoid Sinus Diverticulum/Dehiscence

Richard H. Comstock III, MD, Washington, DC; Ameet K. Grewal, MD, Washington, DC; Benjamin J. Wycherly, MD, Farmington, CT; Ann K. Jay, MD, Washington, DC; H. Jeffrey Kim, MD, Washington, DC; Frank Berkowitz, MD, Washington, DC

**Educational Objective:** At the conclusion of this presentation, the participants should be able to recognize sigmoid sinus diverticula/dehiscence as a cause for pulsatile tinnitus and understand the surgical approach to correction of these abnormalities.

**Objectives:** Tinnitus is poorly understood and generally difficult to treat because its origin is difficult to identify. However, pulsatile tinnitus demands a complete workup to rule out a vascular abnormality. There is increasing evidence that sigmoid sinus diverticulum/dehiscence accounts for a portion of these patients. We describe here the results of surgical decompression and reconstruction of the defect along with results from preoperative intracranial pressure measurement. **Study Design:** Retrospective case series at a tertiary care academic medical center. **Methods:** Four patients with pulsatile tinnitus were identified on temporal bone CT to have sigmoid sinus diverticula or dehiscence. All patients had normal preoperative otologic exams, except for a bruit over the mastoid in 2 of 4 patients. All patients underwent a transmastoid approach to decompression of the sigmoid sinus diverticulum and reconstruction of sigmoid sinus wall. Three patients had a lumbar puncture to measure intracranial pressure. **Results:** All 4 patients were female. Three had pulsatile tinnitus on the right side and one on the left. Average BMI was 34.87 kg/m<sup>2</sup>, range 30.82 - 37.05 kg/m<sup>2</sup>. There was immediate and complete resolution of pulsatile tinnitus in all four patients. The three patients who had a lumbar puncture performed had an elevated intracranial pressure, mean 23 cm H<sub>2</sub>O (range 20-27). **Conclusions:** Surgical correction of sigmoid sinus diverticula/dehiscence results in excellent improvement in patients' symptoms. All patients had an elevated BMI and three patients were found to have an elevated intracranial pressure. We postulate that there may be an association between the development of sigmoid sinus diverticulum/dehiscence and benign intracranial hypertension.

### A256. Balance Study in Parkinson's Disease Patients

Susan O. Edionwe, MD, Galveston, TX; Jennifer R. Coben, BS, Galveston, TX; Tomoko Makishima, MD PhD, Galveston, TX; Monthaporn S. Bryant, PhD, Houston, TX; Scott J. Wood, PhD, Galveston, TX

**Educational Objective:** At the conclusion of this presentation, the participants should be able to

**Objectives:** To clarify the role of vestibular dysfunction in PD postural instability and offer form of therapy in PD patients using vibrotactile stimulation (VTS) as a form of a sensory substitution feedback and remediation therapy. **Study Design:** Prospective clinical pilot study. **Methods:** 10-15 mild to moderate PD patients identified. VTS was applied via eight vibratory factors positioned equidistant around the trunk. An XSENS motion tracking system was placed at the subject's center of gravity to accurately monitor postural sway during directional tasks. Posture and balance was monitored by a system calibrated to provide vibrotactile sensory feedback with improper positioning. Pre and post-therapy posturography data was compared to controls using a student T test. Rotary chair data also compared for vestibular dysfunction. **Results:** Pre vs post-VTS posturography was statistically significant for improvement in 1 of 11 PD patients, ( $p = 0.01$ ). 1 of 10 controls had significant improvement ( $p = 0.04$ ). 4 of 10 controls had a statistically significant decrease in performance for the aforementioned condition. No other significant data found. Rotary data compared for PD patients to controls showed significant data was at condition VVOR 0.05Hz for gain to the right using the 2 tailed T test for comparison ( $p = 0.04$ ). All other conditions were not significant. **Conclusions:** Postural instability possesses significant morbidity in PD. The role of the vestibular system has yet to be elucidated. VTS therapy has shown anecdotally to be an alternative method to improve balance in PD patients but the exact methods are yet to be understood.

### A257. Cochlear Implantation in Patients with Bilateral Meniere's Disease

Timothy A. Fife, MD, Winston-Salem, NC; Meagan E. Lewis, AuD, Winston-Salem, NC; John S. May, MD\*, Winston-Salem, NC; Eric R. Oliver, MD, Winston-Salem, NC

**Educational Objective:** At the conclusion of this presentation, the participants should be able to 1) discuss the auditory and vestibular clinical outcomes in patients with bilateral Meniere's disease (MD) who undergo cochlear implantation (CI); 2) assess CI outcomes in bilateral MD patients who have previously undergone ablative pharmacologic treatment of their inner ear for the treatment of vertigo; and 3) discuss the potential influence that CI for bilateral MD may have on the natural history of auditory and vestibular symptoms.

**Objectives:** Determine whether CI for hearing loss in patients with MD improves hearing as measured by standard audiometric testing

and describe the impact of CI on subjective auditory and vestibular quality of life measures. **Study Design:** Retrospective review of patients within a tertiary referral medical center. **Methods:** Patients age 18 or older, who have met AAO-HNS diagnostic criteria for MD, and have undergone CI over a 12 year period were included. Sentence testing scores, frequency and severity of MD vestibular and auditory symptoms, and hearing quality of life were compared pre and post-CI. CI outcomes in MD patients who had received surgical or ablative pharmacologic treatment were compared with those who had not. **Results:** Twelve CIs were performed in 11 patients with bilateral MD. Mean age at first CI was 61.2 years. 45.5% were diagnosed with MD greater than 21 years before the initial CI. 18.2% previously underwent intratympanic gentamicin injection, and 36.4% had undergone either labyrinthectomy or endolymphatic sac decompression (ELSD). Mean long term followup was 2.4 years. Mean sentence testing in quiet improved from 14.9% pre-CI to 83.8% at the most recent followup ( $p < 0.0001$ ). There were no significant changes in vertigo, tinnitus, aural fullness, and hearing fluctuation, while hearing quality of life significantly improved. **Conclusions:** CI for bilateral MD significantly improved both subjective and objective measures for hearing and does not seem to influence the natural course of MD symptoms. Prior ablative treatment for vertigo did not seem to adversely impact CI outcomes.

**A258. Peripheral Facial Palsy Caused by Carcinomatous Meningitis**

Harukazu Hiraumi, MD PhD, Kyoto, Japan; Norio Yamamoto, MD PhD, Kyoto, Japan; Tatsunori Sakamoto, MD PhD, Kyoto, Japan; Juichi Ito, MD PhD, Kyoto, Japan

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand that peripheral facial palsy caused by carcinomatous meningitis is not very rare and sometimes mimics Bell's palsy.

**Objectives:** To describe the clinical presentation of peripheral facial palsy caused by carcinomatous meningitis. **Study Design:** Case series. **Methods:** Retrospective review including accompanying symptoms, MRI findings, and pathological findings. **Results:** A total of 6 patients were diagnosed with peripheral facial palsy caused by carcinomatous meningitis between January and December, 2011. The age at the presentation ranged from 56 to 77 years. The origin of the tumor was malignant lymphoma in 3 patients, lung cancer in 2 patients, and kidney cancer in 1 patient. In 3 patients, sudden sensorineural hearing loss occurred around the onset of the facial palsy. Three patients were judged as free of tumor at the onset of the facial palsy. In two patients, facial palsy and hearing loss were the initial symptoms of the tumor. Only one patient was diagnosed as alive with disease at the onset of the facial palsy. On the MRI, mass lesion was detected in the internal auditory canal in 4 patients. In the other two, facial nerve was enhanced with the gadolinium, but it was difficult to differentiate it from the findings of Bell's palsy. In 2 patients, repeated cytological study led to the correct diagnosis. In one patient, histopathological study through translabyrinthine approach was needed to make a diagnosis. **Conclusions:** The clinical symptoms of peripheral facial palsy caused by carcinomatous meningitis sometimes mimic those of Bell's palsy.

**A259. Congenital Cholesteatoma of Mastoid Origin**

Shingo Hsegawa, MD PhD, Kobe, Hyogo Japan; Ken-ichi Nibu, MD PhD, Kobe, Hyogo Japan

**Educational Objective:** At the conclusion of this presentation, the participants should be able to recognize that congenital cholesteatomas of mastoid exist more than we considered.

**Objectives:** Congenital cholesteatoma (CC) is mostly found in middle ear cavity but rarely originates from mastoid. Here, we report 5 cases with CC of mastoid origin which were found at one facility. **Study Design:** A retrospective study. **Methods:** Retrospective chart review revealed that four patients were diagnosed to have CC of mastoid origin at our hospital from 1990 to 2011. Ages, symptoms, focuses and complications were studied from medical records. **Results:** Average age was 37 years old ranging from 7 to 70. Facial palsy was observed in 70 year old male as his chief complaint. No symptom was observed in 45 year old male and 52 year old female. Both of the latter two patients were incidentally found to have CC in mastoid on MRI for medical checkup. Total extirpation of cholesteatoma sac via mastoidectomy was performed in these three patients. Destruction of the bony plates of mastoid tegmen, posterior fossa and sigmoid sinus were confirmed during operation in all these three cases. No postoperative complication was recorded in any patient. The other two mastoid CCs were found in 7 and 11 year old males, who were preoperatively diagnosed to have CC of the middle ear cavity. **Conclusions:** CC of mastoid origin is not so rare as mentioned before. The possible reasons why CC of mastoid origin has been considered as very rare were as follows: 1) since CCs of mastoid origin are indolent, they remain as asymptomatic until they substantially grow; and 2) it is difficult to distinguish whether CC occurs in middle ear cavity and mastoid independently, or CC of middle ear cavity extends to the mastoid or vice versa.

**A260. Elevated Plasma IL-6 Levels in Patients with Meniere's Disease**

Jacob B. Hunter, MD, New York, NY; Shresh Pathak, PhD, Manhasset, NY; Elliot Goldofsky, MD, Great Neck, NY; Andrea Vambutas, MD, New Hyde Park, NY

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the relationship of plasma levels of IL-6 in patients with Meniere's disease and healthy controls without hearing loss.

**Objectives:** This study aims to determine if active inflammation can be detected in the peripheral blood of patients with active Meniere's disease as compared to healthy controls, as well as possibly predicting which patients would respond to corticosteroid therapy. **Study Design:** Single institution prospective group design. **Methods:** Patients that met the American Academy of Otolaryngology-Head and Neck Surgery's definition of Meniere's disease, as published in 1995 with active disease and healthy controls were

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recruited in an IRB approved study. Blood was separated over a Ficoll gradient, and plasma was analyzed for a series of cytokines (IL-1B, IL-4, IL-6, TNF-a, and INF-y) with a multiplex ELISA assay. **Results:** Of 19 patients with Meniere's disease, the average IL-6 plasma concentration was 1238.78 pg/mL, while compared to 7 healthy controls, there was a trend that the healthy controls' average IL-6 plasma concentration was much lower, with an average concentration of 2.08 pg/mL ( $p=0.10$ ). A replicate cohort will be examined to determine if IL-6 plasma levels are indeed a robust measure of inflammation in Meniere's disease. **Conclusions:** Patients with Meniere's disease have elevated IL-6 plasma concentrations as compared to healthy controls without hearing loss. Further investigation into plasma IL-6 concentrations, as well as IL-6 concentrations after treatments with corticosteroids and IL-6 inhibitors are pending. These studies may provide opportunities for both prediction of corticosteroid responsiveness and identification of novel drug targets in Meniere's disease.

### A261. PlasmaKnife(TM) Dissection in Cochlear Implant Surgery

Daniel Jethanamest, MD, Miami, FL; Andrew M. Rivera, MD, Miami, FL; Thomas J. Balkany, MD\*, Miami, FL

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the utility of PlasmaKnife(TM) dissection and compare its safety in cochlear implant surgery to monopolar electrosurgery.

**Objectives:** Monopolar electrosurgery is frequently used in primary CI surgery but is contraindicated in bilateral or revision cases. For such cases, sharp dissection may result in more bleeding or prolonged surgery. The purpose of this study was to determine the safety and efficacy of a device that uses radiofrequency to strike a gas plasma at the tissue surface (plasma knife, PK) with monopolar (MP) electrosurgery. **Study Design:** Retrospective case control study. **Methods:** A retrospective chart review was completed of patients undergoing CI from 2009-2011 by a single surgeon. Indications for radiofrequency dissection included revision surgery and second sided CI. Rates of postoperative wound outcomes including wound edema, hematoma, infection, hypertrophic scar, and keloid were assessed. Costs associated with these and alternative techniques were compared. **Results:** A total of 73 independent patients were identified. Radiofrequency PK was used in 31 cases and monopolar electrosurgery in 42 cases. There were 2 (6.25%) wound complications in the PK group and 7 (16.7%) in the control group. An additional 16 patients, each undergoing both PK and MP surgery for a total of 33 surgeries were identified during the study period and compared. Statistical analysis showed no significant differences in wound complication rates between the two surgical techniques. **Conclusions:** Radiofrequency PK is a suitable option for revision and bilateral CI surgery when monopolar electrosurgery is not available. It appears to be as safe and effective as standard surgical techniques.

### A262. Audiologic and Otologic Manifestations of Fanconi Anemia and Other Inherited Bone Marrow Failure Syndromes

Adedoyin O. Kalejaiye, MD, Washington, DC; Carmen C. Brewer, PhD, Bethesda, MD; Christopher K. Zalewski, MA, Bethesda, MD; Kelly King, PhD, Bethesda, MD; Blanche P. Alter, MD MPH, Rockville, MD; H. Jeffrey Kim, MD, Washington, DC

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the common otologic and audiologic manifestations of inherited bone marrow failure syndromes and describe their importance in early diagnosis, especially in Fanconi anemia.

**Objectives:** To characterize the audiologic and otologic manifestations of inherited bone marrow failure syndromes. **Study Design:** Prospective case series. **Methods:** From 2002 to early 2012, patients with Fanconi anemia (FA), dyskeratosis congenita, Diamond-Blackfan anemia, Shwachman-Diamond syndrome, and thrombocytopenia absent radii were enrolled along with their unaffected relatives. Each underwent otolaryngologic and audiologic evaluation as well as temporal bone computerized tomography (CT) in patients with FA. **Results:** Two hundred eighty-one patients and relatives (562 ears) had sufficient data for audiologic analysis. Patients with FA had a significantly higher proportion of conductive and subclinical conductive hearing loss (HL) when compared with their unaffected relatives. Of the 31 patients (62 ears) with FA, 4 ears were excluded from audiologic analysis because of prior surgery. Twenty-eight (48%) ears showed hearing within normal limits, 11 (19%) conductive HL, 8 (14%) subclinical conductive involvement, 2 (3.5%) mixed HL, and 3 (5%) sensorineural HL. Of the 54 ears undergoing microscopic exam, abnormal ear findings (small tympanic membrane, anteriorly displaced malleus, and a bony plate arising from the annulus) were noted in 31 (57%). Temporal bone CTs from 52 ears when compared with normal age matched controls showed significantly smaller measurements for the height and width of the tympanic bony annulus ( $p<0.001$ ). There was one case each of aural atresia and cochlear nerve hypoplasia. **Conclusions:** Conductive HL is associated with FA. Syndrome specific congenital ear malformations are noted in FA patients; recognition of these abnormalities should prompt further investigation and lead to earlier FA diagnosis and management of HL.

### A263. Implantation in Patients with Chronic Otitis Media

Rie Kanai, MD, Osaka, Japan; Shin-ichi Kanemaru, MD PhD, Osaka, Japan; Akiko Nishida, MD PhD, Osaka, Japan; Takuya Tsuji, MD, Osaka, Japan; Masaru Yamashita, MD PhD, Osaka, Japan

**Educational Objective:** At the conclusion of this presentation, the participants should be able to learn the management of CI in patients with chronic otitis media.

**Objectives:** Cochlear implantation (CI) in patients with chronic otitis media (COM) is not performed actively by considering the risks of

complication, meningitis, extrusion of electrode. We have experienced CI in patients with COM. The purpose of this report is to establish the management of CI in patients with COM. **Study Design:** Retrospective medical chart review. **Methods:** Patients are 7 cases (5 males, 2 females, mean age 72.3) with COM who underwent CI between January 2009 and April 2012. 3 cases had infected ears with tympanic membrane perforation. 4 cases had open cavity by middle ear surgery in the past. 3 patients with infection and perforation underwent staged operation. We performed them intact canal wall up tympanoplasty and mastoidectomy to control infection, followed by CI after more than 6 months. 4 open cavity cases which had no active infection underwent CI by one stage. We made groove by drilling mastoid cavity and facial bridge. Then, electrode array was put into the groove and covered by bone dust, bone tips and/or cartilage. In all cases, we didn't obliterate mastoid cavity and close external ear canal to avoid residual cholesteatoma and infection. **Results:** 6 cases were uneventful. In one open cavity case, cholesteatoma occurred and was removed leaving CI. All cases have used cochlear implants without serious complications. **Conclusions:** We showed patients with COM are not contraindication of CI. However, control of infection by middle ear surgery is important before CI in infected ears, and stabilization of electrode array is needed in open cavity ears.

## A264. Image Guided Surgical Navigation in Otology

Darius Kohan, MD\*, New York, NY; Daniel Jethanamest, MD, New York, NY

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the possible applications and efficacy of image guided surgical navigation in otology.

**Objectives:** To evaluate the efficacy of image guided surgical navigation (IGSN) in otologic surgery. **Study Design:** Prospective study. **Methods:** Between January 2003 and January 2010, all patients requiring complicated surgery for chronic otitis media, glomus jugulare, atresia, cerebrospinal fluid leak with or without encephalocele, and cholesterol granuloma of the petrous apex were offered IGSN. The accuracy of IGSN relative to pertinent pathology and 11 anatomic landmarks was established. Additionally IGSN related operative time, complications, and surgical outcome were recorded. **Results:** In the study period there were 820 otologic procedures, among 94 patients (96 ears) with disease meeting proposed criteria. Thirteen patients (15 procedures) consented to the use of IGSN. All patients had a minimum 6 months of followup. The average additional operative time required was 36.7 minutes. The mean accuracy error was 1.1 mm laterally at the tragus but decreased to 0.8 mm medially at the level of the oval window. The mean accuracy of IGSN was within 1 mm in 10 of the 11 targeted surgical anatomic landmarks. **Conclusions:** Interactive image guided surgical navigation during complex otologic surgery may improve surgical outcome and decrease morbidity by providing an accurate real time display of surgical instrumentation relative to patient anatomy and pathology. In select cases, the extra cost of imaging immediately prior to surgery and extra operating room time may be compensated by enhancing the ability to distinguish distorted anatomy relative to disease, potentially improving surgical outcome. IGSN, although useful, does not replace surgical expertise and experience.

## A265. Use of Corrosion Casting as an Experimental Model to Study the Blood Supply of the Temporal Bone

Lukas H. Kus, MD MSc, Toronto, ON Canada; Jafri B. Kuthubetheen, MD, Toronto, ON Canada (Presenter); Jaina Negandhi, MSc, Toronto, ON Canada; Vito Forte, MD FRCP, Toronto, ON Canada; Robert V. Harrison, PhD, Toronto, ON Canada; Evan J. Propst, MD MSc FRCSC, Toronto, ON Canada; Vincent Lin, MD MSc FRCSC, Toronto, ON Canada

**Educational Objective:** At the conclusion of this presentation, the participants should be able to describe the vascular anatomy of the external auditory canal, middle ear, and cochlea of the pig (*sus scrofa*) and how this relates to the vasculature of humans and other animals. In addition, participants should also be able to list various ways in which this experimental model for vascular anatomy could be used to study pathologic conditions affecting otologic end organs.

**Objectives:** Human temporal bone vascular anatomy is poorly understood. Many studies have speculated vascular etiologies in pathologies such as presbycusis and sudden sensorineural hearing loss. Corrosion casting is a method which allows one to view blood vessels without the overlying bone and soft tissue. It is also a valuable research tool for studying changes to the vasculature of an end organ. Our aim is to demonstrate the use of corrosion casting in a nonhuman model (pig, *sus scrofa*) for studying temporal bone and inner ear vascular anatomy both macroscopically and with light and scanning electron microscopy (SEM). **Study Design:** Basic science observational study in animals. **Methods:** Yorkshire piglets were anesthetized and perfused with methyl methacrylate solution. After polymer hardening, the temporal bone was dissected. The external auditory canal, middle ear, and cochlea were corroded in basic solution to expose underlying casted blood vessels. These structures were then imaged under light microscopy and SEM. **Results:** Light microscopy and SEM photographs reveal the vascular anatomy in fine detail. The vasculature of the external auditory canal, middle ear, and inner ear are described as they relate to human and other animal models. Many similarities exist between the vascular anatomy of human and pig otologic structures, although there are significant differences. **Conclusions:** Corrosion casting is useful for describing ear vascular anatomy in detail. These features could be employed to study the vascular effects of various experimental interventions on otologic organs to potentially prevent various associated pathologies.

## A266. Radiation Associated Malignancies of the Ear Canal and Temporal Bone

Elton M. Lambert, MD, Houston, TX; Adam S. Garden, MD, Houston, TX; Dianna B. Roberts, PhD, Houston, TX; Paul W. Gidley, MD\*, Houston, TX

**Educational Objective:** At the conclusion of this presentation, the participants should be able to 1) understand the natural history

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and pathophysiology of radiation associated malignancies of the temporal bone; 2) describe the signs and symptoms of associated radiation associated malignancies of the temporal bone; and 3) describe treatment options for radiation associated malignancies of the temporal bone.

**Objectives:** To examine our experience with surgically treated radiation associated malignancies (RAM) of the temporal bone. **Study Design:** Retrospective review. **Methods:** Thirteen patients who underwent surgical treatment for radiation associated malignancies of the temporal bone were identified from our database of temporal bone malignancies between 1999 and 2011. Average age at presentation was 54.84 with average followup of 25.6 months. The presenting symptoms, pathology, interval between initial radiation treatment and development of radiation associated malignancy, treatment regimens, recurrences and outcomes were measured. **Results:** Of the thirteen cases of RAMs of the temporal bone, nine patients were diagnosed with squamous cell carcinomas (69%), while the remaining four were diagnosed with sarcomatoid carcinoma, chondroblastic osteosarcoma, pleomorphic sarcoma and spindle cell sarcoma. Overall survival was better for those with squamous cell carcinomas. Seven patients (54%) had malignancies that were limited to the external auditory ear canal (LEAC). The average age of patients with LEAC malignancies was 66 years versus 41.8 years for those that extended beyond the external auditory canal (EEAC) ( $p=0.02$ ). These two groups also differed in their rate of negative margins ( $p=0.007$ ) and need for postoperative adjuvant therapy ( $p=0.02$ ). **Conclusions:** To our knowledge this is the largest reported series of surgically treated radiation associated malignancies of the ear canal and temporal bone. This study highlights the need for vigilance for RAM in post-radiation patients. Outcomes are more favorable for squamous cell carcinomas and when the tumor is confined to the external auditory canal.

### A267. A Simple, Standardized Instrument for Assessing Resident Performance of Cadaveric Temporal Bone Dissection

Sarah E. Mowry, MD, Augusta, GA; Erika Woodson, MD, Cleveland, OH; Samuel P. Gubbels, MD, Madison, WI; Matthew J. Carfrae, MD, Des Moines, IA; Marlan R. Hansen, MD\*, Iowa City, IA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to identify the components of a complete mastoidectomy that are assessed using a new standardized assessment tool for cadaveric temporal bone dissection.

**Objectives:** Objective metrics in skilled based educational courses allow trainees and instructors to assess performance and monitor progress. The objective is to validate a concise, easy to use instrument for assessment of resident skill during a timed cadaveric temporal bone (CTB) dissection. **Study Design:** Retrospective analysis of scores derived from the instrument. **Methods:** An instrument was developed to assess resident performance on a timed microdissection of CTB at the conclusion of a yearly CTB dissection course. Five neurotologists participated in assessment. Each reviewer's score was compared to the score given by the senior neurotologist for each year for each resident. Spearman's correlation analysis was then used to assess the reproducibility of the instrument in assessing resident performance. The ability of the instrument to distinguish among experienced and novice trainees and to demonstrate improvement with experience was also assessed. **Results:** The instrument was created and used for six years. Fifty-five residents were assessed. Correlation of scores between the senior neurotologist and the other neurotologist together was very high ( $r=0.883$ ,  $p<0.001$ ). The instrument detected significant improvement in performance between the first year in the course and the final year in the course ( $p<0.001$ , paired t-test). Scores for experienced trainees were significantly better than novice trainees ( $p<0.001$ , Mann-Whitney). **Conclusions:** A new instrument for assessment of resident skill on CTB dissection is presented. The instrument is easy to use and scores derived from this instrument are consistent across reviewers. It distinguishes experienced from novice trainees, is sensitive to individual experience, and has proved useful in providing trainees with objective performance measures.

### A268. Ear Candling: A Safe CAM Process Gone Terribly Wrong

Rachael L. Nowlin, BFA, Los Angeles, CA; Andrew J. Kleinberger, MD, New York, NY; Sujana S. Chandrasekhar, MD\*, New York, NY

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the complementary/alternative medicine practice of ear candling along with its associated risks.

**Objectives:** To present a case of extensive, longstanding otologic injury resulting from ear candling and describe its management. Ear candling is a complementary/alternative medicine practice commonly used for cerumen removal. Despite reports that not only fail to demonstrate efficacy but also describe potential adverse effects, the practice of ear candling continues. **Study Design:** Case report. **Methods:** The patient's medical records, complete audiological examination (CAE), computerized tomography (CT) imaging, operative report, and pathology findings were reviewed. **Results:** A 55 year old woman underwent "routine" ear candling 7 years ago for complaints of ear stuffiness. The hot candle wax fell into the ear, causing major slag burn to the tympanic membrane (TM). She developed immediate hearing loss and pain, and later, worsening tinnitus, otalgia, otorrhea, and taste disturbance. Conservative management elsewhere failed. Otologic examination of the left ear revealed total TM perforation and deep debris within the middle ear. CAE demonstrated left sided moderate to severe conductive hearing loss; CT showed extensive soft tissue within the middle ear and opacified mastoid air cells. The patient underwent left tympanomastoidectomy. Surgical findings included total TM perforation, diffuse inflammation and debris in the mastoid and middle ear, facial nerve protected in bone, chorda tympani nerve that had melted away, and intact ossicular chain. **Conclusions:** Ear candling is an alternative medicine practice that has persisted despite warnings of inefficacy and associated risks. We present this case of significant otologic damage related to ear candling requiring surgical intervention to highlight the potential severity of injuries that can result from this unfounded and dangerous practice.

**A269. Can a Motion Sensitivity Questionnaire Reliably Distinguish Vestibular Migraine from Meniere's Disease?**  
Jeffrey D. Sharon, MD, Saint Louis, MO; Timothy E. Hullar, MD\*, Saint Louis, MO

**Educational Objective:** At the conclusion of this presentation, the participants should be able to compare results of a motion sensitivity questionnaire in subjects with vestibular migraine, Meniere's disease, and controls.

**Objectives:** We examined whether scores on a motion sensitivity questionnaire (MSQ) could distinguish between vestibular migraine (VM) and Meniere's disease (MD). As a secondary goal, we examined whether scores on the MSQ correlated with results from caloric testing. **Study Design:** This study administered a telephone questionnaire to subjects who met clinical criteria for vestibular migraine, Meniere's disease, and controls. **Methods:** A MSQ was administered to 20 subjects meeting American Academy of Otolaryngology (AAO) criteria for MD, 30 subjects meeting Neuhauser criteria for both probable vestibular migraine (pVM) and definite vestibular migraine (dVM), and 22 controls. **Results:** The average score on the MSQ was 5.9 for VM, 4.25 for MD, and 0.4 for controls. Both VM and MD scored significantly higher than controls ( $p=0.0001$ ), but results were not statistically different from each other ( $p=0.17$ ). However, average score for subjects with dVM was 7.1, which was significantly higher than subjects with pVM, whose average score was 4.2 ( $p=0.045$ ), and higher than subjects with MD ( $p=0.048$ ). When each question of the MSQ was analyzed, motion sensitivity to riding in a car was found to be significantly different between VM (average score 1.1) and MD (average score 0.5), with  $p$  value of 0.048. Scores of MSQ did not correlate with total eye speed on caloric testing. **Conclusions:** Our study showed that a motion sensitivity questionnaire could distinguish between dVM and MD, and that the most predictive question for that involved motion sensitivity to riding in a car.

**A270. Revision Cochlear Implants: Outcomes and Surgical Considerations**  
Maja Svrkic, MD, New York, NY; Sean O. McMenomey, MD, New York, NY; Susan B. Waltzman, PhD, New York, NY; J. Thomas Roland Jr., MD\*, New York, NY

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss outcomes of revision cochlear implants.

**Objectives:** To examine the variables affecting performance post-cochlear implant (CI) revision surgery. **Study Design:** Retrospective chart review of 2294 patients, children and adults, who underwent primary and revision CI surgery at a single tertiary referral center between 1984 and 2011 was conducted. 148 patients underwent revision (6.5%) and were included in the study. 84% were due to device failures and 16% were due to non-device factors. **Methods:** Age appropriate speech perception tests were used to evaluate patient performance pre-, post-failure and post-reimplant. The effects of change in electrode configuration, processing strategy, electrode insertion depth, number of electrodes and surgical technique were correlated to post-revision performance. **Results:** Performance post-reimplantation was unaffected by change in electrode configuration, processing strategy, and other factors examined and performance was equal to or better than pre-reimplantation. Surgical technique modification varied and was dictated by the cause of the need for the revision. Modification also involved choosing of electrodes of appropriate diameter, changes in the well, revision of the facial recess and alteration of the cochlear insertion site. Patient complaints prior to device failures were analyzed but no correlation was found between a specific complaint and a particular type of failure mode. Based on the analysis of outcomes, a protocol for the evaluation of possible device failures was established. **Conclusions:** CI reimplantation can be performed safely without the risk of decreased performance, despite changes in device, electrode, processing strategy or surgical manipulation.

**A271. Comparison of Morphologic and Functional Outcomes between Fascia, Split Thickness, and Full Thickness Cartilage Grafts in Tympanoplasty**  
Senja Tomovic, MD, Newark, NJ; Danielle M. Blake, BA, Newark, NJ; Robert W. Jyung, MD, Newark, NJ

**Educational Objective:** At the conclusion of this presentation, the participants should be able to compare the morphologic and functional advantages and disadvantages of different graft materials for tympanoplasty and to explain the optimal graft type for various scenarios.

**Objectives:** To compare outcomes of fascia, split thickness, and full thickness cartilage tympanoplasty grafts. **Study Design:** Retrospective chart review. **Methods:** Patients with complete pre and postoperative data from tympanoplasties performed by the senior author over a seven year period were studied. Audiogram results including air bone gaps, the presence of otorrhea, retraction, and disease recurrence were compared. **Results:** In our population 30.1% underwent fascia (FS) tympanoplasty, 30.1% underwent split thickness (ST) cartilage tympanoplasty, and 39.8% underwent full thickness (FT) cartilage tympanoplasty. Overall, 35.1% were type I (70% FS, 9% ST and 21% FT), 5.3% were type II (20% FS, 40% ST and 40% FT), and 59.6% were type III (11% FS, 39% ST and 50% FT). Comparing both postoperative recurrence rates and changes in average air bone gaps with respect to graft and type, we found that overall average air bone gaps were better in type I tympanoplasty with FS than FT ( $p=0.004$ ), but there was no difference in type III tympanoplasty regardless of graft type. Differences in audiometric results depended on type of tympanoplasty and the lack of retraction. We also found that overall retraction occurred more often in FS when compared to ST ( $p=0.0211$ ) and in FT when compared to ST ( $p=0.0164$ ). There was no significant difference in recurrence rates with respect to graft or type. **Conclusions:** Our data supports using split thickness cartilage tympanoplasty as an alternative technique with the potential advantage of lower retraction rates and no difference in audiometric outcomes compared to fascia grafts.

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- A272. Incudomalleolar Joint Pathology in Human Temporal Bones with Rheumatoid Arthritis**  
Melissa F. Vianna, MD, Minneapolis, MN; Fevziye Ü. Malas, MD, Minneapolis, MN; Joao F. Burlamaqui, MD, Sao Paulo, Brazil; Meredith E. Adams, MD, Minneapolis, MN; Paulo R. Lazarini, MD PhD, Sao Paulo, Brazil; Sebahattin Cureoglu, MD, Minneapolis, MN

**Educational Objective:** At the conclusion of this presentation, the participants should be able to recognize the histopathological changes in the incudomalleolar joint in human temporal bones with rheumatoid arthritis.

**Objectives:** Conductive hearing loss has been described in patients with rheumatoid arthritis (RA). This study was conducted to evaluate the histopathological effects of RA on the incudomalleolar joint. **Study Design:** Retrospective histopathologic human temporal bone (HTB) study. **Methods:** From the medical records of an otopathology laboratory in a tertiary academic medical center, six patients (12 ears) were found with RA. Four ears were excluded because the middle ear was damaged at removal. Eighteen age matched ears (9 patients) of non-RA patients were used as controls. The incudomalleolar joint was analyzed for cartilage fraying, thinning, and calcification, and joint fixation under light microscopy. The width of the incudomalleolar joint at specified lateral, middle, and medial points was measured using ImageJ® software. Statistical analysis was performed with Stata®. **Results:** HTB with RA are significantly more likely to have thinning of the incudomalleolar joint cartilage (RA 7/8 vs. control 0/18,  $p=0.000$  by Fischer's exact test). There was no significant difference between groups in joint calcification and cartilage fraying. The mean joint width was significantly smaller at all three points in the RA group compared to controls using t-tests (lateral: RA 116.4 $\mu$ m, control 151.7 $\mu$ m,  $p=0.040$ ; middle: RA 221.1 $\mu$ m, control 299.3 $\mu$ m,  $p=0.033$ ; medial: RA 146.9 $\mu$ m, control 227.2 $\mu$ m,  $p=0.002$ ). **Conclusions:** Pathologic changes in the incudomalleolar joint in patients with RA resemble those found in other joints in the body and may account for mild conductive hearing impairment.

- A273. Comparison Study of Bone Anchored Hearing Aid Complications Using the 9mm Abutment versus 6mm Abutment at Initial Implantation**  
Sean R. Wise, MD, Farmington Hills, MI; Jacqueline S. Larouere, BS, Farmington Hills, MI; Dennis I. Bojrab, MD, Farmington Hills, MI; Michael J. Larouere, MD, Farmington Hills, MI

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss commonly encountered postoperative complications following bone anchored hearing aid implantation, and to discuss differences in outcomes following implantation with the 9mm abutment versus the 6mm abutment at initial surgery.

**Objectives:** To assess differences in the incidence and type of complications encountered with implantation of the bone anchored hearing aid (BAHA) when using the 9mm abutment versus the 6mm abutment at initial implantation. **Study Design:** Retrospective cohort study. **Methods:** One hundred thirty consecutive patients between January 2010 and December 2011 underwent single stage BAHA implantation using either the 9mm or 6mm abutment at initial surgery. Clinical outcomes assessed for the two groups included the incidence, type and management of postoperative complications. Abutment size, age, gender, indication for surgery, BAHA type, duration of followup and patient comorbidities were evaluated as potential factors affecting outcomes. **Results:** Average duration of followup was 16 months. Postoperative complications occurred in 38 (29.2%) patients. Twenty-four (18.4%) patients experienced minor complications requiring simple, local care; eight (6.1%) patients required in-office procedural intervention; and six (4.6%) patients required revision surgery in the operating room. Implant extrusion occurred in 3 (2.3%) patients. Eleven (8.5%) patients required placement of a longer abutment. Patients receiving the 6mm abutment at initial surgery were significantly more likely to encounter a complication requiring in-office procedural intervention or revision surgery ( $p=0.001$ ). **Conclusions:** Minor complications following bone anchored hearing aid implantation are common. The vast majority of these complications are due to localized skin reactions, most of which are readily addressed through local care. Patients receiving the 9mm abutment during initial implantation are significantly less likely to require in-office procedural intervention or revision surgery postoperatively as compared to those receiving the shorter, 6mm implant at initial surgery.

- A274. Migraine as an Independent Predictor of Outcome following Endolymphatic Sac Decompression for Meniere's Disease**  
Sean R. Wise, MD, Farmington Hills, MI; Eric W. Sargent, MD, Farmington Hills, MI

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the impact of a simultaneous diagnosis of migraine and Meniere's disease on the outcome of endolymphatic sac decompression.

**Objectives:** To examine our initial results evaluating the impact of migraine in those patients with Meniere's disease who undergo endolymphatic sac decompression. **Study Design:** Cross-sectional survey. **Methods:** Fifty-eight patients with Meniere's disease who underwent endolymphatic sac decompression surgery between July 2010 and March 2012 were considered for analysis. Thirty-two patients (17 women, 15 men; age range 37-77) met eligibility criteria based upon their satisfactory return of preoperative and postoperative disease specific surveys and at least 6 months postoperative followup. Change in quality of life scores obtained from the Meniere's Disease Outcome Questionnaire (MDOQ) was the main outcome measure. Survey data additionally included results from individual patient questions surrounding migraine history, the American Academy of Otolaryngology Functional Level Scale and the Migraine Disability Assessment Questionnaire. Demographic and audiometric data were also obtained. **Results:** Mean duration of followup was 8.3 months. Seven (21.9%) patients carried a simultaneous diagnosis of migraine. Overall, quality of life scores were improved in 27

(84.4%) respondents, unchanged in 1 (3.1%) and worse in 4 (12.5%). Among those without a migraine history, mean preoperative and postoperative scores were  $39.1 \pm 10.2$  and  $60.3 \pm 20.5$ , respectively ( $p < 0.001$ ). In patients with a migraine history, mean preoperative and postoperative scores were  $29.2 \pm 5.5$  and  $33.9 \pm 12.9$ , respectively ( $p = 0.373$ ). **Conclusions:** Quality of life is improved in 84% of patients with Meniere's disease after endolymphatic sac decompression, but not significantly improved in migraineurs with Meniere's disease. Simultaneous migraine in patients with Meniere's disease may independently predict an unsatisfactory outcome of endolymphatic sac surgery.

## Pediatrics

### **A275. Congenital Hairy Polyp of the Palatopharyngeus Muscle** Brandon Christianson, MD, Dallas, TX; Seckin O. Ulualp, MD, Dallas, TX

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the characteristics of congenital hairy polyp of the palatopharyngeus muscle.

**Objectives:** Hairy polyp, rare malformation of bigeminal origin, commonly originates from soft palate or lateral pharyngeal wall. We describe clinical, radiologic, and histological features of a congenital hairy polyp arising from palatopharyngeal muscle in a neonate.

**Study Design:** Case review. **Methods:** Chart of a 2 day old female referred to a tertiary care pediatric hospital for assessment of intraoral mass was reviewed. Data included relevant history and physical examination, diagnostic workup, and management. **Results:** The child was born at 32 weeks after an uneventful pregnancy. At the initial exam, an intraoral mass was noted and the patient was transferred to a tertiary care children's hospital on day 2 of life. The child had increased work of breathing at presentation and required continuous positive airway pressure. Physical examination revealed a pedunculated mass which was protruding to the oropharynx from the nasopharynx. MRI of the lesion documented a discrete bilobed mass which filled the posterior nasopharynx. The mass abutted the uvula and soft palate; however, the mass did not appear to be arising from the soft palate. Intraoperative exam showed a mass arising from the right palatopharyngeus muscle in the superior pole region of the tonsil. Histologic examination showed ectodermal and mesodermal derivatives confirming congenital hairy polyp. At 8 month followup, the surgical site was healed with no evidence of recurrent lesion. **Conclusions:** Congenital hairy polyp, although uncommon, should be considered in the differential diagnosis of oropharyngeal mass in a neonate.

### **A276. Effect of Laryngotracheal Reconstruction on Airflow Patterns: A Pilot Computational Fluid Dynamics Study in a Child with Subglottic Stenosis** Gitanjali M. Fleischman, MD, Chapel Hill, NC; Julia S. Kimbell, PhD, Chapel Hill, NC; Carlton J. Zdanski, MD, Chapel Hill, NC

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss how computational fluid dynamics (CFD) analysis might help in assessing post-surgical outcomes in children with subglottic stenosis (SGS) who undergo laryngotracheal reconstruction (LTR).

**Objectives:** To visualize and quantify airflow through the respiratory tracts of children before and after LTR, utilizing CFD modeling derived from pre and postoperative CT scans. **Study Design:** This study is part of an ongoing clinical trial to study children with SGS. **Methods:** Mimics software was used to construct three dimensional (3D) airway models based on preoperative and 1 year postoperative CT scans of a 9 month old patient with SGS who underwent LTR. Steady state inspiratory airflow was scaled to patient's weight and simulated using CFD software ICEM-CFD and Fluent. Cross-sectional area, average pressure, airway resistance, and maximum flow speed were compared in pre- and post-LTR models at 7 locations: choanae, soft palate, epiglottis, glottis, subglottis, mid and distal trachea. **Results:** CFD simulations revealed that pressure drop from the nostrils (inlet) to the subglottis was 6-fold higher preoperatively than postoperatively. Preoperatively, greatest flow speeds occurred across the stenosed subglottis, but reduced four-fold across the same region postoperatively. The overall cross-sectional area of the airway generally increased from pre- to post-LTR secondary to growth, with the greatest increase occurring at the subglottis, primarily from surgical intervention. **Conclusions:** CFD techniques can provide a sophisticated 3D and objective analysis of airway resistance and flow in patients with SGS, in a manner that is both qualitative and quantitative. Our results indicate that LTR, combined with a year of growth, greatly reduced pressure drop and overall resistance in the pediatric airway. CFD may be a useful tool to objectively measure airflow in the pediatric airway under a variety of conditions and may enhance future treatment planning.

### **A277. Actinomycosis of the Middle Ear** Armon Jadidian, MD, Gainesville, FL; Rodrigo C. Silva, MD, Gainesville, FL

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the diagnosis and treatment of actinomyces infection of the middle ear.

**Objectives:** 1) Present a rare pediatric case of ear actinomycosis; and 2) discuss the current literature on actinomycosis of the temporal bone reviewing presentation, diagnosis, and treatment. **Study Design:** Case report. **Methods:** Retrospective chart review. **Results:** A 5 year old girl with Treacher-Collins syndrome presented with a several month history of right sided otorrhea. The patient had failed multiple courses of oral and otological antibiotics. Examination revealed an opaque and full tympanic membrane (TM),

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actively draining ear, and mild to moderate mixed hearing loss with type B tympanogram, CT imaging demonstrated soft tissue density within the middle ear cavity and mastoid air cells concerning for cholesteatoma. The patient was taken to the operating room for tympanoplasty with mastoidectomy. Intraoperatively, the middle ear and mastoid antrum were filled with cheesy, honey colored debris, and histopathologic analysis of these contents was consistent with actinomycosis. **Conclusions:** Otitis media with actinomyces species is an exceedingly rare condition, diagnosed more commonly in adults. Accurate diagnosis and treatment of this potentially aggressive infection with a combination of surgical debridement and systemic antimicrobial therapy results in favorable outcomes.

**A278. The Evolving Utility of Polysomnography in the Management of Tracheostomies for Pediatric Patients with Craniofacial Anomalies**

Grace G. Kim, MD, Chapel Hill, NC; Carlton J. Zdanski, MD, Chapel Hill, NC; Emily E. Cohn, BSPH, Chapel Hill, NC; Bradley V. Vaughn, MD, Chapel Hill, NC; Amelia F. Drake, MD\*, Chapel Hill, NC

**Educational Objective:** At the conclusion of this presentation, the participants should be able to use objective measures of polysomnography in conjunction with clinical parameters to manage tracheostomies in patients with craniofacial anomalies.

**Objectives:** Children with craniofacial anomalies often present with obstructive sleep apnea syndrome (OSAS) that can result in a variety of problems such as failure to thrive, developmental delay, cor pulmonale and sudden infant death. OSAS may be more difficult to treat in individuals with craniofacial anomalies than in other children and may require a tracheostomy. In this study, we evaluate the evolving utility of polysomnography (PSG) in the management of tracheostomies in pediatric patients with craniofacial anomalies.

**Study Design:** Retrospective chart review. **Methods:** This study examines pediatric patients with craniofacial abnormalities and OSAS who underwent PSG for management of a tracheostomy from 1997-2012. **Results:** Twelve pediatric patients (4 males) with craniofacial anomalies and a tracheostomy underwent PSG. Diagnoses included Goldenhar (n=1), Larsen (n=1), Pierre Robin (n=6), Treacher Collins (n=1), as well as other craniofacial anomalies (n=3). Of the 12 patients (mean age at tracheostomy is 3 months, age range 5 days to 1 year), 8 have been decannulated with confirmed airway stability utilizing PSG. The mean period of tracheostomy placement was 26 months (range was 14-46 months). The remaining 4 patients are tracheostomy dependant due to central apnea (n=3) and obstructive apnea (n=1) found on the PSG. **Conclusions:** Polysomnography provides objective measures which augment clinical parameters for evaluating patients for potential tracheostomy decannulation and to confirm airway stability after decannulation for pediatric patients with craniofacial anomalies.

**A279. Paradoxical Reaction in Tuberculosis Including Immune Reconstitution Inflammatory Syndrome (IRIS): Considerations in the Differential Diagnosis of Pediatric Neck Mass**

David T. Montag, MD, Minneapolis, MN; Kiran Belani, MD, Minneapolis, MN; James D. Sidman, MD\*, Minneapolis, MN

**Educational Objective:** At the conclusion of this presentation, the participants should be able to explain the entities of immune reconstitution inflammatory syndrome (IRIS) and paradoxical reaction in tuberculosis, as well as their clinical presentation as it relates to otolaryngology.

**Objectives:** 1) Describe immune reconstitution inflammatory syndrome (IRIS) and paradoxical reaction in tuberculosis and its clinical presentation as it relates to otolaryngology; 2) review our experience with IRIS and paradoxical reaction in tuberculosis. **Study**

**Design:** This study is a retrospective review of our clinical experience with immune reconstitution inflammatory syndrome and paradoxical reaction in tuberculosis at a single institution in February 2012. **Methods:** This study is a retrospective review of our experience regarding patients with paradoxical reaction in tuberculosis including IRIS at a single institution between 2000 and 2012. Clinical presentation, physical exam, laboratory findings, imaging studies, pathology, treatment rendered and recent literature were reviewed.

**Results:** Two patients were identified during retrospective chart review for the diagnosis of paradoxical reaction in tuberculosis including one patient with immune reconstitution inflammatory syndrome. Both patients identified were female and immigrated from Africa as young children. Tuberculosis was diagnosed in both on presentation and HIV in one patient. After appropriate anti-tuberculosis and anti-retroviral therapy (in the one patient) was initiated, both patients had worsening of cervical lymphadenopathy bilaterally. Each patient underwent serial surgical excisions of massive cervical lymph nodes on both sides of the neck yielding no tuberculosis or other bacteria on culture. **Conclusions:** In this report, two patients are presented who developed severe bilateral cervical lymphadenopathy while undergoing treatment for tuberculosis and in one, HIV. Biopsies and cultures yielded inflammation but were negative for organisms. Paradoxical reaction in tuberculosis and IRIS should be considered in the differential diagnosis of pediatric neck mass.

**A280. Rigid Eustachian Tuboplasty for the Treatment of Persistent Eustachian Tube Dysfunction in the Pediatric Population**

Nitin J. Patel, MD, Washington, DC; Rahul K. Shah, MD\*, Washington, DC

**Educational Objective:** At the conclusion of this presentation, the participants should be able to demonstrate an understanding of the endoscopic transnasal rigid eustachian tuboplasty approach employed to treat persistent eustachian tube dysfunction (ETD) in the pediatric population. Participants should be able to describe the unique treatment challenges presented by persistent ETD in the pediatric population.

**Objectives:** To describe a novel approach in the pediatric population—endoscopic transnasal rigid eustachian tuboplasty—employed for the management of persistent eustachian tube dysfunction (ETD). **Study Design:** Technical case report of a surgical technique. **Methods:** We describe an 11 year old female with persistent ETD despite medical management and repeated placement of tympanostomy tubes who presented with chronic serous otitis media. We employed a transnasal approach to perform rigid eustachian tuboplasty using pediatric ureteral sound instruments to dilate the eustachian tube (ET) under endoscopic visualization. The transnasal endoscopic rigid eustachian tuboplasty by surgical terms is described in detail. **Results:** The unique anatomical confines of the ET in the pediatric population made attempts at balloon eustachian tuboplasty technically unfeasible. Rigid dilation using ureteral sound instruments was technically simple to perform. Sequential dilation with increasing sound diameters was done with depth of insertion determined by palpation of the bony cartilaginous junction. Dilation was confirmed visually. The patient was followed with clinical and audiological examinations for 6 months postoperatively without findings suggestive of ETD. **Conclusions:** ETD is common in the pediatric population. In spite of this, eustachian tuboplasty has not been investigated in this population. Ours is the first report to demonstrate the successful surgical approach to persistent ETD in the pediatric population through eustachian tuboplasty, more specifically using a rigid method of dilation. We present the potential of rigid dilation of the ET in the treatment of pediatric persistent ETD for very select patients with the understanding that outcomes need to be assessed.

#### A281. Adenoidectomy Technique and Risk of Post-Tube Otorrhea

Nathan E. Pierce, MD, Gainesville, FL; Rodrigo C. Silva, MD, Gainesville, FL; Brittany C. Dobson, BA, Gainesville, FL; Dandan Xu, MS, Gainesville, FL; Patrick J. Antonelli, MD MS\*, Gainesville, FL

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the relative risk of post-tube otorrhea (PTO) for different adenoidectomy techniques.

**Objectives:** To evaluate the risk of recurrent or chronic PTO for different adenoidectomy techniques used in the treatment of recurrent acute otitis media (RAOM) or chronic otitis media with effusion (COME) in children. **Study Design:** Retrospective chart review. **Methods:** Children who underwent concomitant adenoidectomy and placement of tympanostomy tubes (TTs) for RAOM or COME were studied. Patients with craniofacial anomalies or immunodeficiencies were excluded. The primary outcome measure was the development of recurrent (> 3 episodes in 6 months) or chronic PTO (continuous drainage for > 6 weeks). **Results:** The charts of 741 children were reviewed. 668 met inclusion criteria. Adenoidectomy techniques included curette-cautery (59%), suction-cautery only (26%), radiofrequency ablation (Coblation®, 8%), and microdebrider-cautery (7%). Recurrent or chronic PTO occurred after adenoidectomy in 8% of curette, 8% of suction-cautery, 4% of microdebrider, and 16% of Coblation® adenoidectomies. **Conclusions:** Coblation® adenoidectomy was associated with an increased risk of PTO relative to other adenoidectomy techniques in children with COME or RAOM. Prospective research is needed to better understand the optimal adenoidectomy technique for children with RAOM and COME.

#### A282. Surgical Outcome of Adenoidectomy for Chronic Adenoiditis vs Chronic Rhinosinusitis in Children

Hassan H. Ramadan, MD MSc\*, Morgantown, WV; Chadi A. Makary, MD, Morgantown, WV (Presenter)

**Educational Objective:** At the conclusion of this presentation, the participants should be able to 1) explain the difference between adenoiditis and rhinosinusitis in children; 2) compare the outcome of adenoidectomy for chronic adenoiditis vs chronic rhinosinusitis; and 3) discuss the best treatment option for children with adenoiditis and rhinosinusitis.

**Objectives:** Chronic adenoiditis (CA) and chronic rhinosinusitis (CRS) in children are difficult to distinguish based on symptoms alone. A CT scan is one way to distinguish between the two conditions. An adenoidectomy is initially performed with moderate success rate. The objective of this study is to determine the difference in success rates between CA and CRS. **Study Design:** A retrospective review of all children referred to a tertiary referral pediatric practice over a 10 year period was performed. **Methods:** Children who failed medical treatment and had a CT scan as part of their evaluation and had an adenoidectomy were reviewed. Children who had a CT score of more than 5 were included in the CRS group, whereas those who had a CT score of 5 or less were included in the CA group. **Results:** Two hundred and thirty-four (234) children met the above criteria. Mean age was 5.5 years and mean CT score was 6.4. Overall success rate was 52%. CRS group had a success rate of 43% whereas the CA group had a 65% success rate (P value=0.013). Those children who were asthmatics and had CRS had a success rate of 28% compared to 53% for those who had CA (P value=0.02). Children with no asthma with CRS had a success of 54% compared to 72% for children who had CA (P value=0.038). **Conclusions:** Making the diagnosis of CRS in children seems to be critical in determining whether initially an adenoidectomy alone is an appropriate treatment specifically for those who are asthmatics.

#### A283. Airway Management in an Infant with a Giant Vallecular Cyst

David A. Reiersen, MD, Shreveport, LA; Anil A. Gungor, MD, Shreveport, LA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to 1) demonstrate the presentation of a large vallecular cyst; 2) explain the differential diagnosis of progressive respiratory distress and failure to thrive in an infant; and 3) discuss airway management for obstructing lesions in an infant.

**Objectives:** Review vallecular cysts and report our technique of surgical management of a vallecular cyst of unusual size with near complete obliteration of the airway. **Study Design:** Case report. **Methods:** An 8 week old infant with progressive respiratory distress

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since birth and failure to thrive. Flexible endoscopic exam, suspension laryngoscopy, aspiration and CO2 laser marsupialization of cyst wall. Complete obliteration by cyst preventing visualization of airway. Intubation performed after rapid aspiration of the cyst content. **Results:** Two month old male with failure to thrive, vomiting induced by gagging and worsening stridor previously evaluated by pediatricians for laryngomalacia and reflux. ENT evaluation led to microlaryngoscopy with CO2 laser excision of a large obstructive vallecular cyst resulting in immediate relief of the airway obstruction. He displayed no signs of respiratory distress postoperatively and continued to normalize in feeding habits during the clinical course. At two month followup, the child's weight had increased from below the 3rd percentile to the 50th percentile. Flexible laryngoscopic exam revealed an entirely normal airway at 2 month followup. **Conclusions:** Vallecular cyst can present as a life threatening obstructive mass in infants. Establishing an airway after induction of anesthesia can be very challenging if the cyst is unusually large and complete obstruction is present. In our case, rapid thinking and aspiration of the cyst content helped establish the airway for definitive CO2 laser excision.

### A284. Management of Pediatric Subglottic Cysts

Matthew A. Richardson, MD, Jackson, MS; Tyler W. Winford, MD, Winston Salem, NC; Byron K. Norris, MD, Athens, GA; John M. Reed, MD, Jackson, MS

**Educational Objective:** At the conclusion of this presentation, the participants should be able to recognize subglottic cysts as a cause of airway obstruction, understand the typical presentation of subglottic cysts, and consider the use of the Bugbee fulgurating diathermy electrode as a technique to successfully manage subglottic cysts with a low recurrence rate.

**Objectives:** To present a series of patients with subglottic cysts contributing to airway obstruction who were treated primarily with the Bugbee electrode resulting in high success rates and recurrence rates lower than previously reported. **Study Design:** Case series and literature review. **Methods:** A retrospective chart review was performed on a series of 18 patients treated for subglottic cysts by a single surgeon at a single institution. **Results:** Subglottic cysts (SGCs) are a recognized, yet rare, cause of upper airway obstruction in previously intubated infants. There are currently many treatment options for SGCs including bronchoscopic rupture, cold steel marsupialization, CO2 laser ablation, and laryngeal microdebridement. However, recurrence rates are reported between 13 and 50%. We report a series of 18 patients treated for subglottic cysts who underwent microlaryngoscopy with cyst lysis. The most common presenting symptom was biphasic stridor. Patients presented with a mean of 1.7 prior intubations, 31.9 cumulative days of intubation, and 7.2 months after initial intubation. At the time of diagnosis, patients were found to have a mean of 1.6 cysts, and subglottic stenosis was the most common associated finding. In eighty-nine percent of patients, cysts were ruptured with the Bugbee fulgurating diathermy electrode. After cyst rupture, patients remained intubated overnight. Clinically significant cyst recurrence occurred in only 5% of patients, and no major complications were reported. **Conclusions:** This review presents a treatment algorithm for patients with SGCs that is safe, effective, and has a recurrence rate lower than previously reported.

### A285. Failure on Infant Hearing Screening is Associated with Birth Delivery Method

Kareem O. Tawfik, MD, Cincinnati, OH; Abbas A. Anwar, MD, New York, NY; Diane M. Taylor, MA, New York, NY; Yixin Fang, DPhil, New York, NY; Michael L. Weitzman, MD, New York, NY; Anil K. Lalwani, MD\*, New York, NY

**Educational Objective:** At the conclusion of this presentation, the participants should be able to explain and compare the different methods of infant hearing screening (IHS) and describe the various infant, maternal, and environmental factors that impact upon its result.

**Objectives:** The objective of our study was to investigate the influence of various infant, maternal and perinatal environmental factors on the outcome of IHS. **Study Design:** A retrospective chart review of newborns who underwent IHS. **Methods:** The medical records of 681 neonates (44.64% female, 55.36% male) born between January 1 and December 31, 2010 at a tertiary medical center who underwent IHS were reviewed. All infants who failed screening in 2010, numbering 322 in total, were included. The remaining subjects were the first 359 infants who passed inpatient IHS in 2010. The following information was collected: IHS results, birth weight, method of delivery, and maternal historical data on age, multiple gestation, history of recent travel, smoking, alcohol use, illicit drug use, assisted reproductive technology, and group B streptococcus (GBS) status at time of labor. In addition, followup outpatient hearing screening results were reviewed for 318 neonates who failed initial hearing screening. **Results:** At the initial inpatient single stage otoacoustic emissions or auditory brainstem response testing, only vaginal delivery was significantly associated with failure on IHS ( $p < 0.0001$ ). At second stage followup outpatient screening reflecting true positive hearing loss, 285 passed and 33 failed. Failure on outpatient screening was associated with cesarean birth ( $p = 0.0003$ ), lower birth weight ( $p = 0.0317$ ), and maternal GBS positivity ( $p = 0.0331$ ). **Conclusions:** Delivery method significantly impacts the result on IHS. While the mechanism is unknown, we posit that failure at first stage associated with vaginal delivery may reflect mechanical issues related to the birthing process or timing of IHS. In contrast, delivery by C-section represents a direct or indirect risk factor for hearing loss via a yet unknown mechanism.

### A286. Comparison of Risk Factors Associated with Unilateral and Bilateral Hearing Loss Identified by Newborn Hearing Screening

Jonathan N. Young, MD, Richmond, VA; Joshua C. Yelverton, MD, Richmond, VA; Derek A. Chapman, PhD, Richmond, VA; Shuhui Wang, MS, Richmond, VA; Arti Pandya, MD, Richmond, VA; Kelley M. Dodson, MD, Richmond, VA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to compare the risk factors of unilateral

hearing loss to those of bilateral hearing loss.

**Objectives:** To compare the incidence of Joint Committee on Infant Hearing (JCIH) risk factors and co-occurring birth defects in children with unilateral hearing loss (UHL) to children with bilateral hearing loss (BHL). **Study Design:** Retrospective review of 1065 children. **Methods:** Retrospective review of 1065 children with confirmed hearing loss identified through universal newborn hearing screening (UNHS) program in our state from 2002-2008. **Results:** Of 371 children with confirmed UHL, 97.5% were identified through failed UNHS and 30% had one or more risk factors reported. Of 694 children with confirmed BHL, 97.1% were identified through failed UNHS and 29% had one or more risk factors reported. In UHL, craniofacial anomalies (43.6%) and family history of hearing loss (22%) were the most commonly reported risk factors. In BHL, family history of hearing loss was most commonly reported (43.4%), followed by stigmata of syndromes including hearing loss (18%). Additional co-occurring birth defects were identified in 30% of children with UHL or BHL. For children with a JCIH risk factor, co-occurring birth defects were present in 75.5% with UHL and in 53% with BHL. Children with UHL most often had ear or cardiovascular anomalies, while those with BHL most often had cardiovascular or musculoskeletal anomalies. **Conclusions:** The proportion of children with confirmed UHL or BHL and a JCIH risk factor or co-occurring birth defect was similar at 30%. However, the profile of risk factors and co-occurring birth defects differed. Further studies investigating risk factor and comorbid birth defect associations with the etiology of hearing loss are warranted.

**A287. Primary Repair of Membranous Choanal Atresia by Balloon Dilation without Stent Placement**  
Alice S. Zhao, MD, Albany, NY; Jonathan Levy, BA, Albany, NY; Jason Mouzakes, MD, Albany, NY

**Educational Objective:** At the conclusion of this presentation, the participants should be able to introduce a new technique for treatment of membranous choanal atresia without the use of stents.

**Objectives:** To introduce a new technique for treatment of membranous choanal atresia without the use of stents. **Study Design:** A 37 week female neonate was bradycardic and apneic at birth. This was followed by episodes of desaturation and intolerance to oral feeding. CT scan and nasal endoscopy demonstrated bilateral membranous choanal atresia. The patient was taken to the OR one week after birth to allow for weight gain, while being maintained with orogastric feeds and McGovern's nipple as an oral airway. **Methods:** Nasal endoscope was used to evaluate the nasal passageways. Using a Frazier suction tip, the membranous plate was punctured and dilated. 3.5mm and 5mm balloon dilators were passed and inflated to pressures of 12 and 16 atmospheres, respectively, for 1 minute each. The procedure was performed bilaterally and patency was achieved. No stents were placed. **Results:** At 3 week followup, the patient was found to have bilateral patent choanae and complete resolution of symptoms. **Conclusions:** Choanal atresia affects 1 in 7000 births, ranging from bony and mixed to membranous. To date, the largest patient series investigating balloon dilation technique with and without stent placement consisted of five patients undergoing both unilateral and bilateral primary and revision repair of atresia. Herein, we present the first report of the primary treatment of bilateral membranous choanal atresia using high pressure balloon dilation without stent placement. This technique involves membranous puncture and dilation with sequential increase in balloon size for short durations. We conclude that balloon dilation is sufficient in the treatment of bilateral membranous atresia.

**A288. The Influence of Season and Indication for Tonsillectomy on Incidence of Pediatric Post-Tonsillectomy Hemorrhage**  
Alice S. Zhao, MD, Albany, NY; Christopher D. Vuong, BA, Albany, NY; Jason Mouzakes, MD, Albany, NY

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the factors that influence post-tonsillectomy hemorrhage in the pediatric population.

**Objectives:** To evaluate the relationship between incidence of pediatric post-tonsillectomy hemorrhage and weather variation in the context of two main indications for tonsillectomy, recurrent/chronic tonsillitis and tonsillar hypertrophy. **Study Design:** This was a retrospective study based at a tertiary referral institution. **Methods:** Records were obtained for tonsillectomy procedures performed on patients under the age of 18 between January 2007 and February 2012 with the diagnosis of primary or secondary postoperative hemorrhage. All tonsillectomy procedures were performed using monopolar electrocautery dissection. Daily air temperatures were extracted from the National Climatic Data Center in our city. Statistical analysis was performed using two sample t-test with equal variances. **Results:** During the 5 year period, 4974 tonsillectomy procedures were performed on patients under the age of 18, of which there were 71 cases (1.43%) of post-tonsillectomy hemorrhage. Patients who bled were significantly older than those who did not (8.66 versus 6.44 years; difference 2.21,  $p < 0.001$ ). There was no statistically significant difference in hemorrhage rates when comparing indication for the procedure, maximum, or average temperature on the day of bleed between the tonsillitis and hypertrophy groups. The first quarter months of January through March demonstrated the highest incidence of post-tonsillectomy hemorrhage in both groups (30.77% and 33.34%, respectively). **Conclusions:** Older patients are more likely to experience post-tonsillectomy hemorrhage and should be counseled appropriately. The greatest incidence of hemorrhage occurred in the months of January to March; however, the occurrence of post-tonsillectomy hemorrhage is multifactorial and cannot be attributed to any one particular environmental factor.



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# Triological Society National Awards

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1933	Max. A. Goldstein, MD
2001	Byron J. Bailey, MD
2005	Michael M.E. Johns, MD
2009	Patrick E. Brookhouser, MD
2013	Harold C. Pillsbury, MD

## Patrick E. Brookhouser, MD Award for Excellence

2013	Gerald B. Healy, MD FACS
------	--------------------------

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1896 to 1900	Robert C. Myles, MD
1901 to 1906	Wendell C. Phillips, MD
1907 to 1916	Thomas J. Harris, MD
1917 to 1924	William H. Haskins, MD
1925 to 1936	Robert L. Loughran, MD
1936 to 1962	C. Stewart Nash, MD
1962 to 1968	Victor R. Alfaro, MD
1968 to 1974	Louis E. Silcox, MD
1974 to 1980	Richard R. Ruggles, MD
1980 to 1984	William M. Triple, MD
1984 to 1988	Frank N. Ritter, MD
1989 to 1992	Michael E. Johns, MD
1993 to 1996	Robert H. Miller, MD
1997 to 2004	Patrick E. Brookhouser, MD
2005	Gerald B. Healy, MD
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2011 to 2013	Gerald B. Healy, MD

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2013	Myles L. Pensak, MD
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* 1897	Frank Hyatt, MD	* 1917	Thomas J. Harris, MD
* 1898	William H. Daley, MD	* 1918	George L. Richards, MD
* 1899	S.E. Solly, MD	* 1919	Herbert S. Birkett, MD
* 1900	D. Brayden Kyle, MD	* 1920	Harris P. Mosher, MD
* 1901	Robert C. Myles, MD	* 1921	Lee Wallace Dean, MD
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* 1904	Norval H. Pierce, MD	* 1924	Hanau W. Loeb, MD
* 1905	Frederick F. Cobb, MD	* 1925	William H. Haskin, MD
* 1906	James E. Logan, MD	* 1926	John M. Ingersoll, MD
* 1907	Wendel C. Phillips, MD	* 1927	Burt R. Shurly, MD
* 1908	Ewing W. Day, MD	* 1928	John F. Barnhill, MD
* 1909	Christian R. Holmes, MD	* 1929	Hill Hastings, MD
* 1910	James F. McKenna, MD	* 1930	Ross Hall Skillern, MD
* 1911	Chevalier Jackson, MD	* 1931	Max A. Goldstein, MD
* 1912	G. Hudson Jakuen, MD	* 1932	Edmund Prince Fowler, MD
* 1913	H. Holbrook Curtis, MD	* 1933	Joseph C. Beck, MD
* 1914	Joseph A. White, MD	* 1934	J.W. Jervy, MD
* 1915	Robert Levy, MD	* 1935	Perry G. Goldsmith, MD

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* 1936	Thomas E. Carmody, MD	* 1976	James A. Harrill, MD
* 1937	George M. Coates, MD	* 1977	Joseph H. Ogura, MD
* 1938	Samuel J. Kopetzky, MD	* 1978	Daniel Miller, MD
* 1939	Harold I. Lillie, MD	* 1979	Francis A. Sooy, MD
* 1940	Lee M. Hurd, MD	* 1980	Beverly W. Armstrong, MD
* 1941	J. Mackenzie Brown, MD	* 1981	G. O'Neill Proud, MD
* 1942	James A. Babbitt, MD	1982	John A. Kirchner, MD
* 1943	James G. Dwyer, MD	* 1983	Robin Michelson, MD
* 1944	H. Marshall Taylor, MD	* 1984	Carl N. Patterson, MD
* 1945	Albert C. Furstenberg, MD	1985	William H. Saunders, MD
* 1946	Albert C. Furstenberg, MD	* 1986	Wesley H. Bradley, MD
* 1947	Harry W. Lyman, MD	1987	Roger Boles, MD
* 1948	Lyman G. Richards, MD	* 1988	Harold G. Tabb, MD
* 1949	John J. Shea, MD	1989	Malcolm H. Stroud, MD
* 1950	Robert C. Martin, MD	1990	M. Stuart Strong, MD
* 1951	Louis H. Clerf, MD	1991	Paul H. Ward, MD
* 1952	C. Steward Nash, MD	* 1992	A. Paul Keller, Jr., MD
* 1953	Francis E. LeJeune, MD	* 1993	Frank N. Ritter, MD
* 1954	Leroy A. Schall, MD	1994	Richard R. Gacek, MD
* 1955	Kenneth M. Day, MD	* 1995	Patrick J. Doyle, MD
* 1956	Dean M. Lierle, MD	1996	William R. Hudson, MD
* 1957	Percy E. Ireland, MD	1997	H. Bryan Neel, MD
* 1958	Lawrence R. Boies, MD	1998	Stanley M. Blaugrund, MD
* 1959	Gordon D. Hoople, MD	1999	Mansfield F. W. Smith, MD
* 1960	Theodore E. Walsh, MD	2000	Charles W. Gross, MD
* 1961	Fletcher D. Woodward, MD	2001	Edward L. Applebaum, MD
* 1962	John R. Lindsay, MD	2002	Gerald B. Healy, MD
* 1963	Howard P. House, MD	2003	Roger L. Crumley, MD
* 1964	John E. Bordley, MD	2004	Robert A. Jahrsdoerfer, MD
* 1965	George E. Shambaugh, Jr., MD	* 2005	Patrick E. Brookhouser, MD
* 1966	Francis W. Davison, MD	2006	Stanley M. Shapshay, MD
* 1967	Shirley H. Baron, MD	2007	David F. Wilson, MD
* 1968	G. Slaughter Fitz-Hugh, MD	2008	Harold C. Pillsbury, MD
* 1969	Jerome A. Hilger, MD	2009	Myles L. Pensak, MD
* 1970	Joseph L. Goldman, MD	2010	Frank E. Lucente, MD
* 1971	Victor Goodhill, MD	2011	Gerald S. Berke, MD
* 1972	Victor R. Alfaro, MD	2012	Robert H. Ossoff, DMD MD
* 1973	Walter P. Work, MD	2013	Jesus E. Medina, MD
* 1974	Raymond E. Jordan, MD		
* 1974	Louis E. Silcox, MD		
* 1975	David D. DeWeese, MD		

\* denotes deceased Presidents

## Guests of Honor Since 1947

1947	J. McKenzie Brown, MD	1964	C. Stewart Nash, MD
1948	Harold Walker, MD	1965	Georges Portmann, MD
1949	Claude C. Cody, Jr., MD	1966	Gordon D. Hoople, MD
1950	Harris P. Mosher, MD	1967	Albery C. Furstenberg, MD
1951	Duncan McPherson, MD	1968	Francis E. LeJeune, MD
1952	D.C. Jarvis, MD	1969	Lawrence R. Boies, MD
1953	Charles A. Thigpan, MD	1970	Victor Alfaro, MD
1954	J. Parsons Schaeffer, MD	1971	Vern O. Knudsen, PhD
1955	Edward P. Fowler, MD	1972	Carlos Munoz-MacCormick, MD
1956	Harold L. Lillie, MD	1973	Dean Lierle, MD
1957	Not Available	1974	Raymond Jordan, MD
1958	Arnold S. Diehl, MD	1975	Frank Lathrop, MD
1959	Frederick T. Hill, MD	1976	John Bordley, MD
1960	Terence Cawthorne, MD	1977	Max Soni, MD
1961	Milton J. Robb, MD		W.E.N. Harrison, MD
1962	Thomas C. Galloway, MD	1978	Moses Lurie, MD
1963	Robert C. Martin, MD	1979	Shirley Baron, MD

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	.....Harry Rosen-Wasser, MD	1998	.....Patrick J. Doyle, MD
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1982	.....Harold Schuknecht, MD	2000	.....A. Paul Keller, MD
	.....Ugo Fisch, MD	2001	.....Charles W. Cummings, MD
1983	.....Walter Work, MD	2002	.....Stanley M. Shapshay, MD
	.....Roy B. Cohn, MD	2003	.....Brian F. McCabe, MD
1984	.....Beverly Armstrong, MD	2004	.....Byron J. Bailey, MD
1985	.....G.O. Proud, MD	2005	.....Robert H. Miller, MD MBA
1986	.....Daniel Miller, MD	2006	.....Gerald B. Healy, MD
1987	.....Paul Ebert, MD	2007	.....William F. House, MD
1988	.....Robert W. Brown, MD	2008	.....Patrick E. Brookhouser, MD
1989	.....Hallowell Davis, MD	2009	.....Harry R. van Loveren, MD
1990	.....George Reed, MD	2010	.....Gady Har-El, MD
1991	.....Victor Goodhill, MD	2011	.....Harold C. Pillsbury, MD
1992	.....Roger Boles, MD	2012	.....Paul A. Levine, MD
1993	.....C. Ryan Chandler, MD	2013	.....Robert H. Mathog, MD
1994	.....John Conley, MD		
1995	.....Paul H. Ward, MD		
1996	.....Bobby Ray Alford, MD		

---

## Joseph H. Ogura, MD Lecturers

---

1986	.....Hugh F. Biller, MD	2002	.....David G. Nathan, MD
1987	.....Paul H. Ward, MD	2003	.....Arnold G. D. Maran, MD
1988	.....John Conley, MD	2004	.....Ernest A. Weymuller, Jr., MD
1989	.....George A. Sisson, MD	2005	.....Gerald B. Healy, MD
1990	.....Sir Donald F.N. Harrison	2006	.....Jonas T. Johnson, MD
1991	.....Robert W. Cantrell, MD	2007	.....Byron J. Bailey, MD
1992	.....Michael E. Johns, MD	2008	.....Paul A. Levine, MD
1993	.....John A. Kirchner, MD	2009	.....Robin T. Cotton, MD
1994	.....John Lewis, MD	2010	.....Marvin P. Fried, MD
1995	.....Eugene Myers, MD	2011	.....Lord Bernard Ribeiro Kt CBE FRCS FACS (Hon.)
1996	.....Charles W. Cummings, MD	2012	.....James L. Netterville, MD
1997	.....Harold C. Pillsbury III, MD	2013	.....Randal S. Weber, MD
1998	.....Frank E. Lucente, MD		
1999	.....Haskins Kashima, MD		
2000	.....Christopher Perry, MD		
2001	.....Richard R. Gacek, MD		

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- 1948**  
Edgar A. Thacker, MD .....Everett, WA
- 1949**  
Ernest R.V. Anderson, MD .....Camarillo, CA  
Robert E. Boswell, MD .....West Palm Beach, FL  
F. Johnson Putney, MD .....Charleston, SC  
Julio Quevedo, MD .....Guatemala City
- 1950**  
Arthur L. Juers, MD .....Ivins, UT
- 1951**  
Howard C. High, Jr., MD .....Milwaukee, WI
- 1953**  
Bert A. De Bord, Jr., MD .....Temple, TX
- 1955**  
G. Dekle Taylor, MD .....Jacksonville, FL
- 1956**  
David E. Brown, MD .....Monterey, CA  
J.H. Thomas Rambo, MD .....New York, NY
- 1957**  
Irving I. Cramer, MD .....Scarsdale, NY  
William Skokan, MD .....Fort Worth, TX
- 1958**  
Hershel H. Burston, MD .....Studio City, CA  
James F. Gardner, MD .....Pittsford, NY  
John A. Kirchner, MD .....Hamden, CT  
Jack W. Pou, MD .....Shreveport, LA
- 1959**  
Seymour J. Brockman, MD .....Beverly Hills, CA  
L. Reed Cranmer, MD FACS .....Toledo, OH  
Richard L. Ruggles, MD .....Chagrin Falls, OH  
Peter A. Wallenborn Jr., MD .....Huntsville, AL  
Warren E. Wiesinger, MD .....Oakland, CA
- 1960**  
John T. Bickmore, MD .....Bonita Springs, FL  
James M. Cole, MD .....Danville, PA  
James M. Timmons, MD .....Lexington, SC
- 1961**  
Richard A. Buckingham, MD .....Wilmette, IL  
Richard T. Farrior, MD FACS .....Tampa, FL  
Irwin Harris, MD FACS .....Los Angeles, CA  
Fred H. Linthicum Jr., MD .....Los Angeles, CA  
Ludwig A. Michael, MD FACS .....Dallas, TX  
William F. Robbett, MD .....Manhasset, NY  
Wallace Rubin, MD .....Metairie, LA  
William H. Saunders, MD .....Columbus, OH
- 1962**  
Irving M. Blatt, MD FACS .....Morgan City, LA  
Harry R. Morse, MD .....West Lebanon, NH  
M. Stuart Strong, MD .....Bedford, MA  
John H. Webb Jr., MD .....Orlando, FL
- 1963**  
H.A. Ted Bailey, Jr., MD .....Little Rock, AR  
Arthur J. Gorney, MD .....Sarasota, FL  
William C. Livingood, MD .....Orlando, FL  
George T. Nager, MD .....Baltimore, MD  
Michael M. Paparella, MD .....Minneapolis, MN  
Claude L. Pennington Jr., MD FACS .....Macon, GA

**Please report discrepancies to historian**

## **In Memoriam**

The following deaths have been reported to the Administrative Office since the publication of the 2012 Annual Program

		<b>Elected</b>	<b>Died</b>
James C. Alex, MD FACS	Weston, MA	2003	2012
George W. Allen, MD	Sacramento, CA	1967	unknown
John R. Ausband, MD	Aiken, SC	1960	unknown
Louis B. Balla, MD	Washington, DC	1980	2012
John J. Ballenger, MD	Natick, MA	1957	unknown
William B. Barry, MD	Kansas City, MO	1954	unknown
Truett V. Bennett, MD	Oriental, NC	1962	unknown
Wesley H. Bradley, MD FACS	Glenmont, NY	1958	2012
Edward C. Brandow Jr., MD	Natick, MA	1967	unknown
David W. Brewer, MD	Fayetteville, NY	1955	unknown
Morris Davidson, MD	St. Louis, MO	1959	unknown
Alfred A. Dorenbusch, MD	Charlotte, NC	1954	unknown
Gerald M. English, MD	Boulder, CO	1984	unknown
J. Allan Fields, MD FACS	Fort Lauderdale, FL	1958	unknown
Nathan I. Gershon, MD	Atlanta, GA	1964	1997
Christian Helmus, MD	Grand Rapids, MI	1970	unknown
Albert Hohmann, MD	St. Paul, MN	1968	unknown
Jack Van Doren Hough, MD	Oklahoma City, OK	1958	2012
Leland R. House, MD	Orange, CA	1953	unknown
William F. House, MD	Aurora, OR	1961	2012
Milton L. Jennes, MD	Boca Raton, FL	1950	1995
Robert J. Keim, MD	Oklahoma City, OK	1976	unknown
Harry Kolson, MD	New York, NY	1961	unknown
Robert B. Lewy, MD	Chicago, IL	1950	unknown
Saumil N. Merchant, MD	Boston, MA	1999	2012
Gale W. Miller, MD	Cincinnati, OH	1978	unknown
James A. Moore, MD	New York, NY	1951	unknown
Charley W. Norris, MD	Sandia Park, NM	1979	unknown
Walter A. Petryshyn, MD FACS	Sarasota, FL	1960	2012
Mendell Robinson, MD	Rehoboth, MA	1965	unknown
Joyce A. Schild, MD	Albuquerque, NM	1983	2012
James T. Spencer Jr., MD	Charleston, WV	1966	2012
Clarence H. Steele, MD	Green Valley, AZ	1954	unknown
John W. Stone, MD	Lakeland, FL	1972	unknown
Gerhard D. Straus, MD	Palm Beach, FL	1949	unknown
E. Hale Thornhill, MD	Raleigh, NC	1963	unknown
Lyle G. Waggoner, MD	Grosse Pointe, MI	1958	unknown
Jules G. Waltner, MD	Nyack, NY	1954	1997
Merrill Wattles, MD	Orlando, FL	1949	unknown
Alex Weisskopf, MD	Prescott, AZ	1960	2012
Chester M. Weseman, MD FACS	Berkeley, CA	1958	unknown
Samuel Zurik, MD	New Orleans, LA	1955	unknown



## Active Fellows

Mona M. Abaza, MD  
Elliot Abemayor, MD PhD FACS  
Eugenio A. Aguilar III, MD FACS  
Kenneth W. Altman, MD PhD FACS  
Ronald G. Amedee, MD FACS  
Vijay K. Anand, MD FACS  
Vinod K. Anand, MD FACS  
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