Message from the Vice Presidents

Welcome to Coronado! Thank you for attending our Combined Sections Meeting. It has been a pleasure to serve the membership as Section Vice Presidents this year and we are very proud of the outstanding program that has been assembled by our Program Chair, Dr. Mark Persky, and our Program Committee. The always popular "How I Do It" session is scheduled on Thursday as well as panels on Surgical Salvage Treatment of Recurrent H&N Tumors: Surgical/Ethical Dilemma and Managing Complications of Chronic Ear Disease. General and concurrent sessions on head and neck and otology are followed by the "Great Debate", and "What's the Latest and Greatest" sessions. Thursday evening, immediately following the scientific sessions, is an opportunity to socialize and network at the Vice Presidents' Welcome Reception. Four concurrent sessions will be held on Friday morning which will include facial plastic/reconstructive surgery, head and neck, sleep medicine, general otolaryngology, laryngology and rhinology. Panel topics include Management of Soft Tissue and Bony Facial Trauma, Responders vs Non-responders in OSA: Is It all About the Tongue?, Treatment of Vocal Fold Paralysis, and Lessons Learned During My Career in Rhinology. Friday afternoon activities include the Resident Bowl which has a new twist this year as all the teams have been asked to dress as their school mascots! Come and cheer for your favorite team and see if you are as smart as the residents. The Thesis Seminar for candidates and prospective candidates will be given by Drs. Maureen Hannley and Dana Thompson. The American Society of Geriatric Otolaryngology will hold a scientific session on Friday afternoon. On Saturday we will have concurrent sessions on pediatric otolaryngology, otology, general ENT, and head and neck including panels on Avoiding Pitfalls of Parathyroid Surgery, Preparing for Practice: Is Fee for Service Dying?, Management of Pediatric "Sinusitis", and Management Options for SNHL. Of interest to all attendees will be "Is Subspecialization Challenging or Strengthening Otolaryngology?" and "What We Want and Need from our Faculty/Residents" with viewpoints presented by both faculty and residents.

Ralph B. Metson, MD FACS
Eastern Section Vice President

Kathleen L. Yaremchuk, MD MSA
Middle Section Vice President

Stilianos E. Kountakis, MD PhD FACS
Southern Section Vice President

Scott C. Manning, MD FACS
Western Section Vice President

Meeting Overview

Wednesday - January 21

2:00 pm - 7:00 pm	Exhibitor Set Up - Ballroom
4:00 pm - 7:00 pm	Poster Set Up - Ballroom
5:00 pm - 8:00 pm	Speaker Ready Room - Garden
5:00 pm - 8:00 pm	Registration - Crystal

Thursday - January 22

7:00 am - 5:00 pm	Speaker Ready Room - Garden
7:00 am - 6:00 pm	Registration - Crystal
7:30 am - 8:30 am	Continental Breakfast - Ballroom
7:00 am - 9:30 am	Poster Set Up - Ballroom
7:30 am - 3:30 pm	Exhibits open - Ballroom
7:30 am - 3:30 pm	Spouse Hospitality - Ballroom
8:00 am - 12:05 pm	SCIENTIFIC SESSION - Crown
9:30 am - 5:15 pm	Poster viewing - Ballroom

Meeting Overview continued

Thursday - January 22 (continued)

12:10 pm - 1:15 pm	Lunch - Ballroom
12:10 pm - 1:15 pm	Physician/Scientist Meeting - Executive Board Room (by invitation)
1:15 pm - 5:10 pm	SCIENTIFIC SESSIONS - Crown and California Cabanas
5:15 pm - 6:30 pm	Vice Presidents Welcome Reception - Sundeck (Outdoors)

Friday - January 23

7:00 am - 2:00 pm	Speaker Ready Room - Garden
7:00 am - 12:30 pm	Registration - Crystal
7:00 am - 7:50 am	Southern Section Business Meeting - Continental
7:00 am - 7:50 am	Western Section Business Meeting - Windsor Complex
7:30 am - 8:30 am	Continental Breakfast - Ballroom
7:30 am - 11:00 am	Exhibits open - Ballroom
7:30 am - 12:30 pm	Poster viewing - Ballroom
7:30 am - 11:00 am	Spouse Hospitality - Ballroom
8:00 am - 12:15 pm	SCIENTIFIC SESSIONS - Crown and California Cabanas
12:30 pm - 2:00 pm	Thesis Seminar (candidates and potential candidates) - Windsor Complex
12:30 pm - 2:00 pm	RESIDENT BOWL - Coronet
12:30 pm - 5:00 pm	ASGO Scientific Session - California Cabanas
12:30 pm	Golf Outing (off site) - pre-registration required
Evening	ALA Council Meeting - Executive Board Room

Saturday - January 24

7:00 am - 4:30 pm	Speaker Ready Room - Garden
7:00 am - 6:00 pm	Registration - Crystal
7:00 am - 7:50 am	Eastern Section Business Meeting - Windsor Complex
7:00 am - 7:50 am	Middle Section Business Meeting - Continental
7:30 am - 8:30 am	Continental Breakfast - Ballroom
7:30 am - 1:15 pm	Exhibits open - Ballroom
7:30 am - 7:00 pm	Poster viewing - Ballroom
7:30 am - 1:15 pm	Spouse Hospitality - Ballroom
8:00 am - 11:45 am	SCIENTIFIC SESSIONS - Crown and California Cabanas
11:45 am - 1:00 pm	Lunch - Ballroom
11:45 am - 1:00 pm	Laryngoscope AE/SE Meeting - Executive Board Room
1:00 pm - 4:30 pm	SCIENTIFIC SESSION - Crown
4:45 pm	MEETING ADJOURNS
5:00 pm - 9:00 pm	Meet the Authors Poster Reception and Wrap-Up Party - Ballroom

Combined Sections Meeting
Hotel del Coronado
Coronado Island, California
January 22-24, 2015

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:

- Perform appropriate tonsillectomy techniques according to indications
- Identify the criteria and techniques for sialoendoscopy
- Identify appropriate indications and procedures for surgical salvage of recurrent head and neck tumors
- Better manage the medical and surgical treatment of complications of chronic ear disease
- Defining the need for outpatient balloon sinuplasty
- Realize new role of genetics in the customized treatment of neck cancer
- Better manage the treatment of vocal cord paralysis
- Realize the multiple factors involved with pediatric sinusitis and proper treatment methods
- Better manage surgical challenge of difficult parathyroid surgery.
- Identify the changing needs within a residency training program

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 providership of the American College of Surgeons and the Triological Society. The American College of 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 16.5 *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

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 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

Triological Society Thesis Seminar

This seminar is aimed at Triological Society active candidates as well as those interested in pursuing Active Fellowship in the Triological Society. Seminars are open to Triological Society Fellows. In this seminar, candidates will learn how to select and focus an appropriate topic and research question, how to select a study design based on the research question, select variables, and some basic principles of study conduct. The seminar will also present some useful tips on organizing, analyzing, and presenting the data, and sources of funding for continued investigation. The seminars will be conducted by Maureen Hannley, PhD, a research mentor in otolaryngology-head and neck surgery.

The Seminar will be held immediately following the morning scientific session on Friday, January 23rd.

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Tenafly, NJ

Disclosure Information

Triological Society 2015 Combined Sections Meeting
January 22-24, 2015
Coronado, California

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)
Faisal I. Ahmad, MD	X	
Aadil Ahmed, MD	X	
Amir Allak, MD MBA	X	
William B. Armstrong, MD FACS	X	
Kimberly J. Atiyeh, MD	X	
Douglas D. Backous, MD FACS		Cochlear Corporation, LLC (honorariums by event-surgical advisory board)
Andrew Blitzer, MD DDS FACS	X	
Derald E. Brackmann, MD	X	
Carol R. Bradford, MD FACS	X	
Col. Joseph A. Brennan, MD FACS	X	
Jacob R. Brodsky, MD	X	
Craig A. Buchman, MD FACS		Advanced Bionics Corp (honoraria-surgical advisory board member); Cochlear Corp (honoraria-surgical advisory board member)
Paige E. Bundrick, MD	X	
James A. Burns, MD FACS	X	
Alexander J. Caten, MD	X	
Mohamad R. Chaaban, MD	X	
Kenny H. Chan, MD FACS	X	
Kay W. Chang, MD		Anidapharma (nothing so far-consultant); Gobiquity (options currently worthless-scientific advisory board); Oticon Medical (honorarium, travel costs-speaker); PEAK Surgical (options vested < $2000-consultant)
Hamad Chaudhary, MD	X	
Dinesh K. Chhetri, MD	X	
Sukgi S. Choi, MD FACS	X	
Daniel I. Choo, MD FACS	X	

Susan R. Cordes, MD FACS	X	
Mark S. Courey, MD	X	
Francis Creighton, MD	X	
Michael J. Cunningham, MD FACS	X	
Subinoy Das, MD FACS		Acclarent Corporation ($2000 + travel expenses-speaker, 2013 presented a lecture on Ethical Interactions with Academic Physicians during 2013 National Sales Meeting); ARS/AAO (several hundred thousand dollars-committee leadership for ARS and AAO-HNS which have received several hundreds of thousands of dollars of corporate support since 2008 from multiple balloon device companies); Entellus Corporation ($0-2014 received advice on developing and improving my practice website); Johnson and Johnson ($0-2013-present engaged in discussions and received advice on developing and potentially selling Intellectual Property/Corporation to J&J); Multiple balloon device companies ($250-2008-2014 have occasionally gone out to lunches/dinners with multiple balloon device companies to discuss use of their products over past 6 years)
Karthik Devarajan, BSc	X	
Nicholas A. Dewyer, MD	X	
Donald T. Donovan, MD FACS	X	
Sigsbee W. Duck, MD FACS	X	
David R. Edelstein, MD FACS	X	
Zarmina Ehsan, MD	X	
Charles A. Elmaraghy, MD	X	
Michael Friedman, MD FACS		Imthera Medical (research grand advisor)
Rick A. Friedman, MD PhD	X	
David R. Friedmann, MD	X	
Jessica R. Gandy, BS	X	
C. Gaelyn Garrett, MD	X	
George A. Gates, MD	X	
Eric M. Genden, MD FACS	X	
Marion Boyd Gillespie, MD MSc FACS		Inspire Medical (research grant-consultant); Medtronic (research grant-consultant); Olympus (research grant-consultant); Surgical Specialties (research grant-consultant)
Douglas A. Girod, MD FACS	X	
Cristian Daniel Gonzalez, BS BA	X	
Christine G. Gourin, MD FACS	X	
Joshua B. Greene, MD	X	
Scott A. Hardison, MD	X	
Earl H. Harley, MD	X	
Willard C. Harrill, MD FACS	X	
Jeffrey P. Harris, MD PhD FACS	X	
Henry T. Hoffman, MD	yes	Cook Medical (travel and compensation for research and development; provision of research equipment - consultant)
Eric H. Holbrook, MD	X	
Peter H. Hwang, MD FACS		Intersect (ownership interest-consultant); Medtronic (honorarium-consultant); Sinuwave (honorarium-consultant); Xoran (honorarium-consultant)
Euna Hwang, MD	X	
Leslie E. Irvine, MD	X	
Stacey L. Ishman, MD MPH	X	
Jonas T. Johnson, MD FACS	X	
Arjun S. Joshi, MD FACS		Cook Medical (one time grant-consultant)
Steven R. Kapeles, BS	X	
Robert M. Kellman, MD FACS	X	
Robert C. Kern, MD FACS	X	
Bradley W. Kesser, MD		Nasco, Inc. (royalty for an ear simulator I and my UVA colleagues patented and licensed not applicable to chronic ear disease-inventor)
Eric J. Kezirian, MD		Inspire Medical Systems (fee-consultant); Magnap (intellectual property rights co-inventor); Nyxoah (consulting fee/ownership interest-consultant/advisory committee); Revent Medical (consulting fee/ownership interest-consultant/advisory board); Split Rock Scientific (ownership interest-consultant/advisory committee)

Stilianos E. Kountakis, MD PhD FACS	X	
Dennis H. Kraus, MD FACS	X	
Greg A. Krempl, MD FACS	X	
John F. Kveton, MD FACS	X	
Paul R. Lambert, MD FACS	X	
Pierre Lavertu, MD FACS	X	
Kenneth H. Lee, MD PhD	X	
Victoria S. Lee, MD	X	
Samuel C. Levine, MD FACS		OtoMed (royalty for suction irrigation tubing set); Preceptis Medical (paid scientific advisor)
Paul A. Levine, MD FACS	X	
Sean M. Lewis, MD	X	
Nikhil S. Limaye, BS	X	
Ho-Sheng Lin, MD FACS		Intuitive Surgical (honorarium-consultant, proctor)
Robin W. Lindsay, MD	X	
Wei Liu, MD	X	
Daniel D. Lydiatt, MD FACS	X	
Scott C. Manning, MD FACS	X	
Jesus E. Medina, MD FACS	X	
Ritvik P. Mehta, MD	yes	Turtle Beach Corporation (consulting fees - consultant)
Josh C. Meier, MD	X	
Ralph B. Metson, MD FACS	X	
Alan G. Micco, MD FACS	X	
Kris S. Moe, MD FACS		SPI Surgical, LLC (equity holder-founder, board of directors)
Patrick D. Munson, MD	X	
Alexander W. Murphey, BS	X	
Andrew H. Murr, MD FACS		IntersectENT (minor stockholder-consultant)
Cherie-Ann Nathan, MD FACS	X	
John R. Neiner, MD	X	
James L. Netterville, MD FACS	X	
John K. Niparko, MD	X	
Clara M. Olcott, MD	X	
Quinn Orb, BA	X	
David Oshinsky, PhD	X	
Fred D. Owens, MD	X	
Blake C. Papsin, MD FACS	X	
Stephen S. Park, MD	X	
Steven M. Parnes, MD FACS	X	
Myles L. Pensak, MD FACS	X	
Mark S. Persky, MD FACS	X	
Michael J. Persky, MD	X	
James D. Phillips, MD	X	
Kristina Piastro, MD	X	
Harold C. Pillsbury, MD FACS	X	
Karen T. Pitman, MD FACS	X	
Dennis S. Poe, MD PhD FACS	X	
Patricia L. Purcell, MD	X	
Hassan H. Ramadan, MD FACS	X	
Aaron K. Remenschneider, MD	X	
Lauren T. Roland, MD	X	
Maya G. Sardesai, MD Med	X	
Steven D. Schaefer, MD FACS	X	
Zachary G. Schwam, BA	X	
Andrew R. Scott, MD FACS	X	
Michael D. Seidman, MD FACS		AAO-HNS (board of directors leadership role); Body Language Vitamins (royalties roled back into company-founder); Henry Ford Health System (salary-physician); NIH (research funding-simulation work); ViSalus Sciences (royalty-off label several products I developed)
Maroun T. Semaan, MD	X	
Brent A. Senior, MD FACS		Intersect ENT (fee-consultant); Karl Storz (fee-teacher); Laurimed (fee-consultant); Olympus (fee-consultant); Sinuwave (fee-consultant)
Michael Setzen, MD FACS		Meda (speakers bureau); Teva (speakers bureau)
Janki Shah, BA	X	

William W. Shockley, MD FACS	X	
Marshall E. Smith, MD FACS	X	
Joseph C. Sniezek, MD FACS	X	
Satyan B. Sreenath, BS	X	
James A. Stankiewicz, MD FACS	X	
Shawn M. Stevens, MD	X	
David L. Steward, MD FACS	X	
Warren C. Swegal, MD	X	
Abtin Tabaee, MD	X	
Alice Tang, MD	X	
Sherard A. Tatum, MD FACS	X	
David J. Terris, MD FACS	X	
Betty S. Tsai, MD	X	
Jessica M. Van-Beek King, MD	X	
Richard W. Waguespack, MD FACS	X	
Mark K. Wax, MD	X	
Randal S. Weber, MD FACS	X	
D. Bradley Welling, MD PhD FACS	X	
Ashley E. Wenaas, MD	X	
Lauren Crosby White, MD	X	
Brian J.F. Wong, MD PhD		Aerin Medical, Inc (licensed IP); Lockheed-Martin Corporation (grant); OCT Medical Imaging (grant); Praxis BioSciences, Inc (equity); Silhouette Medical, Inc (equity)
Peak Woo, MD FACS	X	
Kathleen S. Yaremchuk, MD MSA	X	
Joshua C. Yelverton, MD	X	
Soroush Zaghi, MD	X	
Adam M. Zanation, MD	X	

PLANNING COMMITTEE	NOTHING TO DISCLOSE	DISCLOSURE (All commercial relationships)
Pete S. Batra, MD FACS		Medtronic (consultant); Merck (scientific advisory board)
Andrew Blitzer, MD DDS FACS		Allergan, Inc. (unrestricted research funding - researcher); Ipsen Pharmaceutical (honorarium - consultant); Merz Pharmaceuticals (unrestricted research funding honoraria - researcher, consultant)
Carol R. Bradford, MD FACS	X	
Kay W. Chang, MD		Anidapharma (consultant); Oticon (honorarium - speaker); PEAK Surgical (fee - consultant)
Michael J. Cunningham, MD FACS	X	
Donald T. Donovan, MD FACS	X	
Robert L. Ferris, MD PhD FACS	X	
Michael Friedman, MD FACS		ImThera (honorarium - advisory board)
C. Gaelyn Garrett, MD	X	
Eric M. Genden, MD FACS	X	
Eric H. Holbrook, MD	X	
Peter H. Hwang, MD FACS		Intersect (ownership interest - consultant); Medtronic (fee - consultant); Sinuwave (fee - consultant); Xoran (fee - consultant)
Stacey Lynn Ishman, MD MPH	X	
Bradley W. Kesser, MD		Nasco, Inc. (royalty - inventor, patent holder)
Eric J. Kezirian, MD		Apnex Medical (fee - consultant, medical advisory board); Berendo Scientific (ownership interest, intellectual property rights - consultant); Inspire Medical Systems (fee - consultant); Magnap (intellectual property rights - consultant); Split Rock Scientific (ownership interest - consultant)
Stilianos E. Kountakis, MD PhD FACS		Acclarent (honorarium - speaker); Teva (honorarium - speaker)
Pierre Lavertu, MD FACS	X	
Scott C. Manning, MD FACS	X	
Cliff A. Megerian, MD FACS		Cochlear Americas (travel reimbursement - surgeon's advisory board); Grace Medical (royalty agreement - inventor)
Albert L. Merati, MD FACS	X	
Ralph B. Metson, MD FACS	X	
Alan G. Micco, MD FACS	X	
Kris S. Moe, MD FACS		Spi Surgical (founder, shareholder - speaker)
Andrew H. Murr, MD FACS		Allakos (consultant); Intersect ENT (consultant, minor stockholder)
John Kim Niparko, MD	X	

Steven M. Parnes, MD FACS	X	
Mark S. Persky, MD FACS	X	
Dennis S. Poe, MD PhD FACS		Acclarent, Inc. (honorarium, fees - consultant)
Hassan H. Ramadan, MD FACS	X	
Brent A. Senior, MD FACS		Intersect ENT (fee - consultant); Karl Storz (travel grant - speaking and teaching); Olympus (fee - consultant); Sinuwave (fee - consultant)
William W. Shockley, MD FACS	X	
Scott P. Stringer, MD FACS		Intersect ENT (fee - research study grading)
Sherard A. Tatum, MD FACS	X	
David J. Terris, MD FACS		Johnson & Johnson (honorarium - director thyroid course)
Dean M. Toriumi, MD FACS	X	
Peak Woo, MD FACS	X	
Kathleen L. Yaremchuk, MD MSA	X	

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Triological Society Research Grant Programs

The Society continues to promote research into the causes of and treatments for otolaryngic diseases by providing financial support for the research efforts of young otolaryngologists-head and neck surgeons. The Society has awarded in excess of $4 million to otolaryngologists-head and neck surgeons in support of clinical and basic research. These competitive research grant programs have included funding for resident research projects, research training grants, and career development grants.

The Society's research grant programs include Research Career Development Awards and Clinical Scientist Development Awards. New programs may be announced this spring.

Research Career Development Awards: Are available to otolaryngologists who hold full-time, part-time and contributed service medical school faculty appointments. Awards provide support for research career development for up to $40,000 of support over a one or two year period. Additional information will be available this Spring at www.triological.org.

The 2014-2015 Research Career Development Awardees and their funded projects are:

- Simon R.A. Best, MD - *Therapeutic DNA Vaccine for Recurrent Respiratory Papillomatosis*
- Matthew L. Bush, MD - *Promoting Early Congenital Hearing Loss Diagnosis with Patient Navigation*
- Jolie L. Chang, MD - *Plasticity of Binaural Integration in Asymmetric Sensorineural Hearing Loss*
- Jeremy Meier, MD - *Improving Value in Pediatric Tonsillectomy through Shared Decision Making*
- Aaron C. Moberly, MD - *Personalizing Aural Rehabilitation for Adults with Cochlear Implants*
- Stephanie S. Smith, MD - *Acute Rhinosinusitis Complications: Risks and Role of Prior Antibiotics*

Clinical Scientist Development Awards: The Triological Society and the American College of Surgeons combined competitive grant program provides supplemental funding to otolaryngologists-head and neck surgeons who have received a new NIH Mentored Clinical Scientist Development Award (K08/K23) or have an existing award with a minimum of 3 years remaining in the funding period. This award is a means to facilitate the research career development of otolaryngologists with the expectation that the awardee will have sufficient pilot data to submit a competitive R01 proposal prior to the conclusion of the K award. This award provides financial support in the amount of $80,000 per year for up to five years, or for the remainder of the term of existing grants, to supplement the K08/K23 award.

The 2014-2015 Triological/American College of Surgeons Clinical Scientist Development Awardees (TRIO/ACS) and their funded projects are:

- New--Akihiro J. Matsuoka, MD PhD - *Nanotechnological Regeneration of Spiral Ganglion Neurons with Human Stem Cells*
- Renewal--Devraj Basu, MD PhD - *Targeting Mesenchymal-like Cells in Oral Cancer to Overcome Cetuximab Resistance*
- Renewal--Frank R. Lin, MD PhD - *Hearing Loss and Aging*
- Renewal--Bruce Kuang-Huay Tan, MD - *Role of B-cell Mediated Inflammation in Chronic Rhinosinusitis with Nasal Polyps*

The 2014-2015 Triological Society Clinical Scientist Development Awardee and his funded project is:

- Renewal--Benjamin T. Crane, MD PhD - *Visual and Vestibular Perceptions of Motion*

Guidelines and additional information are available at the Triological website - www.triological.com/researchgrants.html

Guests of Honor

Eastern Section - Dennis S. Poe, MD PhD FACS, Boston, MA
Middle Section - James A. Stankiewicz, MD FACS, Maywood, IL
Southern Section - Harold C. Pillsbury, MD FACS, Chapel Hill, NC
Western Section - George A. Gates, MD, Boerne, TX

Citation Awardees

Eastern Section - Richard E. Gliklich, MD, Boston, MA
Vicente Honrubia, MD, Los Angeles, CA
Paul H. Ward, MD, Pauma Valley, CA

Middle Section - Michael S. Benninger, MD FACS, Cleveland, OH
Michael Friedman, MD FACS, Chicago, IL
Pell A. Wardrop, MD, Lexington, KY

Southern Section - Joseph B. Jacobs, MD, New York, NY
Brent A. Senior, MD FACS, Chapel Hill, NC
David J. Terris, MD FACS, Augusta, GA

Western Section - Lanny Garth Close, MD FACS, New York, NY
Peter S. Roland, MD, Dallas, TX
Steven D. Schaefer, MD FACS, New York, NY

Keynote Speaker

David Oshinsky, PhD, New York, NY

Patrick E. Brookhouser, MD Award of Excellence

Robert H. Miller, MD MBA FACS, Houston, TX

Resident Research Awardees

Eastern Section -

Francis Creighton, MD - Harvard - William W. Montgomery, MD Resident Research Award
Sean M. Lewis, MD - SUNY Downstate HSC - John J. Conley, MD Resident Research Award
Kristina Piastro, MD - Albany Medical Center - Richard J. Bellucci, MD Resident Research Award

Middle Section -

Matthew S. Hensler, MD - University of Cincinnati - Dean Lierle, MD Resident Research Award
Trung N. Le, MD PhD - University of Manitoba - Joseph Ogura, MD Resident Research Award
Lauren T. Roland, MD - Washington University - John R. Lindsay, MD Resident Research Award

Southern Section -

Deepa Danan, MD MBA - University of Virginia - Lloyd Storrs, MD Resident Research Award
Nathan E. Pierce, MD - University of Florida - Francis E. LeJeune Sr., MD Resident Research Award
Lauren Crosby White, MD - Georgia Regents University - James Harrill, MD Resident Research Award

Western Section -

Aaron J. Feinstein, MD MHS - University of California - Vice President's Resident Research Award
Ryan P. Goepfert, MD - University of California, San Francisco - Shirley Baron Resident Research Award

THE TRIOLOGICAL SOCIETY
COMBINED SECTIONS MEETING PROGRAM
JANUARY 22-24, 2015, HOTEL DEL CORONADO
SAN DIEGO, CALIFORNIA

THURSDAY, JANUARY 22, 2015

CROWN ROOM

8:00 **Welcome by Vice Presidents**

8:05 **Eastern Section Guest Introductions - Ralph B. Metson, MD, Boston, MA**
Citation Awardees: Vicente Honrubia, MD, Los Angeles, CA
Paul H. Ward, MD, Pauma Valley, CA
Richard E. Gliklich, MD, Boston, MA

Guest of Honor: Dennis S. Poe, MD PhD FACS, Boston, MA
From Bench to Evidence-Based Bedside

Southern Section Guest Introductions - Stilianos E. Kountakis, MD PhD FACS, Augusta, GA

Citation Awardees: Joseph B. Jacobs, MD, New York, NY
Brent A. Senior, MD FACS, Chapel Hill, NC
David J. Terris, MD FACS, Augusta, GA

Guest of Honor: Harold C. Pillsbury, MD FACS, Chapel Hill, NC
The Evolution of Training in Otolaryngology Head and Neck Surgery

Western Section Guest Introductions - Scott C. Manning, MD, Seattle, WA
Citation Awardees: Lanny Garth Close, MD FACS, New York, NY
Steven D. Schaefer, MD FACS, New York, NY
Peter S. Roland, MD, Dallas, TX

Guest of Honor: George A. Gates, MD, Boerne, TX
Collegiality - Clinical Research Takes a Village

Middle Section Guest Introductions - Kathleen L. Yaremchuk, MD MSA, Detroit, MI

Citation Awardees: Michael S. Benninger, MD FACS, Cleveland, OH
Michael Friedman, MD FACS, Chicago, IL
Pell A. Wardrop, MD, Lexington, KY

Guest of Honor: James A. Stankiewicz, MD FACS, Maywood, IL
Honesty in ENT

9:05 **Presidential Address: Changing Goals in Neurotology**
Derald E. Brackmann, MD, Los Angeles, CA

9:20 **Presentation of Third Annual Patrick E. Brookhouser, MD Award of Excellence (by Jonas T. Johnson, MD FACS)**
Robert H. Miller, MD MBA FACS, Houston, TX

9:30 - 10:00 ***Break with Exhibitors/Poster Viewing - Ballroom***

10:00 - 12:05 GENERAL SESSION

CROWN ROOM

Moderators: Stilianos E. Kountakis, MD PhD FACS, Augusta, GA
Ralph B. Metson, MD, Boston, MA

10:00 **Triological Society Thesis 2014 Honorable Mention**
Regional Variations in the Presentation and Surgical Management of Pierre Robin Sequence
Andrew R. Scott, MD FACS, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to describe how isolated Pierre Robin sequence may present at higher rates in certain ethnicities. Participants should also be able to understand how the choice of surgical airway intervention for airway and feeding problems related to Pierre Robin sequence may vary between geographic regions of the United States.

Objectives: To estimate the current birth prevalence of isolated and syndromic Pierre Robin sequence (iPRS and sPRS), including demographic variations. To assess for regional variations in surgical airway interventions for PRS, and to determine the mean length of stay (LOS), cost of admission, complication rate, and rate of associated procedures related to tongue-lip adhesion (TLA), neonatal mandibular distraction osteogenesis (MDO), and tracheotomy. **Study Design:** Retrospective cross-sectional study. **Methods:** The 2006 and 2009 Kids Inpatient Databases were used to identify newborns and infants with PRS; analysis using cross tabulations and linear regression modeling was performed. **Results:** In 2006 and 2009, the estimated birth prevalence of iPRS was 1.8:10,000 live births and sPRS 1.4:10,000 live births. The highest rate was in whites and the lowest in non-Hispanic blacks. There were 145 TLAs (36%), 176 MDOs (43%), and 85 tracheotomies (21%). The Northeast favored a TLA strategy; the Midwest favored MDO. The mean LOS for TLA was 24.5 days, MDO 36.7 days, tracheotomy (iPRS) 44.9 days, and tracheotomy (sPRS) 53.0 days. **Conclusions:** The birth prevalence of PRS may be higher than previously described, especially in whites. Surgical management strategies vary between regions. The overall cost of a TLA admission is lower than an MDO or tracheotomy admission, owing primarily to shorter LOS. This study was limited by not taking into account outpatient expenses (nursing care, monitoring) or need for further airway/feeding intervention over subsequent admissions.

10:10 **Triological Society Thesis 2014 Honorable Mention**
Ephs and Ephrins in Cochlear Innervation and Implications for a Biological Approach to Advancing Cochlear Implant Function
Kenneth H. Lee, MD PhD, Plano, TX

Educational Objective: At the conclusion of this presentation, the participants should be able to: 1) Identify that disruption of Eph/ephrin signalling results in anatomical anomalies in cochlear innervation and functional loss of hearing in mice. 2) Understand that application of this finding may provide the basis for a biological approach to improving cochlear implant function.

Objective: Determine if the neuronal pathfinding cues resulting from Eph/ephrin interaction in the inner ear play a role in establishing the tonotopic innervation of the cochlea. **Study Design:** Protein expression of Ephs and ephrins was evaluated in the inner ear of mice and chicks. Subsequently, *in vitro*, *in vivo*, and functional electrophysiologic studies were performed to indicate that Ephs and ephrins play a role regulating the normal innervation patterns in the mouse inner ear. **Methods:** Eph and ephrin protein expression was identified in the inner ear by western blotting and localized by fluorescence immunohistochemisty and X-gal staining. Eph/ephrin effects on neruite outgrowth was assesed via co-culture with EphB2 expressing COS-1 cells. Anatomic effects of disrupting Eph/ephrin signalling on cochlear innervation was determined with lipophillic dye tracing and functional effects with Auditory Brainstem Response. **Results:** Expression of several different Ephs and ephrins were found in the inner ear of chicks and mice. The changes in ephrin A2 immunoreactivity after gentamicin ototoxicity coincides with spatio-temporal pattern of hair cell loss and regeneration in the chick cochlea. EphB2 inhibited outgrowth of spiral ganglion cell neurites. Knockout mice with null function of EphB1, EphB2, and EphB3 demonstrated abnormal inner ear innervation and elevated ABR thresholds indicating hearing loss. **Conclusions:** Ephrin A2 may be involved in the guidance of ganglion cells to hair cells in the chick. Disruption of Eph/ephrin signalling results in abnormal innervation and hearing loss, suggesting that these proteins play a role in establishing normal innervation patterns in the mouse cochlea.

10:20 - 11:15 **HOW I DO IT**

Moderator: Michael Friedman, MD FACS, Chicago, IL

Panelists:
Overview of Tonsillectomy Techniques
Sukgi S. Choi, MD FACS, Pittsburgh, PA
Sialoendoscopy
Arjun S. Joshi, MD FACS, Washington, DC
Cultivating Patient Trust and Rapport
Mark S. Persky, MD FACS, New York, NY

11:15 **Q&A**

11:20 - Noon **KEYNOTE ADDRESS**
Polio: A Look Back at American's Most Successful Public Health Crusade
David Oshinsky, PhD, Director, Division of Medical Humanities, NYU, New York, NY

Q&A

12:10 - 1:15 ***Lunch - Ballroom***

1:15 - 3:05 CONCURRENT SESSION 1
HEAD & NECK

CROWN ROOM

Moderators: William B. Armstrong, MD FACS, Irvine, CA
Daniel D. Lydiatt, MD FACS, Omaha, NE

1:15 **Effect of Quality and Short and Long Term Outcomes of Laryngeal Cancer Care in the Elderly**
Christine G. Gourin, MD MPH, Baltimore, MD; Heather M. Starmer, MA CCC-SLP, Baltimore, MD; Robert J. Herbert, BS, Baltimore, MD; Amanda L. Blackford, ScM, Baltimore, MD; David W. Eisele, MD, Baltimore, MD; Sydney M. Dy, MD MSc, Baltimore, MD

Educational Objective: At the conclusion of this presentation, the participants should be able to explain the association between higher quality care, short and long term airway and swallowing outcomes, and costs of care in elderly larynx cancer patients.

Objectives: To examine associations between quality of care, short term and long term treatment related outcomes, and costs in elderly patients treated for laryngeal squamous cell cancer (SCCA). **Study Design:** Retrospective analysis of Surveillance, Epidemiology, and End Results (SEER)-Medicare data. **Methods:** We evaluated longitudinal data from 2,370 patients diagnosed with laryngeal SCCA from 2004-2007 using cross tabulations, multivariate regression, and survival analysis. Using quality indicators derived from guidelines for recommended care and performance measures, an overall summary measure of quality was calculated incorporating summary quality measures for diagnosis, initial treatment, performance, surveillance, treatment for recurrence, and end of life care. **Results:** Higher quality care was associated with a lower likelihood of long term weight loss (OR=0.6 [0.5-0.8]), stricture (OR=0.5 [0.3-0.8]), gastrostomy (OR=0.5 [0.4-0.7]), airway obstruction (OR=0.7 [0.6-0.9]), tracheostomy (OR=0.5 [0.3-0.7]), and pneumonia (OR=0.7 [0.5-0.9]), but had no impact on the likelihood of dysphagia. Higher quality care was associated with lower risk of death in patients with dysphagia (HR=0.7 [0.6-0.8]), weight loss (HR=0.8 [0.6-0.9]), airway obstruction (HR=0.7 [0.6-0.8]), tracheostomy (HR=0.7 [0.5-0.9]), and pneumonia (HR=0.8 [0.6-0.9]), but was not associated with differences in survival in patients with gastrostomy or stricture. Costs associated with dysphagia, weight loss, stricture, airway obstruction, and pneumonia were lower for patients receiving higher quality care. **Conclusions:** Higher quality larynx cancer care was associated with a reduced incidence of airway and swallowing impairment after laryngeal SCCA treatment in elderly patients, with improved survival and reduced costs. These data suggest that greater attention to evidence based practices associated with quality indicators may lead to improved functional outcomes in the elderly.

1:22 **Socioeconomic Factors Affect Outcomes in Well Differentiated Thyroid Cancer**
Warren C. Swegal, MD, Detroit, MI; Edward L. Peterson, PhD, Detroit, MI; Steven S. Chang, MD, Detroit, MI

Educational Objective: At the end of this presentation, the participant should be able to better understand the affects socioeconomic status has on the potential outcomes of well differentiated thyroid cancer, and improve their ability to educate and manage patients of variable socioeconomic backgrounds.

Objectives: The effects of socioeconomic status on the incidence and diagnosis of well differentiated thyroid cancer (WDTC) are well

researched. However, the association between a patient's socioeconomic status and cancer outcomes is not well delineated. Our objective was to determine if socioeconomic standing affected outcomes of WDTC. **Study Design:** Retrospective database review. **Methods:** Patient information was obtained from a regional database of thyroid cancer. The 2000 US Census data was used to obtain socioeconomic data including area median household (HH) income, % below poverty line (%BPL), median HH size, % rent vs own, and general demographics. Survival was the primary outcome. Disease specific survival was also calculated. Cox proportional hazards for each factor were calculated and a multivariate analysis was also performed. **Results:** There were 1507 patients with WDTC. Median HH income (0.85 HR, change of $10,000), HH size (1.49 HR, change of 1), age (1.97 HR, change of 10 yrs) and gender (0.50 HR for females) were significantly associated with survival after multivariate analysis. Controlling for stage revealed %BPL (0.51 and 1.28 HR, change in 10%, for stages I and IV respectively) and median HH income (0.84 HR, change of $10,000 for stage III) to be significant factors in survival. **Conclusions:** Diagnosis and incidence of WDTC are affected by socioeconomic factors. However, when presenting stage is controlled for, both median HH income and %BPL are also significantly associated with outcomes. This suggests that a patient's economic background and residence, along with age and gender, affect their outcomes.

1:29 **Clinical and Quality of Life Outcomes following Gland Preserving Surgery for Chronic Sialadenitis**
M. Boyd Gillespie, MD, Charleston, SC; Brendan P. O'Connell, MD, Charleston, SC; Jordan W. Rawl, MD, Charleston, SC; Conor W. McLaughlin, MD, San Francisco, CA; William W. Carroll, MD, Charleston, SC; Shaun A. Nguyen, MD, Charleston, SC

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the impact of gland preserving therapy on patient salivary specific qaulity of life.

Objectives: Gland preserving salivary surgery utilizing salivary endoscopy has been proposed as a treatment alternative in the management of chronic sialadenitis. This study seeks to determine medium term clinical and quality of life outcomes following a gland preserving approach for chronic sialadenitis. **Study Design:** Cross-sectional survey with retrospective chart review. **Methods:** All patients undergoing attempted gland preserving salivary surgery with salivary endoscopy for chronic sialadenitis at a tertiary, academic salivary referral center between October 2008 and April 2013 were identified from a quality assurance database. A research database was constructed to examine clinical factors of interest. A clinical outcomes and quality of life survey was mailed to all eligible patients in order to obtain long term followup data. **Results:** 206 of 306 (67%) eligible patients returned the survey. The median length of followup was 17 months (3-54 months). The majority of patients (89%) endorsed symptom improvement after gland preserving therapy. Surgical excision was performed on 8% of affected glands. Patients with chronic sialadenitis due to stones reported a greater incidence of symptom resolution (p=0.0004) and more favorable quality of life outcomes (p=0.0001) than patients with non-stone etiologies. **Conclusions:** Patients undergoing gland preserving salivary surgery with salivary endoscopy for chronic sialadenitis have favorable long term symptom improvement and gland retention rates. Although patients with stones demonstrated the best outcomes, improvement was documented for all etiologies of chronic sialadenitis.

1:36 **The Role of Postoperative Hematoma in Free Flap Compromise**
Faisal I. Ahmad, MD, Portland, OR; Deniz Gerecci, MD, Portland, OR; Javier Gonzalez-Castro, MD, Portland, OR; Jessica J. Peck, MD MAJ, Fort Gordon, GA; Mark K. Wax, MD, Portland, OR

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the role hematomas play in free flap compromise.

Objectives: Hematomas may develop in the postoperative setting. When they occur, they can exert pressure on the surrounding tissue. Their effect on the vascular pedicle of a free flap is unknown. We describe our incidence of hematoma in free flaps and the outcome when the flap is compromised. **Study Design:** Retrospective chart review: 1883 free flaps between 1998 and 2014. **Methods:** Patients with free tissue transfer who developed a hematoma were evaluated. Etiology, demographic data and outcomes were evaluated. **Results:** One hundred thirty-four (7.1%) patients developed hematomas. Twenty (14.9%) of those had free flap compromise: mean time to flap compromise/hematoma was 48.6 hrs. Vessel thrombosis was: artery (1), vein (7), both (4), none (8). The salvage rate was 75% compared to 54% in 79 flaps with compromise from other causes (P=0.13). The mean time to detection of the hematoma was 35.3 hours in salvaged flaps compared to 91.6 hours in unsalvageable flaps(P=0.057). Time to operating room from detection was 2.8 hours in salvageable flaps compared to 12.4 hours in non-salvageable flaps (P=0.053). Vascular thrombosis predicted survival 6.6% vs 60% (P=0.03). **Conclusions:** In our series hematomas developed rarely. When they did 15% went on to develop flap compromise. Prompt recognition allowed for a high salvage rate. Vessel thrombosis predicted inability to salvage the flap.

1:43 **Postoperative 30 Day Morbidity and Mortality following Surgery for Oral Cavity Cancer: Analysis of 408 Cases**
Zachary G. Schwam, BA, New Haven, CT; Julie A. Sosa, MD MA, Durham, NC; Sanziana Roman, MD, Durham, NC; Benjamin L. Judson, MD, New Haven, CT

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss overall complication and mortality rates following surgery for oral cavity squamous cell carcinoma, explain the time course for specific adverse events, and compare independent risk factors for specific postoperative complications.

Objectives: To examine postoperative morbidity and mortality following surgery for oral cavity squamous cell carcinoma (OCSCC), including characterizing the nature and time course of specific adverse events and identifying risk factors for their occurrence. **Study Design:** Retrospective cohort study. **Methods:** Patients undergoing surgery for OCSCC were identified in the American College of Surgeons National Surgical Quality Improvement Program (2005-2010). Overall and disease specific complication and mortality data were analyzed using chi-square and multivariate analysis. **Results:** There were 408 cases identified. The overall complication and mortality rates were 20.8% and 1.0%, respectively. While most complications occurred during admission, post-discharge pneumonia occurred in 7.1% of cases, graft failure in 22.2%, and death in 25.0%. The majority of pneumonia cases occurred by postoperative day (POD) 8, reintubation by POD 9, and graft failure by POD 10. Smoking was a risk factor for ventilator dependence (OR 3.54, p=.009), return to the operating room (OR 2.93, p=.003), and graft failure (OR 6.92, p=.019). Neck dissection was associated with ventilator dependence (OR 5.70, p=.002), blood loss requiring transfusion (OR 5.44, p<.001), and graft failure (OR 11.27, p=.025). Chronic corticosteroid use was associated with postoperative mortality (OR 57.59, p=.017). **Conclusions:** Postoperative complications following surgery for OCSSC are common and varied, with most occurring during the admission period. However, over 15% of complications occur post-discharge. Further studies are needed to investigate interventions aimed at reducing such adverse events using the risk factors outlined above.

1:50 **Kaposi Sarcoma of the Head and Neck: Analysis of Survival in 1157 Cases**

Janki Shah, BA, Newark, NJ; Nishant Reddy, MD, Newark, NJ; Alejandro Vazquez, MD, Newark, NJ; Chan W. Park, MD, Newark, NJ

Educational Objective: At the conclusion of this presentation, the participants should be able to demonstrate an understanding of demographic features of Kaposi sarcoma of the head and neck and compare survival of patients by treatment modality and location of primary disease in the head and neck region.

Objectives: Kaposi sarcoma (KS) is a multifocal, angioproliferative disorder associated with human herpesvirus 8 (HHV8) infection that primarily presents at mucocutaneous sites, including the head and neck. In this study, we analyze various features of Kaposi sarcoma of the head and neck region using a national population based database. **Study Design:** Demographics, disease specific survival (DSS), and survival by treatment modality and location of disease in the head and neck were described for this rare tumor. **Methods:** The United States National Cancer Institute's Surveillance, Epidemiology, and End Results (SEER) registry was utilized to extract data regarding Kaposi sarcoma of the head and neck between 1973 and 2009. **Results:** A total of 1157 cases of Kaposi sarcoma of the head and neck were identified. Overall 5 year DSS was 29.2%. There was a statistically significant difference in the 5 year survival rate between patients who received surgery (41.59%) and those that did not (22.26%, p<0.0001). For Kaposi sarcoma localized to the oral cavity, there was a statistically significant difference in 5 year survival for patients who received surgery compared to those who received radiation therapy (44.07% vs 24.74%, p=0.0185). Prognosis was significantly better for the 50 years or greater age group relative to the youngest age group, 20-29 years (HR 0.69, p =0.0039). **Conclusions:** Our study profiles the demographic and disease specific parameters affecting survival for Kaposi sarcoma. For patients with isolated resectable lesions in the head and neck, surgery should be offered as the primary therapeutic option, especially for oral cavity lesions.

1:57 **How to Choose? Factors Associated with Pursuing an Open Approach to the Skull Base during the Endoscopic Era**

Adam M. Zanation, MD, Chapel Hill, NC; Allison A. Deal, MS, Chapel Hill, NC; Justin J. Miller, MD, Chapel Hill, NC

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the limitation of the endoscopic skull base approach and when an open approach may need to be utilized.

Objectives: As part of a comprehensive skull base program, open and endoscopic surgery play complementary roles. No study has quantitatively assessed the incidence and factors associated with pursuing an open, rather than endoscopic, approach to the skull base. **Study Design:** A retrospective comparative cohort study. **Methods:** 401 patients underwent 444 skull base surgeries over a four year period in a comprehensive skull base program. 116 (26%) were performed with standard open techniques. Multivariate Fisher's exact tests evaluated associations of reasons for an open approach with lesion histopathology and anatomic location. **Results:** Malignancies comprised 67 (58%) of open cases and the most common pathologies was squamous cell carcinoma (n=39). The open approach was most frequently utilized for lesions occupying the infratemporal fossa (ITF) (33%), ethmoid/cribriform (16%), maxillary sinus (11%), middle fossa (11%), frontal sinus (10%), and orbit (10%). The most common reasons for utilizing the open rather than endoscopic approach were involvement of the ITF/parotid (24%), skin (23%), orbit (15%), high frontal sinus (11%), and intradural involvement lateral to the cavernous sinus (10%). A significant decision trend was observed between reasons for open surgery and malignancy (p<0.05) with orbital involvement having high association with malignancy and high frontal sinus involvement was more associated with benign disease (p<0.005). Pathology at the cribriform was significantly associated with performing open surgery secondary to orbital involvement (p<0.0001). **Conclusions:** This is the first study to objectively evaluate the reasons why a skull base surgery was performed with an open or endoscopic approach. Significance associations with pathology/anatomic location and the surgical approach are demonstrated. This information aids in patient selection, skull base education and demonstrates the importance of all aspects (both endoscopic and open) of skull base surgery.

2:04 **Q&A**

2:10 - 3:05 **SURGICAL SALVAGE TREATMENT OF RECURRENT HEAD AND NECK TUMORS: SURGICAL/ETHICAL DILEMMA**
Moderator: Randal S. Weber, MD FACS, Houston, TX
Panelists: Dennis H. Kraus, MD FACS, New York, NY
Pierre Lavertu, MD FACS, Cleveland, OH
Cherie-Ann Nathan, MD FACS, Shreveport, LA
Karen T. Pitman, MD FACS, Gilbert, AZ

3:05 - 3:30 ***Break with Exhibitors/Poster Viewing - Ballroom***

1:15 - 3:05 CONCURRENT SESSION 2
OTOLOGY/NEUROTOLOGY

CALIFORNIA CABANAS

Moderators: Alan G. Micco, MD FACS, Chicago, IL
Dennis S. Poe, MD PhD FACS, Boston, MA

1:15 - 2:10 **MANAGING COMPLICATIONS OF CHRONIC EAR DISEASE**
Moderator: Harold C. Pillsbury, MD FACS, Chapel Hill, NC
Panelists: Bradley W. Kesser, MD, Charlottesville, VA
Cliff A. Megerian, MD FACS, Cleveland, OH
Michael D. Seidman, MD FACS, West Bloomfield, MI
D. Bradley Welling, MD PhD FACS, Boston, MA

2:10 **Sequential Bilateral Cochlear Implantation in the Adolescent Population**
David R. Friedmann, MD, New York, NY; Kelsey Ensor, MD, New York, NY; Janet Green, AuD, New York, NY; Yixin Fang, PhD, New York, NY; J. Thomas Roland, MD, New York, NY; Susan B. Waltzman, PhD, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to understand variables to be considered in evaluating the benefit of a sequential cochlear implant in the adolescent population.

Objectives: To examine the variables affecting post-implantation outcomes for sequential bilateral cochlear implantation patients in the adolescent population. **Study Design:** Retrospective chart review at tertiary care center. **Methods:** Main outcome measures were open set speech recognition tests at the word (CNC) and sentence levels in noise (HINT-N) in different test conditions with respect to the age at first and sequential implantation as well as the interval between implants. **Results:** Despite a mean age at sequential implantation of 13.5 years, sequential bilateral implanted adolescents revealed significant improvement in the CI2 ear. The mean time interval between implants was 8 years. A wide range of performance was noted and age at implantation and interval between CI1 and CI2 did not predict outcome. Mean CNC score with CI1 alone was 83%, with the sequential implant alone (CI2) was 56.5% and with bilateral implants 86.8%. Sentence scores (HINT in noise) were 89.5% for CI1, 74.2% for CI2, 94.4% for bilateral CI condition. The clinical relevance of these enhanced perception abilities requires attention to individual device use/disuse, performance with the first implant and testing beyond perception abilities. **Conclusions:** Bilateral sequential cochlear implantation leads to improved speech perception in the adolescent population, even after a long period of deafness and despite a prolonged interval between implants. Numerous factors affect ultimate outcome and the ability to predict the better performing ear. Individual factors revealed from such a cohort calls into question dogma related to predetermined limits on intervals between implantation and support individualized counseling in making such decisions. These data support other recent findings that central effects of unilateral cochlear implantation and stimulation may mitigate the prolonged deprivation of the sequentially implanted deaf ear.

2:17 **Audiometric Asymmetry as a Predictor of Tinnitus Laterality in Stapedectomy Patients**
Nicholas A. Dewyer, MD, San Francisco, CA; Ruwan Kiringoda, MD, San Francisco, CA; Jolie L. Chang, MD, San Francisco, CA; C.Y. Joseph Chang, MD, Houston, TX; Steven W. Cheung, MD, San Francisco, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the utility of interaural hearing threshold differences in predicting tinnitus laterality in stapedectomy patients, and begin to think about how stapedectomy may alter tinnitus laterality perception beyond changing hearing thresholds.

Objectives: To evaluate an audiometrically based tinnitus laterality predictive model in a stapedectomy cohort. **Study Design:** Prospective study. **Methods:** Thirty subjects undergoing stapedectomy completed the study between January 2012 and October 2013. Tinnitus surveys, audiometric data, and demographic information were collected prior to and 1 month after surgery. Tinnitus laterality was assessed using a visual analog scale. Audiometric asymmetry, defined as an average interaural threshold difference in 2 adjacent fre-

quencies of ≥ 15 dB, was used to predict tinnitus laterality at pre and 1 month postoperative time points. Sensitivity, specificity, and positive predictive value (PPV) were calculated. **Results:** Preoperative audiometric asymmetry predicted tinnitus laterality with a sensitivity = 0.94, specificity = 0, and PPV = 0.59 (n = 30). At 1 month after surgery, sensitivity = 0.63, specificity = 0.29, and PPV = 0.50 (n = 30). When patients with tinnitus functional index scores of < 15 were excluded, test characteristics were: sensitivity = 0.92, specificity = 0, and PPV = 0.80 preoperatively (n = 16); and sensitivity = 0.50, specificity = 0.40, and PPV = 0.40 at 1 month after surgery (n = 9). **Conclusions:** Audiometric asymmetry, as defined above, is a sensitive test for tinnitus laterality in preoperative stapedectomy patients; it is less accurate in stapedectomy patients 1 month after their operation. The decreased sensitivity in postoperative patients suggests that stapedectomy may alter tinnitus laterality perception in a more complex manner than simply reducing interaural hearing thresholds.

2:24 **Histopathology of Spontaneous Cerebrospinal Fluid Leaks of the Lateral Skull Base**
Aaron K. Remenschneider, MD, Boston, MA; Elliott D. Kozin, MD, Boston, MA; Felipe Santos, MD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to compare the three sites of spontaneous CSF leaks from the temporal bone and discuss common otopathologic findings that accompany each type of leak. Upon understanding the otopathologic findings, they should then be able to use associated clinical and radiographic information to help guide CSF leak repair in patients.

Objectives: The histopathologic basis of cerebrospinal fluid (CSF) leaks of the lateral skull base is not well understood. The objective of this study is to utilize techniques of otopathology to gain insight into the pathogenesis, site of origin and associated defects in CSF leaks of the lateral skull base. **Study Design:** Histopathologic analysis of temporal bones from an otopathology repository and laboratory. **Methods:** Specimens from a temporal bone repository were investigated for clinical or otopathologic evidence of otogenic meningitis, dural defects, or bony dehiscence indicating communication between the intracranial space and temporal bone. Specimens were then examined by light microscopy, organized by leak site and histopathologically described. Pre-mortem patient history and imaging were reviewed. **Results:** Specimens from thirty-three individuals meeting inclusion criteria were obtained. Three distinct anatomic sites of CSF leak were determined: transdural, labyrinthine, and perilabyrinthine. Arachnoid granulations (pacchionian bodies) were noted along the middle and posterior fossa dura (n=17) and can give rise to asymptomatic transdural leaks in older individuals. Labyrinthine leaks (n=10) were seen primarily with Mondini dysplasia where bony atresia occurs at the cribrose area of the internal auditory canal. Perilabyrinthine leaks (n=6) were observed with an incompletely closed tympanomeningeal fissure (Hyrtl's fissure) in children, or with arachnoid granulations within this space. **Conclusions:** CSF leaks of the lateral skull base occurred in three common locations: transdural, labyrinthine or perilabyrinthine. In the absence of clear radiographic localization, patient age and associated cochlear defects may indicate the occult location. This has implications for the surgical approach to CSF leak repair.

2:31 **Comparative Ototoxicity of Phosphodiesterase Type 5 Inhibitors for Erectile Dysfunction**
Wei Liu, MD, Gainesville, FL; Patrick J. Antonelli, MD, Gainesville, FL; Philipp Dahm, MD, Gainesville, FL; Tobias Gerhard, PhD, New Brunswick, NJ; Joseph A. Delaney, PhD, Seattle, WA; Almut G. Winterstein, PhD, Gainesville, FL

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the comparative ototoxicity of oral phosphodiesterase type 5 (PDE5) inhibitors used to treat erectile dysfunction.

Objectives: We recently found that use of phosphodiesterase type 5 (PDE5) inhibitors increases the risk of sudden sensorineural hearing loss (SSNHL), however, little is known about the comparative ototoxicity of these agents. **Study Design:** We conducted a cohort study in the MarketScan CCAE database of all new users of PDE5 inhibitors from December 2003 to November 2007. **Methods:** SSNHL was defined by an outpatient visit with e1 ICD-9 code indicative of sensorineural hearing loss combined with e1 codes for audiometry performed within [-30,0] and [+4,+30] day window of the SNHL diagnosis. Exposure to PDE5 inhibitor was updated each week based on electronic prescriptions. We used Cox proportional hazards models to compare rates of SSNHL adjusting for propensity score that summarizes baseline patient characteristics. We conducted secondary analyses to explore effects of potentially different utilization patterns of PDE5 inhibitors. **Results:** Among 275,229 men who initiated PDE5 inhibitors (158,860 for sildenafil, 49,774 for vardenafil, and 66,595 for tadalafil), we accrued 61 incident cases of SSNHL. The crude incidence rate was 4.45, 3.62, and 3.69 per 1,000 person years respectively for sildenafil, vardenafil and tadalafil. Compared with sildenafil, the relative risks were 0.80 (95% CI 0.42-1.51) and 1.02 (95% CI 0.51-2.02) for tadalafil and vardenafil. No meaningful difference was observed for the secondary analyses. **Conclusions:** Risk of SSNHL was comparable among the 3 PDE5 inhibitors, although lack of statistical power limited our ability to detect subtle differences. Further studies are required to explore the otologic safety for these and newer PDE5 inhibitor products.

2:38 **Updated Outcomes of Cochlear Implantation in Adults with Hearing Exceeding Current Candidacy Criteria**
Euna Hwang, MD, Toronto, ON Canada; Ohad Hilly, MD, Toronto, ON Canada; David B. Shipp, MA, Toronto, ON Canada; Julian M. Nedzelski, MD, Toronto, ON Canada; Joseph M. Chen, MD, Toronto, ON Canada; Vincent Y.W. Lin, MD, Toronto, ON Canada

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the improvement in both

objective hearing performance and subjective satisfaction of cochlear implant patients whose pre-implantation hearing exceeded currently recommended candidacy criteria.

Objectives: To measure hearing and qualitative outcomes of cochlear implantation in post-lingually deafened adults whose preoperative aided speech recognition performance exceeded current implantation candidacy criteria. **Study Design:** Retrospective case series. **Methods:** All post-lingually deafened patients who were implanted between 2000 and 2014 and had been unsuccessful hearing aid users with a Hearing in Noise Test (HINT) score of ≥ 60% prior to cochlear implantation were included (N = 132). Their preoperative hearing performance (HINT score) with hearing aids was compared to their postoperative hearing performance with the cochlear implant 12 months following activation. In addition, the Hearing Handicap Inventory questionnaire was given to patients before and after implantation to quantify the hearing related handicap change perceived by the patients. **Results:** 119 patients were followed at one year of implant use and all demonstrated significant postoperative improvement in both hearing and qualitative outcomes. Their mean HINT score improved from 76.6% to 93.3%. Individually, none of the patients had a decrease in their HINT score post-implantation. In addition, their perceived hearing related handicap was also significantly reduced. **Conclusions:** This expanded and updated series confirms that individuals, whose hearing loss is not severe enough to meet the currently accepted candidacy criteria (HINT score < 60%) prove to be excellent candidates for cochlear implantation. In the past, these patients would suffer considerably from hearing difficulties despite being optimally fitted with hearing aids. The significant improvement in the postoperative speech recognition performance and hearing related handicap in this cohort of hearing impaired individuals supports the expansion of our conventional cochlear implantation candidacy criteria.

2:45 **John R. Lindsay, MD, Resident Research Award**
The Effect of Noninvasive Brain Stimulation of Temporoparietal Junction on Neural Connectivity in Chronic Tinnitus
Lauren T. Roland, MD, St. Louis, MO; Jonathan E. Peelle, PhD, St. Louis, MO; Dorina Kallogjeri, MD MPH, St. Louis, MO; Joyce E. Nicklaus, RN BSN CRNC, St. Louis, MO; Jay F. Piccirillo, MD, St. Louis, MO

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the neural connectivity changes associated with repetitive transcranial magnetic stimulation to the temporoparietal junction for chronic tinnitus.

Objectives: To explore neural connectivity changes associated with repetitive transcranial magnetic stimulation (rTMS) to the temporoparietal junction for patients with chronic bothersome tinnitus. **Study Design:** Randomized controlled clinical trial. **Methods:** 29 patients aged between 22 and 59 years with subjective, unilateral or bilateral, nonpulsatile tinnitus for 6 months duration or longer and a score of 36 or greater on the Tinnitus Handicap Inventory (THI) completed the study. Participants were randomized to receive either sham or active treatment with rTMS for either 2 or 4 weeks of therapy. Participants underwent resting state functional connectivity MRI (rs-fcMRI) before therapy and immediately following their course of active or sham treatment. Functional connectivity changes between treatment groups were compared using regions of interest in the default mode and executive attention networks. **Results:** 16 patients received active rTMS treatment, and 13 patients received sham treatment. There were no differences between the active and placebo groups in baseline functional connectivity. Neither treatment with rTMS nor sham therapy resulted in statistically significant functional connectivity changes in the default mode or attention networks. **Conclusions:** Consistent with our previously published work reporting lack of tinnitus symptom improvement following rTMS to the temporoparietal junction, our analysis did not identify any changes in neural connectivity following treatment in these same patients. Rather than suggesting that rTMS is ineffective, these results emphasize the importance of targeting the brain region(s) responsible for tinnitus. Further work using therapy directed at alternative targets is necessary to understand the possible benefits of rTMS for tinnitus from a neural connectivity perspective.

2:52 **Novel Ultrasonic Sound Carrier Significantly Improves Speech Discrimination in Subjects with Hearing Loss**
Ritvik P. Mehta, MD, La Jolla, CA; Sara L. Mattson, AuD, La Jolla, CA; Robin L. Seitzman, MPH PhD, San Diego, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) understand a novel audio system using ultrasound technology (Hypersonic Sound System - HSS); and 2) understand the benefits of HSS in improving speech understanding, in quiet and in noise, in subjects with mild to severe hearing loss.

Objectives: To assess whether the HyperSonic® Sound System (HSS), a novel audio system using ultrasound technology, improves sound clarity compared to a conventional acoustic speaker in subjects with mild to severe hearing loss. **Study Design:** Single blind, randomized crossover study. **Methods:** Patients: Ten adult patients with mild to severe hearing loss with pure tone average (PTA) of > 30 dB and word discrimination scores of < 80% in both ears. Intervention(s): Subjects completed the AzBio Sentences test and the Consonant Nucleus Consonant (CNC) word test for each speaker type. Subjects were randomized regarding which speaker the tests were administered through first. All tests were completed for the first speaker before switching to the second speaker. The AzBio and CNC word tests were conducted in quiet at both 50 dB and 70 dB. The AzBio was also conducted in noise at +10 SNR. Main outcome measure: Sound clarity, as measured by the AzBio Sentences test and the CNC word test. **Results:** Significant gains in speech understanding were observed using the HSS speaker versus conventional speaker for all test conditions at 70 dB. The mean AZBio scores for the HSS vs conventional speakers showed an average improvement of 27.4% (p=0.008) in quiet and 35.3% in noise (p=0.004). The CNC whole word test scores improved by an average of 38.4% (p=0.0001) and CNC phoneme test scores improved by an average

of 41.1% (p=0.0002). **Conclusions:** HSS demonstrates highly significant improvement in sound clarity over conventional speakers, including in background noise, in those with mild to severe hearing loss.

3:00 **Q&A**

3:05 - 3:30 ***Break with Exhibitors/Poster Viewing - Ballroom***

3:30 - 5:10 GENERAL SESSION

CROWN ROOM

3:30 - 4:00 **THE GREAT DEBATE - POINT/COUNTERPOINT**
Office Balloon Sinuplasty - Use or Abuse?
Moderator: James A. Stankiewicz, MD FACS, Maywood, IL
Panelists: **PRO -** Subinoy Das, MD FACS, Columbus, OH
CON - Abtin Tabaee, MD, New York, NY

4:00 - 4:30 **THE GREAT DEBATE - POINT/COUNTERPOINT**
Is a Second Cochlear Implant Necessary? Functional and Economic Considerations
Moderator: Paul R. Lambert, MD FACS, Charleston, SC
Panelists: **Yes, Necessary -** Douglas D. Backous, MD FACS, Seattle, WA
Yes, If . . . - John K. Niparko, MD, Los Angeles, CA

4:30 - 5:10 **WHAT'S THE LATEST AND GREATEST?**
Moderator: Michael D. Seidman, MD FACS, West Bloomfield, MI
Panelists: **Gene Testing in Delivering Otologic Care**
Daniel I. Choo, MD FACS, Cincinnati, OH
Molecular Diagnostics for H&N Cancer Treatment
Christine G. Gourin, MD FACS, Baltimore, MD
Hypoglossal Nerve Stimulation for Obstructive Sleep Apnea
David L. Steward, MD FACS, Cincinnati, OH

5:15 - 6:30 ***VICE PRESIDENTS WELCOME RECEPTION - Sundeck (Outdoors)***

FRIDAY, JANUARY 23, 2015

7:00 - 7:50 **Triological Society Business Meetings - Fellows Only**
Southern Section - Continental
Western Section - Windsor Complex

8:00 **Announcements by Vice Presidents**

8:05 - 10:00 CONCURRENT SESSION 1
FACIAL PLASTIC/RECONSTRUCTIVE AND HEAD & NECK

CROWN ROOM

Moderators: Sherard A. Tatum, MD FACS, Syracuse, NY
Brian J.F. Wong, MD PhD, Irvine, CA

8:05 **Accidental Misplacement of Flaps during Reconstruction**
Mark K. Wax, MD, Portland, OR; Neal D. Futran, MD DDS, Seattle, WA; Eben L. Rosenthal, MD, Birmingham, AL; Keith E. Blackwell, MD, Los Angeles, CA; Steve B. Cannady, MD, Philidelphia, PA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the etiology of accidental misplacement of flaps transferred during surgery. They will understand the system and communication errors that can occur and be presented an algorithm to prevent this rare occurrence.

Objectives: Standard operating procedures have been developed in many surgical procedures to ensure quality of care, such as appropriate specimen handling or handling of calvarial bone harvested during craniotomy. Because free tissue transfer involves the harvesting of tissue from one body site, storage for a variable period of time and then inset in another location, there is ample opportunity for accidental misplacement. We undertook a multi-institutional study to examine the incidence etiology and outcome. **Study Design:** Retrospective review was performed at five institutions. **Methods:** Charts were reviewed and pertinent data collected. **Results:** 8340 free flaps were harvested. Fourteen [.17%] flaps were either dropped or wrapped in a towel/sponge and placed in a waste bucket: 10 radial forearms, 3 fibula and one latissimus dorsi. All flaps were retrieved, washed in saline/betadine and implanted into the patient. All flaps survived, no altered outcomes were encountered. The etiology of transfer of the free tissue off the sterile field included miscommunication among nursing (6) or medical staff (3), fumbled (3) or inattention between surgeons (2). As a result of these events, changes in the handling procedures were instituted such as different positioning of the patient, improved labeling methodologies and changing communication strategies. **Conclusions:** Inadvertent loss of free tissue during transfer does occur in a sporadic fashion in high volume practices. Resolution of the underlined etiology leads to improved strategies for prevention. Fortunately no long lasting altered outcomes are encountered.

8:12 **Cytokine Profile of Murine Bone Marrow Derived Stem Cells in Setting of Ischemia Reperfusion Injury of Single Pedicle Skin Flap Model**
Paige E. Bundrick, MD, Shreveport, LA; Timothy S. Lian, MD, Shreveport, LA; James S. Alexander, PhD, Shreveport, LA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the possible implications of decreased IL-6 and MCP in supernate of bone marrow derived stem cells after exposure to in vivo ischemic conditions.

Objectives: Investigate the anti-inflammatory mechanism of bone marrow derived stem cells (BMSC) in the setting of early ischemia reperfusion injury in a murine flap 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 microvascular clamp was achieved. Bone marrow stromal stem cells were injected into the contralateral femoral vein at the end of the ischemic period. The secretory profile of the supernate from cells harvested and cultured from the post-ischemic tissues was compared to the supernate of the cells prior to injection with a multi-analyte enzyme linked immunosorbent assays (ELISA) for IL1B,IL4,IL6,IL10,IL12,IFNg, TNFa,MCP,MIP1a,andMIP1b. A second ELISA was performed to compare preop and postop supernate cultures specifically for IL6 and MCP as the multi-analyte assay suggested significance. **Results:** The secretory profile from cells harvested from post-ischemic tissues shows decreased concentrations of IL-6 and MCP. **Conclusions:** These results suggest that exposure of BMSCs to an in vivo setting of ischemia reperfusion injury results decreased expression of IL-6 and MCP which may, in part, explain the anti-inflammatory and improved wound healing properties of bone marrow derived stem cells.

8:19 **A Novel Commissuroplasty Technique to Correct the Blunted Oral Commissure**

Kimberly J. Atiyeh, MD, New York, NY; Benjamin C. Paul, MD, New York, NY; Milton Waner, MB BCh (Wits) FCS(SA) MD, New York, NY; Teresa M. O, MD M Arch, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the different types of commissural defects and describe a novel surgical technique to correct the blunted oral commissure.

Objectives: Lips are a critical aesthetic component of the face and when dysmorphic can have drastic functional and social implications for the patient. The location, geometry, and symmetry of the oral commissure greatly impact appearance, speech, and the oral phase of swallow. The commissure may be abnormal as the result of microstomia, macrostomia, or an isolated defect whether from facial paralysis, trauma, or adjacent surgical intervention. While there are described techniques to correct the blunted commissure, none are in the setting of vascular malformation. We describe a novel, succinct technique that specifically targets blunted commissures from facial scarring secondary to treatment of adjacent vascular malformations. **Study Design:** Case series. **Methods:** The surgical technique of four patients is described. Careful measurement of the contralateral facial anatomy is used to map ipsilateral incisions. The blunted commissure is excised strategically to establish the site of the new commissure. Skin and mucosal flaps are raised, then advanced, rotated, and anchored at the new commissure. Intra and postoperative nasolabial groove to commissure vector, commissure angle, and vermillion and white roll alignment were recorded. **Results:** Improvement in symmetry, geometry, and overall aesthetic appearance of the lips is noted in our series of patients, while maintaining oral function. No revision surgery was performed. Representative diagrams and operative photographs are included. **Conclusions:** While a significant body of literature exists regarding commissuroplasty, we draw attention to the blunted commissure after treatment of adjacent vascular malformation. This novel technique has been successful in our patients and may have further applications such as staged commissuroplasty after oncologic surgery.

8:26 **Creation of an Electronic Data Repository for Patients with Nasal Obstruction undergoing Functional Rhinoplasty**

Robin W. Lindsay, MD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to design an electronic database utilizing readily available software. They should be able to discuss important quality of life outcomes measures for patients with nasal obstruction and be able to explain the importance of standardized data entry to facilitate multi-institutional research.

Objectives: Assessment of outcomes after functional rhinoplasty for patients with nasal obstruction is challenging due to lack of standardized nasal function evaluation and labor intensive data collection. Progress is limited by the inability of surgeons to quantify technical success and compare results across institutions. We describe a methodology for automated prospective electronic data collection for patients with nasal obstruction undergoing functional rhinoplasty to permit optimal assessment of clinical outcomes. **Study Design:** Descriptive. **Methods:** An automated REDCap database was designed to capture patient directed outcomes data through validated instruments, clinical exam, and surgical methodology. Enrollment, informed consent, and the initial quality of life assessment are administered though electronic mail prior to the first in clinic evaluation. Responses are deposited directly into the database without the need for user tabulation or data entry. The web based platform allows for mobile data entry of a standardized nasal exam and surgical details. Postoperatively, quality of life surveys are automatically delivered electronically to patients at specific time intervals. **Results:** The rhinoplasty literature is dominated by single surgeon publications of retrospective patient series. Progress is limited by the effort required for data collection and entry. Retrospective data acquisition is inherently less accurate and time consuming. A user friendly searchable database permits prospective data collection, eases effort burdens, and increases available data to analyze. **Conclusions:** We have developed an automated database to prospectively collect data for the analysis of functional rhinoplasty. The electronic nature of the database should allow for improved data collection and analysis and facilitate multi-institutional rhinoplasty outcomes collaboration.

8:33 **A Cartilage Conserving Technique for Microtia Repair: Comprehensive Framework Construction from One Rib**

Jessica R. Gandy, BS, Irvine, CA; Bryan T. Lemieux, BS, Irvine, CA; Allen I. Foulad, MD, Irvine, CA; Cyrus T. Manuel, BS, Irvine, CA; Brian J. Wong, MD PhD, Irvine, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) review the evolution of techniques for microtia repair and understand the limitations of current approaches; and 2) appreciate a novel cartilage conserving technique that uses one rib to reconstruct the cartilage framework.

Objectives: Microtia repair requires 1) creation of the cartilage framework; and 2) coverage with soft tissue. Current methods carve an auricular framework from the costal synchondrosis, wasting viable cartilage tissue and creating a large donor site defect. Here, we minimize cartilage needed by developing a method to construct the framework from just one rib. **Study Design:** Ex vivo study and survey. **Methods:** A porcine rib (#5) was sectioned into multiple 1 or 2 mm thick slices using a commercial cartilage guillotine. Templates were used to cut each thin slab to a precise shape. A silicone mandrel guided suture assembly to create a 3D framework with projection, curvature, and natural topology. Viability was confirmed using confocal imaging. Ten frameworks were iteratively created (using modified Delphi approach) and then reviewed by boarded facial plastic surgeons using a 5 point Likert scale to evaluate aesthetics, mechanical stability, and feasibility for clinical use. **Results:** An anatomically correct and projected auricular framework was fashioned from one rib.

Cartilage was found to be viable and aesthetic standards were met according to expert opinion. Structural assessment revealed framework was robust. **Conclusions:** One rib can be used to create an aesthetic and mechanically viable framework, but relies upon technique to design and assemble. The ability to obtain thin, uniform slices of rib cartilage was essential to this technique. One rib can be harvested via smaller incisions. This cartilage sparing approach may be a potential alternative to classic synchondrosis carving techniques now widely used.

8:40 **Spreader Grafts Combined with Spreader Flaps Leads to Greater Improvement in Nasal Obstruction as Compared to Spreader Grafts Alone**

Nikhil S. Limaye, BS, Salt Lake City, UT; Cristian D. Gonzalez, BA BS, Salt Lake City, UT; Jasdeep S. Gill, MSBS, Salt Lake City, UT; Preston D. Ward, MD MS, Salt Lake City, UT

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the technique of spreader flaps and the application of this technique in addition to spreader grafts.

Objectives: To assess the effectiveness of spreader flaps in combination with spreader grafts as compared to the current gold standard—spreader grafts alone. **Study Design:** Retrospective cohort. **Methods:** Nasal obstruction severity was measured using a validated instrument (NOSE) on all patients who presented with nasal obstruction. Only patients who underwent septoplasty, turbinate submucous resection, and internal valve reconstruction without dorsal hump reduction were included. Some patients underwent spreader graft placement only whereas some patients underwent spreader flap placement in addition to spreader graft placement based on surgeon evaluation of the internal nasal valve. Pre and postoperative NOSE scores were recorded on all patients. **Results:** 38 patients underwent the combined spreader flap-spreader graft procedure, whereas 19 patients underwent spreader graft placement alone. The mean preoperative NOSE score for the combined spreader flap-graft group was 83.03 versus 75.53 for the spreader graft group (p=0.099). The mean postoperative NOSE score for the combined spreader flap-graft group was 18.42 versus 26.05 for the spreader graft group (p=0.096). The mean improvement in NOSE score for the combined spreader flap-graft group was 64.6 versus 49.5 for the spreader graft group (p=0.031). There were no complications related to the placement of spreader grafts or spreader flaps. **Conclusions:** Our results demonstrate that the addition of spreader flaps to spreader grafts may provide further improvement in the nasal valve as compared to spreader grafts alone.

8:47 **Long Term Complications and Outcomes Associated with the Nasoseptal Flap in Endoscopic Skull Base Reconstruction**

Satyan B. Sreenath, BS, Chapel Hill, NC; Stanley W. McClurg, MD, Chapel Hill, NC; Brian D. Thorp, MD, Chapel Hill, NC; Brent A. Senior, MD, Chapel Hill, NC; Charles S. Ebert, MD MPH, Chapel Hill, NC; Adam M. Zanation, MD, Chapel Hill, NC

Educational Objective: At the conclusion of this presentation, the participants should be able to demonstrate long term outcomes and complications of nasoseptal (NSF) flap usage in skull base reconstruction, explain advantages and disadvantages in the use of the NSF flap, discuss ways of minimizing complications with regard to the NSF flap, and compare outcomes in usage of the NSF flap with respect to other methods of skull base reconstruction.

Objectives: The nasoseptal flap (NSF) has reduced perioperative cerebrospinal fluid (CSF) leak rates within endoscopic skull base surgery. The theoretical disadvantages of NSF usage include sinonasal healing, septal donor site complications, and secondary mucocele or encephalocele formation, however, little data exists regarding these outcomes. The middle turbinate mucosal autograft to the donor site has been described to accelerate septal healing, but its long term advantages are unknown. The objective of this study was to evaluate long term outcomes of NSF usage in skull base reconstruction. **Study Design:** Retrospective, consecutive cohort study. **Methods:** IRB approved, retrospective review of endoscopic skull base reconstruction with a NSF with long term clinical and radiographic followup. **Results:** 138 patients were identified with mean followup of 12 months. A middle turbinate autograft was placed at the donor site in 119 cases (86.2%). Perioperative (< 3 months) complications included 0 flap deaths and 3 CSF leaks (2.2%). Long term complications included 1 case of mucocele (0.7%), 2 cases of septal perforation (1.4%), and 5 cases of prolonged (>6 months) skull base crusting (3.6%). No cases of delayed CSF leaks or secondary encephaloceles were seen. Donor site complications were significantly reduced in patients who received middle turbinate autografts (p =0.018). 26 patients received radiation therapy (18.8) with no increased complication rate (p=.401). **Conclusions:** The NSF has excellent success in preventing perioperative CSF leakage (97.8%). The delayed complication rate is low (5.8%), however long term followup for sinonasal healing and potential mucocele formation is recommended. The use of middle turbinate autografts not only increases healing rate, but decreases donor site complications.

8:54 **Assessment of AHNAK as a Potential Biomarker in Keloids: Integration of Methylation and Gene Expression**

Lamont R. Jones, MD, Detroit, MI; Joshua B. Greene, MD, Detroit, MI (Presenter); Maria J. Worsham, PhD, Detroit, MI; George W. Divine, PhD, Detroit, MI; Kang M. Chen, PhD, Detroit, MI

Educational Objective: At the conclusion of this activity, the participant should be able to 1) explain how the difference in gene methylation affects protein expression in keloids versus normal tissue and its potential role in the pathogenesis and treatment of keloids; and 2) discuss the role of AHNAK in keloid pathogenesis and as a potential drug target.

Objectives: Keloid molecular studies have focused on genetic mechanisms yielding few results with large gaps in our understanding of keloid pathogenesis. Previous 450 K analysis has identified differentially methylated keloid genes relative to normal tissue, including AHNAK (p=0.001). AHNAK is a 700 kDa protein located on the cell membrane in epithelial cells and in the nucleus and cytoplasm of other cell types such as fibroblasts. Its function is unknown. However, AHNAK has been suspected to contribute to cell-cell adhesion or exocytosis. The objective of this study was to investigate AHNAK as a potential biomarker in keloids through the integration of methylation and gene expression. **Study Design:** Prospective cohort. **Methods:** mRNA from keloid (n=5) and normal tissues (n=4) were examined for AHNAK expression using quantitative real time PCR (7900HT Sequence detector, Applied Biosystems). Statistical analyses included t-tests to compare means of log (delta Ct) and methylation ² values. Pearson's correlations were used to assess concordance of gene methylation and expression. **Results:** Three of five keloid samples showed a large reduction in expression as compared to the normal tissue. The mean difference in log (delta Ct) was almost significant (p=0.06). In this small sample, gene expression (log delta Ct) was concordant with methylation, r=0.64, p=0.06. **Conclusions:** AHNAK gene expression was concordant with hypermethylation status. It may serve as a potential marker for keloid pathogenesis or a potential target for treatment.

9:01 **Q&A**

9:05 - 10:00 **MANAGEMENT OF SOFT TISSUE AND BONY FACIAL TRAUMA**
Moderator: Robert M. Kellman, MD FACS, Syracuse, NY
Panelists: Col. Joseph A. Brennan, MD FACS, Ft. Sam Houston, TX
Kris S. Moe, MD FACS, Seattle, WA
Stephen S. Park, MD, Charlottesville, VA
William W. Shockley, MD FACS, Chapel Hill, NC

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

8:05 - 10:00 CONCURRENT SESSION 2
GENERAL AND SLEEP MEDICINE

CALIFORNIA CABANAS

Moderators: Willard C. Harrill, MD FACS, Hickory, NC
Andrew H. Murr, MD FACS, San Francisco, CA

8:05 - 9:05 **RESPONDERS VS NON-RESPONDERS IN OSA: IS IT ALL ABOUT THE TONGUE?**
Moderator: Kathleen S. Yaremchuk, MD MSA, Detroit, MI
Panelists: Marion Boyd Gillespie, MD MSc FACS, Charleston, SC
Stacey L. Ishman, MD MPH, Cincinnati, OH
Eric J. Kezirian, MD, Los Angeles, CA
Ho-Sheng Lin, MD FACS, Detroit, MI

9:05 **Quality Indicators in Surgical Training—A National Survey**
Aadil Ahmed, MD, Baltimore, MD; Nasir I. Bhatti, MD, Baltimore, MD

Educational Objective: At the conclusion of this presentation, the participants should be able to explain the indicators of high quality surgical training and help residency programs to improve those indicators for developing competent surgeons.

Objectives: Evidence shows a positive association between quality of surgical training received and patient outcomes. Traditionally, improved patient outcomes are linked with increased operative volume. However generalizing this finding to surgeons in training is not clear. In addition, reduced exposure due to work hour restrictions calls for alternative methods to determine the quality of training. The purpose of this study was to identify the indicators of high quality training by surveying the trainees and trainers. **Study Design:** Prospective longitudinal study. **Methods:** A survey questionnaire was developed based on input from faculty and previous studies. The survey was divided into three sections asking about the indicators of quality training, methods to measure them and interventions for improvisation. The questionnaire was administered to all the residents and program directors of ACGME accredited otolaryngology training programs nationwide. **Results:** Quality indicators such as continuity of faculty-residents interaction, exposure to variety of cases, a balanced level of supervision and independence, etc. were suggested. Residents' assessment, feedback and improvement over time were considered essential to measure the quality in training. Ideas of frequent feedback, enhanced team structure, personalized training, opportunities for deliberate practice, etc. were supported to enhance the quality of training. **Conclusions:** Measuring quality of a residency training program is imperative to produce competent surgeons and ensuring patient safety. The results of this study will help the residency programs to better train their residents and improve the overall quality of their program.

9:12 **William W. Montgomery, MD Resident Research Award**
Does Septoplasty Performed at the Same Time as Oropharyngeal Surgery Increase Complication Rates?
Francis Creighton, MD, Boston, MA; Neil Bhattacharrya, MD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to compare complication rates between oropharyngeal surgery and oropharyngeal surgery combined with septoplasty.

Objectives: To determine if septoplasty when combined with ambulatory oropharyngeal surgery increases postoperative complications. **Study Design:** Cross-sectional analysis of multi-state ambulatory surgery and hospital databases. **Methods:** Ambulatory adult septoplasty and oropharyngeal surgical procedures (tonsillectomy and uvulopalatoplasty [UPPP]) were extracted from the state ambulatory surgery databases for New York, Florida, Iowa, and California for 2010-11. Cases with concurrent sinus surgery were excluded. Cases were linked to the state emergency department databases and the state inpatient databases to identify revisits within 14 days. The rates of unplanned revisits and postoperative bleeding were determined and compared among groups undergoing solely oropharyngeal surgery versus groups undergoing oropharyngeal surgery combined with septoplasty. **Results:** Among 26,280 tonsillectomies alone versus 1,002 septoplasty+tonsillectomies, rates for unplanned revisits and hemorrhage were 13.2% and 12.8%, (p=0.66) and 4.9% and 7.0% (p=0.003), respectively. Among 2,598 UPPPs alone versus 1,343 UPPPs+septoplasty, rates for revisits and hemorrhage were, 11.4% versus 10.1% (p=0.242) and 3.5% versus 3.8% (p= 0.683), respectively. Among 389 UPPP/tonsillectomies versus 164 UPPP/tonsillectomies+septoplasty, rates for revisits and hemorrhage were 11.8% versus 8.5% (p=0.256) and 3.9% versus 6.1% (p=0.247), respectively. Among all cases and groups, there were two deaths, both in the UPPP alone group. **Conclusions:** The addition of septoplasty to oropharyngeal ambulatory surgical procedures does not significantly increase the rate of unplanned revisits or postoperative hemorrhage except in the case of septoplasty added to tonsillectomy, with a small percent increase in hemorrhage rate. Combining septoplasty with ambulatory oropharyngeal surgery is clinically reasonable in adults.

9:19 **TranQuill Sling Snoreplasty for Snoring and Mild Obstructive Sleep Apnea: A Single Arm, Pilot Study for Safety and Effectiveness**
Alexander W. Murphey, BS, Charleston, SC; Colin W. Fuller, MD MS, Augusta, GA; Shaun A. Nguyen, MD MA, Charleston, SC; Marion B. Gillespie, MD MSc, Charleston, SC

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss indications and short term outcomes of snoreplasty in the snoring adult population.

Objectives: Determine safety and efficacy of the TranQuill Sling Snoreplasty (TSS) for the treatment of snoring in adults with benign snoring or mild obstructive sleep apnea. **Study Design:** Prospective, unblinded, single center pilot study. **Methods:** From February 2014 to July 2014, 20 adult patients with chronic, disruptive snoring assessed by bed partner were recruited to undergo TSS. Only subjects with Apnea Hypopnea Index (AHI) <15 and minimum oxygen saturation > 85% confirmed with WatchPAT home sleep study and BMI <32 were included for study. Outcomes were assessed comparing the results of a variety of quality of life questionnaires (Snoring, ESS, EAT-10), bed partner assessed snoring and pain visual analog scales (VAS), WatchPAT home sleep studies, and nasal endoscopy at baseline and 90 day followup. **Results:** 13 males and 7 females enrolled in our study. 11 of 20 patients have completed 90 day followup. Average age was 49.1 (range 31 to 67) and BMI of 25.8 ±2.66. TSS significantly reduced snoring symptom scores from 8.64 ± 4.27 to 5.73 ± 3.0, p = 0.026. Snoring VAS demonstrated a nonsignificant reduction of 24.8 mm (93.5 mm ± 38.8 to 68.7 mm ± 37.0, p = 0.09) in evaluable subjects. Complications related to the trial were documented in 25% (5/20) of subjects with no serious adverse events. **Conclusions:** TranQuill Sling Snoreplasty is a safe therapy that improves snoring symptoms in most but not all adult subjects with mild or no evidence of sleep apnea. Further analysis will need to be conducted once remaining subjects finish followup.

9:26 **Usage of Cephalosporins in the Patient with History of Penicillin Allergy: A Survey of Otolaryngologists and Review of the Literature**
Michael J. Persky, MD, New York, NY; Scott A. Roof, BA, New York, NY; Yixin Fang, PhD, New York, NY; Daniel Jethanamest, MD, New York, NY; Max M. April, MD, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to demonstrate an understanding of the current guidelines for the antibiotic management of the penicillin allergic patient, as well as understand the current literature regarding the cross-reactivity of beta-lactams.

Objectives: This study investigated the differences between the standard guidelines and the practice patterns of otolaryngologists in the management of the penicillin allergic patient. A major goal was to identify factors influencing an otolaryngologist's choice of antibiotic. **Study Design:** Survey. **Methods:** 470 members of the American Society of Pediatric Otolaryngologists (ASPO) and 150 general otolaryngologists from the Florida Society of Otolaryngology (FSO) were surveyed. **Results:** 100 ASPO members (21.3%) and 22 members of FSO (14.6%) responded. When asked about the management of a pediatric patient with acute otitis media and a history of a nonsevere IgE mediated amoxicillin allergy, 54% of ASPO respondents indicated they would initiate guideline recommended cefdinir, while only 27.3% of FSO respondents chose cefdinir (p = 0.02). Otolaryngologists who are fellowship trained in pediatrics or have a pediatric focused practice were significantly more likely to prescribe cefdinir. In general, 57% of respondents indicated that they were familiar with the literature regarding the cross-reactivity of beta-lactams, but only 26% of respondents felt that they could easily differentiate a poten-

tially life threatening IgE-mediated allergy from a non-IgE mediated drug intolerance. **Conclusions:** The data show differences between the current recommendations and the behavior of otolaryngologists. Overall, pediatric otolaryngologists were more familiar with the guideline recommended therapy, likely from their frequent exposure to patients requiring a beta-lactam. Nevertheless, most otolaryngologists could benefit from increased awareness of the current literature. Indeed, patients may be receiving less than optimal medication management due to a misidentification of those at risk of a life threatening allergic cross-reaction.

9:33 **The Effects of Anesthesia on the Upper Airway: A Systematic Review**
Zarmina Ehsan, MD, Cincinnati, OH; Mohamed Mahmoud, MD, Cincinnati, OH; Sally R. Shott, MD, Cincinnati, OH; Raouf S. Amin, MD, Cincinnati, OH; Stacey L. Ishman, MD MPH, Cincinnati, OH

Educational Objective: At the conclusion of this presentation, the participants should be able to recognize the effects of commonly used anesthetics on the upper airway.

Objectives: Drug induced sleep endoscopy (DISE) is increasingly used to determine surgical therapy for OSA, however it is critical to understand the effects of anesthesia on the upper airway as we develop DISE protocols. It was our aim to systematically review existing literature on the effects of anesthetic agents on the upper airway. **Study Design:** Systematic review. **Methods:** A search was performed encompassing all indexed years in PubMed, CINAHL, EBM reviews and Scopus. Inclusion criteria included English language papers containing original human data. Two investigators independently reviewed all abstracts for outcomes related to upper airway morphology, dynamics, neuromuscular response and respiratory control. **Results:** The initial search yielded 102 abstracts; 47 articles were ultimately included with a total study population of 6692 patients. The anesthetic agents studied were: topical lidocaine, propofol, dexmedetomidine, midazolam, pentobarbital, sevoflurane, desflurane and ketamine. Outcome measures were diverse and included imaging studies (e.g. cine MRI), genioglossus electromyography, endoscopic airway assessment, polysomnography, upper airway closing pressure (Pcrit) and clinical evidence of obstruction. All agents caused some degrees of airway collapse. Unlike sevoflurane, isoflurane and propofol, dexmedetomidine did not have dose dependent effects when evaluated using cine MRI. Propofol caused more dynamic collapse on cine MRI compared to dexmedetomidine. **Conclusions:** Studies assessing the effect of anesthesia on the upper airway with and without obstructive sleep apnea are limited and few compare effects between agents. Dexmedetomidine appears to have the least effect on respiratory control, but the requirement for a loading dose may limit its usefulness for DISE.

9:40 **Hyoepiglottic Ligament Collagen and Elastin Fiber Composition and Changes Associated with Aging**
Leslie E. Irvine, MD, Los Angeles, CA; Eric J. Kezirian, MD, Los Angeles, CA; Zhi Yang, MD, Los Angeles, CA; Marcel E. Nimni, PhD, Los Angeles, CA; Bo Han, PhD, Los Angeles, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand age related changes in the components of the hyoepiglottic ligament.

Objectives: Drug induced sleep endoscopy has identified the potential contribution of the epiglottis in upper airway obstruction in approximately 10% of patients with obstructive sleep apnea. Clinical experience indicates that older patients may be more likely to have epiglottis related obstruction. This study was designed to examine tissue characteristics of the hyoepiglottic ligament as a possible factor in epiglottis related obstruction, based on previous research suggesting that older adults have fewer collagen, elastin, and muscle fibers in the hyoepiglottic ligament. The objective of this study was to characterize the collagen and elastin fibers in the hyoepiglottic ligament of human cadavers, identifying changes associated with age. **Study Design:** Cross-sectional study of twenty-seven cadaver hyoepiglottic ligaments. **Methods:** Specimens were stained using hematoxylin and eosin and elastica van Gieson to quantify collagen fibers and subtypes and elastin fibers. Immunohistochemistry was used to quantify the ratio of collagen types I/III and the degree of collagen cross-linking. **Results:** Cadaver specimens were of age 69.9±14.6 years (range 30-90 years). Increasing age was associated with a lower ratio of type I/III collagen and decreases in the number of collagen and elastin fibers and in collagen cross-linking. **Conclusions:** Age related differences in the hyoepiglottic ligament may contribute to epiglottis related upper airway obstruction in in older adults.

9:47 **The Effect of Glossectomy for Obstructive Sleep Apnea: A Systematic Review and Meta-Analysis**
Alexander W. Murphey, BS, Charleston, SC; Jessica A. Kandl, BS, Charleston, SC; Shaun A. Nguyen, MD MA, Charleston, SC; Marion B. Gillespie, MD MSc, Charleston, SC

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the surgical treatment options (midline glossectomy, lingualplasty, and submucosal minimally invasive lingual excision) for obstructive sleep apnea patients and compare the evidence supporting these surgical treatments.

Objectives: Determine the effect of glossectomy on sleep related outcomes of patients with obstructive sleep apnea (OSA). **Study Design:** Discuss the surgical treatment options (midline glossectomy, lingualplasty, and submucosal minimally invasive lingual excision) for obstructive sleep apnea patients and compare the evidence supporting these surgical treatments. **Methods:** The review was conducted by two independent researchers using the PubMed-NCBI literature database. Included studies had 10 or more patients and reported pre and postoperative AHI scores. Primary endpoint was change in AHI. Secondary endpoints included predefined surgical success rates, and changes in additional reported sleep outcomes such as Epworth Sleep Scores (ESS), Lowest Oxygen Saturation

(LSAT), and snoring visual analog scale (VAS). **Results:** 14 articles with 403 patients treated with three glossectomy techniques (midline glossectomy, lingualplasty, and submucosal minimally invasive lingual excision (SMILE)) meet inclusion criteria. Pooled analyses (baseline vs. post-surgery) showed a significant reduction of AHI (47.88±22.57 to 19.60±15.33, p <0.0001), ESS (11.52±4.53 to 5.23±3.04, p<0.0001), and VAS (8.83±1.42 to 3.29±2.69, p<0.0001). There was a significant increase for LSAT (76.71±9.92 to 84.38±7.25, p<0.0001). Surgical success, defined as AHI < 20 and > 50% reduction, was achieved in 56% (95%CI, 49% to 62.9%) of cases. Complications occurred in 19% (65/342) of reported patients. 22 patients were treated with glossectomy as sole therapy for OSA. Significant reduction found in AHI (41.84±32.05 to 25.02±20.43, p=0.0354) and ESS (12.35±5.05 to 6.99±3.84, p <0.0001). **Conclusions:** Glossectomy significantly improves sleep outcomes as part of multilevel surgery in adult patients with OSA. Currently there is insufficient evidence to analyze the role of glossectomy as a standalone procedure for the treatment of sleep apnea.

9:54 **Q&A**

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

10:30 - 12:15 CONCURRENT SESSION 3
LARYNGOLOGY

CROWN ROOM

Moderators: Andrew Blitzer, MD DDS FACS, New York, NY
Peak Woo, MD FACS, New York, NY

10:30 **Harmonic Scalpel vs. Stapler in Performing Endoscopic Myotomy for Zenker's Diverticulum**
Tina Ramineni, BA, Albany, NY; Kristina Piastro, MD, Albany, NY (Presenter); Lisa T. Galati, MD, Albany, NY; Adam S. Weisstuch, MD, Albany, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to recognize the distinct advantages and disadvantages of two prevailing endoscopic instruments, the stapler and harmonic ace, for treatment of Zenker's diverticulum (ZD).

Objectives: The traditional stapler's anvil extends beyond the blade's edge, impeding its ability to excise the dividing wall fully and thus creating recurrent pouches. In contrast, the harmonic blade cuts towards the distal end of the wall and is thought to decrease recurrence rates when used in conjunction with the endoscopic stapler. Thus, we compare preoperative and postoperative outcomes for patients who underwent surgery for ZD via the stapler method alone and via the stapler and harmonic scalpel combined. **Study Design:** Retrospective. **Methods:** Medical records were searched to find surgical procedure, age, sex, length of stay (LOS) after surgery, length to follow up, preoperative, surgical, and postoperative complications, and the size of diverticula. **Results:** 13 patients underwent surgery with a stapler alone, while eight patients underwent combined surgery using a stapler and scalpel. No difference was found between gender, age, LOS, time to followup, or diverticula size between each group (p>0.05). Six patients using the stapler method alone had postoperative complications, with 11 total complications. Two patients using the combined method had postop complications, with three total complications. Recurrent pouches were the most common complication for the stapler (46%) and combined method (67%). No difference was found in number of patients with complications (p>0.05). **Conclusions:** Although the harmonic ace is shown to decrease recurrence in smaller diverticula, we found no difference in complication rate nor diverticula size between techniques. Thus, an optimal technique may not exist and a patient's anatomical and clinical features may better indicate the appropriate surgical technique.

10:37 **John J. Conley, MD Resident Research Award**
Systematic Review for Surgical Treatment of Adult Laryngotracheal Stenosis
Sean M. Lewis, MD, Brooklyn, NY; Marisa A. Earley, MD, Brooklyn, NY; Richard M. Rosenfeld, MD MPH, Brooklyn, NY; Joshua B. Silverman, MD PhD, Brooklyn, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss which types of surgical treatment for the varying etiologies of adult laryngotracheal stenosis have the highest likelihood of decannulation success and treatment success with one surgery.

Objectives: To determine if there is a surgical treatment option for adult laryngotracheal stenosis that is more successful. **Study Design:** Systematic review. **Methods:** Systematic review using EMBASE and Medline for adult patients (>13 years old) with laryngotracheal stenosis. Cause of stenosis (intubation, idiopathic, or trauma) and treatments (open laryngotracheal resection with anastomosis, open laryngoplasty with expansion grafting, or endoscopic procedures) were included. Primary outcomes are decreased need for further surgery and success of decannulation if previously had tracheostomy. **Results:** There were 297 abstracts reviewed, 104 articles were selected for full text review, and 39 articles were included in the analysis. Patients who have LTR with anastomosis or expansion graft have similar outcomes: 31-36% need additional surgery and 83-89% are decannulated. Patients who have endoscopic repair do worse:

60% need additional surgery and only 63% are decannulated. Patients with idiopathic stenosis were more likely to need additional surgery than those with traumatic cause of stenosis (54% vs. 25%) as well as those who had intubation/tracheostomy as cause of stenosis (54% vs 35%). Etiology of stenosis did not impact decannulation rates. Risk of bias did not impact study results, but we cannot exclude the possibility of a type 2 (false negative) error. Risk of bias was assessed using a validated instrument, MINORS criteria. Validity of these results is limited by moderate to high heterogeneity among studies for most of the analyses. **Conclusions:** Patients who undergo endoscopic procedures are more likely to need further surgery and less likely to be decannulated than those undergoing open LTR with expansion grafting or anastomosis.

10:44 **The Progression of Thyroid Cartilage Ossification as it Relates to the Utilization of Laryngeal Ultrasound**
Ashley E. Wenaas, MD, Houston, TX; Tran D. Huy, MD, Houston, TX; Julina Ongkasuwan, MD, Houston, TX

Educational Objective: At the end of this presentation, the participants should be able to understand the progression of thyroid cartilage ossification as it relates to age, as well as the pattern of ossification within the cartilage. This will further allow participants to appreciate in which age groups laryngeal ultrasound can be considered as a viable alternative to flexible fiberoptic laryngoscopy due to limitations of laryngoscopy in certain patient populations.

Objectives: The purpose of this study is to review CT scans of infants, children and adults to assess the degree of ossification of the thyroid cartilage at various ages. Our objective is to study the relationship between age and the degree of ossification of the thyroid cartilage, as this will help us better understand in which age group laryngeal ultrasound can be utilized. **Study Design:** Retrospective. **Methods:** Two hundred patients from newborn to 50 years who received a CT scan of the neck from January 2009 through May 2012 were identified. The Hounsfield units (HU) of the thyroid cartilage were calculated at one o'clock, four o'clock, eight o'clock and eleven o'clock at the level of the true vocal fold and false vocal fold. The Spearman correlation coefficient was calculated to evaluate the correlation between each measure and age, then a linear regression with a logarithmic transformation was applied to study further how the measures were related to age. **Results:** The Spearman correlation coefficients ranged from 0.58 to 0.75. The p-values of these coefficients were all <0.0001, showing a significant relationship to age. Age increase by 1 year resulted in increased ossification by 1.5% to 4%. The Wilcoxon signed rank test compared the rate of ossification at each site measured. This showed that the two posterolateral sites ossify faster than the two anteromedial sites. **Conclusions:** The thyroid cartilage ossifies at a rate that is significantly related to increasing age and ossifies in a posterolateral to anteromedial direction. Based on the HU, the thyroid cartilage is not consistently denser than soft tissue in the age ranges that were studied. Both the ossification rate of the thyroid cartilage and the pattern of ossification in a posterolateral to anteromedial direction should make the utilization of laryngeal ultrasound feasible for patients between birth and 50 years of age.

10:51 **Development and Evaluation of a Rigid Esophagoscopy Simulator for Residency Training**
Amir Allak, MD MBA, Charlottesville, VA; Yizhen Liu, BS, Charlottesville, VA; Mariana Oliynyk, BS, Charlottesville, VA; Kaihang Weng, BS, Charlottesville, VA; Mark J. Jameson, MD PhD, Charlottesville, VA; David C. Shonka Jr., MD, Charlottesville, VA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the feasibility of designing and constructing an esophagoscopy simulator and its utility in training residents in rigid esophagoscopy.

Objectives: Rigid esophagoscopy is being performed less frequently by resident trainees. Nonetheless it remains important for certain indications including foreign body extraction. This study describes the construction of a simulator and evaluates its utility in training residents. **Study Design:** Simulator development, fabrication, feasibility analysis, and procedural evaluation of postgraduate trainees. **Methods:** A prototype simulator was developed and constructed in association with biomedical engineering. Residents with varied experience in upper aerodigestive procedures performed standard rigid esophagoscopy on the model. Key steps and ACGME Objective Structured Assessment of Technical Skills (OSATS) criteria for rigid esophagoscopy were created and then used by a faculty member to evaluate trainees. Pressure measurements were obtained from force sensors at the tip of the endoscope. **Results:** 14 trainees were evaluated. Number of rigid esophagoscopies and direct laryngoscopies performed by each trainee were noted. OSATS scores and key steps of the procedure correlated with resident number of cases performed ($R^2 = 0.75$, $p < 0.0001$; $R^2 = 0.66$, $p < 0.001$ respectively). Pressure exerted on the simulator esophagus by the esophagoscope was inversely correlated with case number and approached statistical significance ($R^2 = 0.41$, $p = 0.06$) while length of procedure was not correlated ($R2 = 0.04$, $p = 0.49$). **Conclusions:** A successful simulator for training residents to perform rigid esophagoscopy can be developed and utilized by a faculty proctor to objectively evaluate trainees. OSATS scores, performing key procedural steps, and pressure exerted on the simulator tissue correlated with upper aerodigestive cases logged, demonstrating validity of the simulator.

10:58 **Idiopathic Subglottic Stenosis—A Comparison of Tracheal Size**
Soroush Zaghi, MD, Los Angeles, CA; Jose Alonso, BS, Los Angeles, CA; Michael Orestes, MD, Los Angeles, CA; Natalie Edmonson, MD, Los Angeles, CA; William Hsu, PhD, Los Angeles, CA; Gerald Berke, MD, Los Angeles, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the distinctive pattern of tracheal narrowing characteristic of idiopathic subglottic stenosis.

Objectives: To compare the cross-sectional area of the tracheal airway among patients with idiopathic subglottic stenosis (iSGS), subglottic stenosis (SGS) attributable to specific causes, and normal controls. **Study Design:** Case control study. **Methods:** Subjects were identified from our institutional radiologic database using the keywords: subglottic stenosis and modality CT neck and CT chest. CT scans from a total of n=19 normal controls, n=12 patients with iSGS, and n=31 patients with SGS attributable to specific causes were analyzed. Cross-sectional area was measured at the level of the subglottic larynx, mid-cervical trachea, and mid-thoracic trachea by an investigator blinded to the clinical diagnosis. **Results:** Patients with iSGS were found to have a significantly smaller cross-sectional area at both the mid-cervical (1.72 ± 0.26 cm2) and mid-thoracic trachea (1.88 ± 0.24 cm2) as compared to normal controls (mid-cervical: 2.82 ± 0.21 cm2, p=0.0029 and mid-thoracic: 2.59 ± 0.19 cm2, p=0.0293). Patients with Wegener's granulomatosis (n=5) and SGS due to prolonged intubation (n=12) were found to have a significantly smaller mid-cervical tracheal area (1.49 ± 0.45 cm2, p=0.0124 and 1.93 ± 0.29 cm2, p=0.0229); the mid-thoracic tracheal area was comparable to controls (2.82 ±0.41 cm2, p=0.6161 and 2.59± 0.21 cm2, p=0.3658). Patients with SGS due to extrinsic compression and traumatic injury had cervical and thoracic trachea measurements that were comparable to normal controls. **Conclusions:** Idiopathic subglottic stenosis (iSGS) is a rare but distinct subclass of subglottic stenosis (SGS) characterized by smaller cross-sectional area throughout the course of the subglottic, cervical, and thoracic trachea.

11:05 **Transillumination for Needle Localization within the Larynx**
Henry T. Hoffman, MD, Iowa City, IA; Seth H. Dailey, MD, Madison, WI; Jonathan M. Bock, MD, Milwaukee, WI; Timothy M. McCulloch, MD, Madison, WI

Educational Objective: At the conclusion of this presentation, the participants should be able to identify shortcomings to current techniques for needle placement into laryngeal soft tissue (e.g. for injection and diagnostic electromyography) in the context of a new technique employing transillumination to visualize a needle tip within laryngeal tissue during concurrent laryngoscopy.

Objectives: Development of instrumentation and technique for transillumination through small caliber needles to direct their placement into specific sites in the larynx with monitoring via laryngoscopy. **Study Design:** Cadaver simulation (canine and human). **Methods:** Lighted devices including sialoendoscopes and fiberoptic were used as transilluminating obturators in trocars and needles through multiple studies to identify appropriate illumination, monitoring, and equipment for successful localization of needle/trocar tips placed within laryngeal tissue. **Results:** Lighted 250 micron fiberoptic cables within 23 gauge needles were successfully placed percutaneously (full cadaver study) through the cricothyroid membrane and maneuvered submucosally into Reinke's space, the mid-lateral vocal fold, and the deep posterior paraglottic space with concurrent monitoring with flexible transnasal laryngoscopy. **Conclusions:** Small caliber fiberoptic cables are useful as transilluminating obturators to accurately direct needle position within laryngeal tissue.

11:12 **Effects of Laryngeal Adductors on Phonatory Acoustics, Aerodynamics, and Vibration**
Dinesh K. Chhetri, MD, Los Angeles, CA; Juergen N. Neubauer, PhD, Los Angeles, CA; Donna S. Soofer, BA, Los Angeles, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand effects of thyroarytenoid muscle and lateral cricoarytenoid muscle in phonatory acoustics aerodynamics and vibration, from paresis to paralysis.

Objectives: Treatment of laryngeal neuromuscular disorders requires a clear understanding of intrinsic laryngeal muscle function. The vocal fold adductor muscles are frequently targeted in many hypo- and hyper-functional disorders. The effects of laryngeal adductors on phonatory acoustics, aerodynamics, and vibration were investigated. **Study Design:** Basic science using in vivo canine model. **Methods:** The thyroarytenoid (TA) and lateral cricoarytenoid (LCA) muscle nerve branches were stimulated over 7 graded levels to assess function at activation levels ranging from subtle paresis to paralysis. The fundamental frequency (F0), subglottal pressure, airflow, and vibration were assessed at phonation onset. Assessments were made with bilateral LCA stimulation alone, bilateral TA stimulation alone, and combined TA and LCA stimulation. **Results:** With increasing levels of TA activation alone, the F0 decreased, while subglottal pressure and airflow increased. With increasing levels of LCA activation alone, there was no change in F0, and airflow and pressures were very low. Combined TA plus LCA activation led to slight increase in F0, increased subglottal pressure but reduced airflow. Noise to harmonic ratio was highest with TA activation alone and least with combined TA/LCA activation. Vibration in many mid LCA activation alone conditions were characterized by small amplitude vibration at very low subglottic pressure and flow with slow vocal rise time, whereas addition of TA activation led to sharper onset and vocal rise time. **Conclusions:** Among adductors, glottic resistance is primarily controlled by the TA muscles. Concurrent activation of both TA and LCA muscles is needed for improved F0 control as well as reduced noise and sharper phonation onset.

11:19 **Q&A**

11:25 - 12:15 **TREATMENT OF VOCAL FOLD PARALYSIS - STATIC PROCEDURES VS. INNERVATION**
Moderator: James L. Netterville, MD FACS, Nashville, TN
Panelists: James A. Burns, MD FACS, Boston, MA
Mark S. Courey, MD, San Francisco, CA
C. Gaelyn Garrett, MD, Nashville, TN
Marshall E. Smith, MD FACS, Salt Lake City, UT

12:15 *Adjourn Scientific Sessions*

10:30 - 12:15 CONCURRENT SESSION 4
RHINOLOGY

CALIFORNIA CABANAS

Moderators: Eric H. Holbrook, MD, Boston, MA
Robert C. Kern, MD FACS, Chicago, IL

10:30 - 11:20 **IMPORTANT LESSONS LEARNED DURING MY CAREER IN RHINOLOGY**
Moderator: Brent A. Senior, MD FACS, Chapel Hill, NC
Panelists: Peter H. Hwang, MD FACS, Stanford, CA
Stilianos E. Kountakis, MD PhD FACS, Augusta, GA
Ralph B. Metson, MD FACS, Boston, MA
Steven D. Schaefer, MD FACS, New York, NY

11:20 **Objective Assessment of Olfaction Following Transsphenoidal Pituitary Surgery**
Mohamad R. Chaaban, MD, Birmingham, AL; Ajaz L. Chaudhry, MD, Birmingham, AL; Kristen O. Riley, MD, Birmingham, AL; Bradford A. Woodworth, MD, Birmingham, AL

Educational Objective: At the conclusion of this presentation, the participants should be able to gain some knowledge about olfactory disturbances following transsphenoidal pituitary surgery. In addition, they will be able to compare prior studies to this prospective study regarding the effect of this surgery on olfaction.

Objectives: The goals of this prospective study are to objectively assess olfaction following ETPS and evaluate the impact of vascularized nasoseptal flap reconstruction on olfaction. **Study Design:** Prospective cohort study. **Methods:** Subjects 19 years and older undergoing transnasal endoscopic pituitary surgery were recruited for this study. The University of Pennsylvania Smell Identification Test (UPSIT) was administered preoperatively and postoperatively at >3 months. Data regarding demographics, reconstructive technique, and complications were recorded. Patients had skull base reconstruction with a Medipore implant or a vascularized nasoseptal flap. **Results:** A total of 33 subjects were recruited with 18 completing the study. The mean preoperative smell score was 32 ± 1. The majority (89%) of patients had nonfunctioning macroadenomas and 33% (n=6) were reconstructed using a vascularized nasoseptal flap. Matched mean preoperative UPSIT score for this cohort was 31.3 ± 0.4 and not significantly different than mean postoperative UPSIT scores that was 30.5 ± 0.5. (p>0.05). **Conclusions:** Pre and postoperative UPSIT scores do not seem to be significantly different in patients who underwent endoscopic transnasal pituitary surgery. The use of nasoseptal flap did not adversely affect postoperative UPSIT scores.

11:27 **Immunologic Profile of Nasal Polyps in Chronic Rhinosinusitis**
Clara M. Olcott, MD, Norfolk, VA; Maria J. Benson, BS, Norfolk, VA; Christopher P. Benson, BS, Norfolk, VA; Matthew J. Butcher, MS, Norfolk, VA; Elena V. Galkina, PhD, Norfolk, VA; Joseph K. Han, MD, Norfolk, VA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the immunologic differences in CRSwNP and CRSsNP as well as the significance of IL-6 and IL-8 in CRSsNP.

Objectives: The pathophysiology of chronic rhinosinusitis (CRS) is complex and is divided into CRS with nasal polyps (CRSwNP) and CRS without nasal polyps (CRSsNP). These CRS groups are likely different entities. This study is to compare interleukin (IL)-8 and IL-6 levels in CRSwNP and CRSsNP to define their immunologic profile. **Study Design:** Prospective case control study. **Methods:** Nasal polyp or sinus mucosal specimens from CRSwNP, CRSsNP and control groups were collected and processed. IL-6 and IL-8 were measured by flow cytometry. Cells were gated for CD45 and CD4 to identify Th2 cells. Percentage of CD45+CD4+ cells expressing IL-6 and IL-8 were identified. The percentages of IL-6 and IL-8 producing cells were compared between the 3 groups using the same analysis. **Results:** Sixty-nine specimens were collected (control:15, CRSsNP:21, CRSwNP:33). The mean percentages (%) of CD45+CD4+Th2 cells expressing IL-6 in CRSsNP, CRSwNP and control were 0.941, 0.273 and 0.0522 respectively (95% confidence interval= 0.396-1.49, 0.131-0.412 and -0.0286-0.133; p=0.001); whereas those of CD45+CD4+Th2 cells expressing IL-8 were 1.62, 0.876 and 0.233 (95% CI= 0.418-2.83, 0.291-1.46 and -0.213-0.680 respectively; p=0.153). IL-6 and IL-8 levels were both elevated in CSRsNP compared to CRSwNP and control. **Conclusions:** CD45+CD4+ Th2 cells expressed higher levels of IL-6 in CRSsNP than CRSwNP or control. CD45+CD4+ Th2 cells expressing IL-8 is likely higher in CRSsNP than CRSwNP or control. Targeting the reduction of IL-6 and IL-8 may be a potential treatment for CRSsNP.

11:34 **The Impact of Surgical Trainee Participation on Sinus Surgery Outcomes**

Josh C. Meier, MD, Boston, MA; Aaron K. Remenschneider, MD, Boston, MA; Stacey T. Gray, MD, Boston, MA; Eric H. Holbrook, MD, Boston, MA; Richard E. Gliklich, MD, Boston, MA; Ralph B. Metson, MD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to assess the impact of trainee participation on sinus surgery outcomes.

Objectives: To determine the effect of otolaryngology trainee participation on clinical outcomes of endoscopic sinus surgery (ESS) for chronic rhinosinusitis (CRS). **Study Design:** Secondary analysis of prospectively collected data. **Methods:** Patients enrolled in a sinus surgery outcomes study between May, 2011 and March, 2013 were stratified into two groups—those operated on by an attending alone and those operated on by an attending with a trainee present (resident, fellow or both). Patients completed quality of life surveys (CSS, SNOT-22, EQ-5D) at baseline and one year following surgery. Operative time, estimated blood loss, complication rates, and survey scores were compared between groups. **Results:** The study population consisted of 452 patients. The attending alone (n=119) and trainee (n=333) groups were statistically comparable in terms of patient demographics, disease severity, and extent of surgery. Mean operative time was significantly shorter in the attending alone group (80.0 vs. 90.6 minutes, p = 0.001). Median estimated blood loss (50.0 ml vs. 50.0 ml, p=0.771), and complication rates (3.3% attending vs. 0.6% trainee, p=0.073) were similar between groups. Observed changes in quality of life measures following sinus surgery were also comparable between groups, although absolute improvement in the SNOT-22 scores (19.0 attending vs. 24.5 trainee, p=0.050) did approach statistical significance with a trend toward greater improvement in the trainee group. **Conclusions:** Trainee participation in sinus surgery is associated with prolongation in surgical time; however such participation was not found to adversely affect patient safety or clinical outcomes.

11:41 **A Review of the Pan Positive SNOT-20 Patients**

Alexander J. Caten, MD, Augusta, GA; Christopher Z. Johnson, PharmD, Augusta, GA; Jose G. Gurrola, MD, Augusta, GA; Stilianos E. Kountakis, MD PhD, Augusta, GA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the SNOT 20 questionnaire for sinusitis and the impact of the pan positive patients.

Objectives: The sinonasal outcomes test (SNOT20) is a validated tool to assess treatment outcomes in patients with chronic rhinosinusitis (CRS). We observed in the clinic that when patients responded with a positive score on all 20 items of the SNOT20 questionnaire (pan positive patients) often did not have evidence of CRS upon workup. Many of these patients had other underlying diseases contributing to their complaints. **Study Design:** Retrospective review of prospectively collected database. **Methods:** Analysis of prospectively collected data was performed to identify SNOT20 pan positive patients and compared them to 100 consecutive non-pan positive patients, who served as the control group. The following parameters were compared between the two patient groups: presence or absence of chronic diseases such as obstructive sleep apnea, depression, anxiety, fibromyalgia, chronic pain, headaches, temporomandibular joint disease, and arthritis, in addition to sinus CT Lund-McKay scores and nasal endoscopy Lund-Kennedy scores. We also reviewed the medication list of each patient to look for the possible presence of mental illness. Statistical analysis was performed using the chi-squared and Student t-test. **Results:** 122 pan positive patients were identified in our database collected from 2003-2011. Pan positive patients had higher incidence of depression, fibromyalgia, anxiety, pain, headache, use of depression medications, and they also had higher SNOT20 and endoscopy scores when compared to controls ($p<0.05$). Pan positive patients were more likely female ($p<0.05$) but age and race differences did not reach statistical significance. **Conclusions:** The SNOT20 questionnaire assists clinicians to monitor outcomes in patients treated for CRS. However, clinicians should suspect other underlying chronic conditions in SNOT20 pan positive patients.

11:48 **Sinonasal Symptoms and Clinical Findings in Patients with Primary Headache Syndrome versus Chronic Rhinosinusitis**

Joshua C. Yelverton, MD, Augusta, GA; Thomas W. Holmes, BS, Augusta, GA; Stilianos E. Kountakis, MD PhD, Augusta, GA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the symptoms and clinical findings at initial presentation of primary headache syndrome as compared to chronic rhinosinusitis.

Objectives: To compare sinonasal symptoms and clinical findings of patients with primary headache syndrome (PHS) to those with chronic rhinosinusitis (CRS) at initial presentation. **Study Design:** Analysis of prospectively collected data. **Methods:** Patients with PHS were identified from a prospectively collected database at a tertiary referral institution. Symptom scores from the initial visit were obtained using a visual analog scale. Sinonasal Outcome Test scores and Lund-Kennedy endoscopy scores were obtained for each patient. Lund-McKay CT scores were calculated, if available. The control group consisted of randomly selected patients with CRS. **Results:** One hundred seventy-three patients were identified with PHS and 173 randomly selected patients with CRS served as control. Of the 173 patients with PHS, 139 (80%) were female, versus 85 (49%) females in the CRS group ($p<0.001$). In general, PHS presented with more severe symptoms. Average SNOT-20 scores were 37.8 and 22.6 for PHS and CRS, respectively ($p<0.001$). PHS patients rated their symptoms much more severe than CRS patients in every category on the wellness portion of the SNOT-20 survey ($p<0.05$ for all symptoms). Sinonasal symptoms were similar between groups. Loss of smell and taste ere the only symptom with higher scores

in CRS versus PHS (p<0.001). Objective endoscopy and CT scores were both significantly higher for patients with CRS (p<0.001). **Conclusions:** Overall, patients with PHS report more severe symptoms than those with CRS. Loss of smell and taste can suggest the patients most likely with CRS. Endoscopy and CT scores are higher in patients with CRS compared to patients with PHS.

11:55 **James Harrill, MD Resident Research Award**
Why Sinonasal Disease Spares the Inferior Turbinate—An Immunohistochemical Analysis
Lauren Crosby White, MD, Augusta, GA; Paul M. Weinberger, MD, Augusta, GA; Hannah C. Coulson, MD, Augusta, GA; Dehuang Guo, PhD, Augusta, GA; David W. Jang, MD, Durham, NC; Stilianos E. Kountakis, MD, Augusta, GA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss embryological origins of sinus anatomy and discuss inflammatory markers for chronic sinusitis.

Objectives: The purpose of this study is to investigate differences in protein expression of inferior turbinate and middle turbinate tissue in patients with chronic rhinosinusitis (CRS) to further evaluate clinically the observed difference that sinonasal diseases affects structures such as the middle turbinate (MT) while leaving the inferior turbinate (IT) healthy and free of disease. **Study Design:** Prospective cohort. **Methods:** Pathologic specimens obtained from patients with CRS undergoing functional endoscopic sinus surgery with inferior turbinate reduction were evaluated by immunohistochemical analysis of inflammatory markers cysteinyl leukotriene 1 (CysLT1), toll-like receptor 2 (TLR2) and vascular cell adhesion molecule 1 (VCAM1). Protein expression was quantified with Nuance Multispectral analysis and results compared between middle turbinate and inferior turbinate tissue. **Results:** The total expression of VCAM1 and CysLT1 was decreased in the IT compared to the MT. There was no difference in total TLR2 expression between the IT and MT. When comparing patients with eosinophilic (eCRS) to non-eosinophilic (neCRS), there was decreased expression of VCAM1 in the IT of patients with neCRS. When comparing patients with nasal polyposis to those without polyps, there was decreased expression of VCAM1 in the IT of patients without polyps. **Conclusions:** There is a difference in protein receptor expression of VCAM1 and CysTL1 in middle turbinate tissue compared to inferior turbinate tissue. While the leukotrienes are a well-known target for treatment of chronic sinusitis, this is the first study demonstrating an up-regulation of VCAM1 expression in the middle turbinate and could be a potential future target for the treatment of CRS.

12:02 **Familial Risk of Chronic Rhinosinusitis in Children with and without Nasal Polyposis**
Quinn Orb, BA, Salt Lake City, UT; Jeremy D. Meier, MD, Salt Lake City, UT; Gretchen M. Oakley, MD, Salt Lake City, UT; Karen Curtin, PhD MStat, Salt Lake City, UT; Richard R. Orlandi, MD FACS, Salt Lake City, UT; Jeremiah A. Alt, MD PhD, Salt Lake City, UT

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the familial risks associated with chronic rhinosinusitis in pediatric patients.

Objectives: Determine the risk of CRS in relatives of children with a diagnosis of CRS. **Study Design:** Retrospective observational cohort study with population based matched controls. **Methods:** A unique genealogical database linked to medical records was used to identify subjects <18 years old with a diagnosis of CRS with nasal polyps (CRSwNP) and without polyps (CRSsNP) from 1996-2011. The familial recurrence risks of CRS in first degree (FDRs), second degree (SDRs), and more extended relatives of probands were calculated using Cox models and compared to 10:1 matched controls. **Results:** We identified 4,458 non-cystic fibrosis patients with CRSsNP and 1,330 patients with CRSwNP. In both groups, FDRs, SDRs, and first cousins of probands demonstrated a significant increased risk of having CRSsNP or CRSwNP themselves. FDRs of patients with CRSsNP were at 10.5 fold increased risk (P<10-16) primarily in siblings. FDRs and SDRs combined had a 9.2 fold increased risk (P<10-16) while first cousins were at a 2 fold increased risk (P<10-2). In patients with CRSwNP, FDRs and SDRs combined were at a significant increased risk although the estimate was imprecise due to small numbers (HR=7.7, P<0.01). **Conclusions:** In the largest population study to date of children with CRS, a significant familial risk is confirmed in CRSwNP and CRSsNP. Further understanding of the genetic basis of CRS and its interplay with environmental factors could clarify the etiology and lead to more effective targeted treatments.

12:09 **Q&A**

12:15 ***Adjourn Scientific Sessions***

12:30 - 2:00 **TRIOLOGICAL SOCIETY THESIS SEMINAR *(candidates and prospective candidates) - Windsor Complex***

12:30 - 2:00 **RESIDENT BOWL - KNOWLEDGE MATCH - Coronet**

GOLF OUTING

1:30 - 5:00 ***AMERICAN SOCIETY OF GERIATRIC OTOLARYNGOLOGY SCIENTIFIC SESSION -***
California Cabanas (Program available at this link)

Free Afternoon/Free Evening

SATURDAY, JANUARY 24, 2015

7:00 - 7:50 **Triological Society Business Meetings - Fellows Only**
Eastern Section - Windsor Complex
Middle Section - Continental

8:00 **Announcements by Vice Presidents**

8:05 - 10:00 CONCURRENT SESSION 1
PEDIATRICS

CROWN ROOM

Moderators: Kay W. Chang, MD, Stanford, CA
Blake C. Papsin, MD FACS, Toronto, ON Canada

8:05 **Update on Prospective Parental Quality of Life Survey in the Treatment of Laryngomalacia**
James D. Phillips, MD, Little Rock, AR; Jennings R. Boyette, MD, Little Rock, AR; Lauren A. Kilpactrick, MD, Little Rock, AR; Tara L. Rosenberg, MD, Little Rock, AR; Jessica C. Taylor, MS, Little Rock, AR; Gresham T. Richter, MD, Little Rock, AR

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the effects of laryngomalacia in parental quality of life, and how that might direct method of treatment.

Objectives: A parent's perception of their infant's health is dramatically affected by its ability to breathe and feed. Laryngomalacia is present, in varying degrees, in over 5% of infants and treated based upon its effect on respiration, swallowing, and weight gain. How laryngomalacia affects a parent's quality of life (QOL) may help guide therapy. This study aims to update the QOL outcomes of parents with infants with laryngomalacia. **Study Design:** Prospective QOL survey was randomly conducted on families of infants newly diagnosed with laryngomalacia. **Methods:** A 29 question survey, administered at initial and post-treatment visits, evaluated symptom frequency and parental response to their child's symptoms. A Likert scaling system was used and ranged from 1 (never) to 5 (always). **Results:** Forty-eight patients were enrolled in the study; twenty patients were managed with medication alone and twenty-eight underwent supraglottoplasty. The overall mean QOL score for patients treated medically was 2.62 (standard deviation, 0.54) on initial visit and 1.69 (SE 0.46) post-treatment. Patients undergoing supraglottoplasty had a mean QOL score of 3.35 (SE 0.63) on initial visit and 2.17 (SE 0.82) post-treatment (mean 3.5 months). A two tailed t-test revealed significant improvement after treatment in both groups ($p < 0.05$). There was not a significant difference between groups for the degree of post-treatment QOL improvement ($p > 0.05$). **Conclusions:** Prospective QOL assessment of children with laryngomalacia and their families reveals a significant burden of disease which is improved with both medical and surgical therapies.

8:12 **Short Term Quality of Life Outcomes after Pediatric Septoplasty**
Victoria S. Lee, MD, Seattle, WA; Rebecca M. Gold, BA, Woodinville, WA; Sanjay R. Parikh, MD FACS, Seattle, WA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the short term effect of pediatric septoplasty on quality of life and identify factors that may be associated with improved short term quality of life.

Objectives: Pediatric septoplasty remains controversial. There is a lack of studies assessing its effect on quality of life (QOL) using validated surveys. The primary aim was to evaluate the short term effect of pediatric septoplasty on QOL using the SN-5 survey and a visual analog scale (VAS). The secondary aim was to identify factors associated with improved QOL outcomes. **Study Design:** Retrospective case series. **Methods:** 28 pediatric patients that underwent septoplasty were included. Pre and postoperative SN-5 and VAS scores were obtained and compared using a Wilcoxon signed rank test. Comparisons of pre to postoperative improvements by gender (male versus female), age (under 13 versus 13 and over), and surgical approach (closed versus open) were performed using a Mann Whitney U test. **Results:** There was a significant improvement in mean SN-5 and VAS scores after undergoing septoplasty ($p<0.001$ and $p<0.001$, respectively). Females reported significantly greater pre to postoperative improvements in mean SN-5 and VAS scores than males ($p=0.012$ and $p=0.006$, respectively). Comparisons of pre to postoperative improvements by age and surgical approach were not significant. **Conclusions:** Pediatric patients have improved quality of life after undergoing septoplasty. Female patients had greater levels of improvement after septoplasty, which may indicate that they experience more symptomatic benefit from septoplasty than male patients. Older age and a closed surgical approach did not show greater levels of improvement, in contrast to what previous studies have suggested.

8:19 **The Use of Propranolol in the Treatment of Subglottic Hemangiomas: A Literature Review and Meta-Analysis**
Scott A. Hardison, MD, Richmond, VA; Wen W. Wan, MD PhD, Richmond, VA; Kelley M. Dodson, MD, Richmond, VA

Educational Objective: This study aims to 1) describe the origins of the use of propranolol in the treatment of subglottic hemangiomas; 2) perform meta-analysis of all case reports and series in which propranolol was used to treat subglottic hemangiomas.

Objectives: 1) Describe the origins of the use of propranolol in the treatment of subglottic hemangiomas; 2) perform meta-analysis of all case reports and series in which propranolol was used to treat subglottic hemangiomas. **Study Design:** Literature review and meta-analysis. **Methods:** A total of 61 cases were identified from 19 scholarly articles. Cases were assessed by parameters including age at diagnosis, presence of other hemangiomas, percent airway obstructed, dose of propranolol, treatment duration, age at therapy termination, use of steroids, and treatment failure. Treatment failure was defined as: 1) need for surgery after initiation of propranolol; 2) return of symptoms, or 3) endoscopic worsening/recurrence of hemangioma. All data was subjected to comprehensive statistical analysis. **Results:** Several key trends were identified from the collected data. Increasing doses of propranolol showed a positive association with percent decrease in airway obstruction (p=0.0158). Accordingly, a trend was noted towards a decreased failure rate with increasing doses of propranolol (p=0.0568). The use of steroids was associated with a higher failure rate, p=0.0443 (chi-square). Notably, no associations were observed between the presence of additional hemangiomas or increased initial percent airway obstruction with treatment failure. **Conclusions:** Propranolol is rapidly becoming the standard of care in the treatment of subglottic hemangiomas. Despite widespread adoption, the rarity of this condition has limited previous studies to case reports and small series. No evidence based guidelines exist for proper dosing of propranolol. The results of this meta-analysis suggest a benefit to higher doses of propranolol (3 mg/kg/day).

8:26 **The Role of Tonsillectomy in the Management of Children with PANDAS/PANS and Its Efficacy Relative to Treatment with Intravenous Immune Globulin (IVIG)**
Earl H. Harley, MD, Washington, DC; Nathan J. L'etoile, BS, Philadelphia, PA; Elizabeth M. Latimer, MD, Bethesda, MD

Educational Objective: At the conclusion of this presentation, the participants should be able to identify the symptoms of PANDAS/PANS and be familiar with a treatment option.

Objectives: The aim of our research was to assess the efficacy of tonsillectomies in reducing symptoms in children with PANDAS/PANS. **Study Design:** This was a retrospective review of 50 patients who were diagnosed with PANDAS/PANS. **Methods:** The study was conducted by reviewing the pediatric neurologist's office notes and a structured telephone interview of the parents. **Results:** Information was available for 44 children. For the purpose of analysis five cohorts were identified. Group 1 received tonsillectomy alone. Group 2 received tonsillectomy followed by IVIG. Group 3 received IVIG before tonsillectomy. Group 4 received IVIG followed by tonsillectomy and IVIG again. Group 5 did not receive tonsillectomy. Symptoms included OCD's, tics, frequent urination, initial insomnia, interrupted sleep, anxiety, separation anxiety, dysgraphia, aggressive behavior, behavior regression and choreiform movements. There was a statistically significant improvement in the symptoms in children who received tonsillectomy first followed by IVIG. In the no tonsillectomy group there was some improvement in most symptoms except tics. **Conclusions:** Tonsillectomies may be an important adjunct in the treatment of PANDAS/PANS. Patients who received tonsillectomies saw more decrease in symptom prevalence than those who opted not to have a tonsillectomy. Most notable is the fact that tics in patients who received a tonsillectomy were reduced 43.75% (p=0.0004); whereas, tics were not reduced at all in the patients who received no tonsillectomy. Additionally, IVIG was noted to be more effective post-tonsillectomy than prior to the surgery.

8:33 **The Risks of Neuromuscular Blockade Agents in Pediatric Patients following Tracheostomy**
Charles A. Elmaraghy, MD, Columbus, OH; Eric L. Bauer, BS, Columbus, OH; Justin L. Mahida, MD, Columbus, OH; Brandis Roman, MS, Columbus, OH

Educational Objective: At the conclusion of this presentation, the participants should be able to determine the risks of use of neuromuscular blockade agents in pediatric patients following tracheostomy.

Objectives: The purpose of this study is to investigate the risks of use of neuromuscular blockade agents in pediatric patients following tracheostomy. Sedation protocols are used for pediatric patients following tracheostomy and the hypothesis is use of paralytic agents in these protocols is a risk factor for prolonged intensive care unit stay and hospitalization. This study will investigate this hypothesis. **Study Design:** Retrospective chart review of pediatric patients (0-18 years old) who had tracheostomy placed at our hospital between 2012-2013. **Methods:** Retrospective chart review of pediatric patients (0-18 years) who had tracheostomy placed at Nationwide Children's Hospital between 2012-2013. Sedation protocol was documented and identification of patients that required use of neuromuscular blockade and those that did not were documented. Comorbidities, indications for tracheostomy, and other confounding variables were documented. Statistical analysis comparing patients that had neuromuscular blockade postoperatively were compared with those that did not require these agents. Length of stay in ICU and hospital were compared between the groups as well as postoperative complications, pneumonia, length of time on ventilator, and other confounding variables. **Results:** 63 patients were identified by retrospective chart review. 48 patients had neuromuscular blockade and 15 patients did not. Preliminary statistical analysis using Student's t-test revealed a statistically significant increase in the length of stay of pediatric patients who had neuromuscular blockade (48 days) compared

to those that did not (28 days) with p=0.0108. **Conclusions:** The use of neuromuscular blockade in pediatric patients following tracheostomy increases the length of stay. Caution should be used when these agents are part of a postoperative protocol.

8:40 **Subjective Visual Vertical Testing in Children and Adolescents**
Jacob R. Brodsky, MD, Boston, MA; Brandon A. Cusick, MBA BBA, Boston, MA; Margaret A. Kenna, MD MPH, Boston, MA; Guangwei Zhou, ScD CCC-A, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the role of the subjective visual vertical (SVV) test in the evaluation of children with vertigo.

Objectives: Subjective visual vertical (SVV) is a vestibular test commonly used in adults that has not been well studied in children. In this test the patient aligns a projected line with the perceived true vertical in darkness. Deviation of >2 degrees is associated with utricular dysfunction and may also be seen with central vestibular lesions. The goal of this study was to determine the efficacy of SVV in children. **Study Design:** Prospective, controlled study. **Methods:** Thirty-three children aged 7-18 years with (n = 21) and without dizziness (n = 12) underwent static SVV. History, exam, rotary chair, and caloric testing were used to categorize subjects into groups with peripheral vestibular loss, benign paroxysmal positioning vertigo (BPPV), central vertigo, and non-vestibular dizziness. Results were also analyzed by 2 year age group. **Results:** Mean SVV score was significantly higher in the peripheral vestibular loss group (n = 4; 2.1 ± 1.48) compared to BPPV (n = 5; 0.4 ± 0.31; p = 0.005), central vertigo (n = 7; 0.5 ± 0.37; p = 0.003), non-vestibular dizziness (n = 5; 0.6 ± 0.44; p = 0.01), and control (n = 12; 0.7 ±0.49; p = 0.004) groups by one way ANOVA. Mean SVV scores did not differ significantly between age groups. SVV > 2 degrees demonstrated a sensitivity of 100%, specificity of 75%, positive predictive value of 100%, and negative predictive value of 97% for peripheral vestibular loss. **Conclusions:** SVV is a simple, noninvasive test that provides a valuable contribution to the assessment of peripheral vestibular function in children.

8:47 **Examination of Subglottic Distraction and Cricoid Cartilage Genesis for Laryngotracheal Stenosis**
Patrick D. Munson, MD, Sioux Falls, SD; Teri N. Moak, MS, Little Rock, AR; Yuemeng M. Dai, MD PhD, Little Rock, AR; Gresham T. Richter, MD, Little Rock, AR

Educational Objective: At the conclusion of this presentation, the participants should be able to understand a novel animal model for distraction chondrogenesis for subglottic stenosis.

Objectives: To expand the cricoid cartilage using newly available micro-distractors in an animal model in an attempt to overcome severe subglottic stenosis while avoiding morbidity and complications associated with presently used open surgical techniques. **Study Design:** In vivo animal model. **Methods:** Four white New Zealand rabbits age four weeks underwent implantation of newly available micro-distraction devices. The devices were seated along either side of the midline of the cricoid cartilage ring and activated for distraction. Following a 48 hour latency period, the rabbits then underwent 0.25mm of cricoid cartilage distraction daily for 20 days, yielding a total of 5mm distraction distance. At the completion of the distraction period, two weeks were allowed for consolidation of cricoid cartilage in all rabbits. Laryngotracheal cartilage complexes were then grossly inspected and surgically removed from the rabbits. Specimens were stained with hematoxylin-eosin (H&E) and safranine O/fast green for morphological/vascular assessment and cartilage content in addition to staining for detection of the presence of type II collagen in the distracted segment of the cricoid cartilage ring. **Results:** Neocartilage was present at either edge of the distracted segment of cricoid cartilage in addition to limited neocartilage formation at the central aspect of the distracted segments. Growth of type II collagen at either edge of the distracted segment of cricoid cartilage was observed. Type II collagen was most predominately located at the edges of the original cricoid ring incision with limited presence of type II collagen in the central aspect of the distracted segment. **Conclusions:** The results of this study indicate that chondrogenesis can be stimulated at the cricoid cartilage ring via slow distraction of implantable micro-distractors. Further, the neocartilage present in the distracted segments of the specimens is highly composed of type II collagen, thus mimicking the naturally occurring cartilage at the cricoid ring.

8:52 **Do Children with Unilateral Hearing Loss Have Lower Intelligence Quotient scores? A Meta-Analysis**
Patricia L. Purcell, MD, Seattle, WA; Justin R. Shinn, BS, Seattle, WA; Greg E. Davis, MD MPH, Seattle, WA; Kathleen C.Y. Sie, MD, Seattle, WA

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the degree to which published investigations have detected an association between pediatric unilateral hearing loss and reduction in intelligence quotient score.

Objectives: Previous studies have suggested that children with unilateral hearing loss may have lower intelligence quotient (IQ) scores than children with normal hearing. This review investigates the difference in verbal and full scale IQ scores of children with unilateral hearing loss when compared to children with normal hearing by performing a meta-analysis of observational studies. **Study Design:** Meta-analysis and systematic review. **Methods:** Medline/PubMed, Embase, CINAHL and PsychInfo databases were queried to identify all studies related to pediatric unilateral hearing loss that had been published between January 1980 and May 2014. Titles, abstracts and articles were reviewed to identify observational studies reporting verbal and full scale IQ scores. Meta-analysis using a random effects model was performed. **Results:** Search strategy identified 3 observational studies with a total of 152 children with unilateral hearing loss and 179 children with normal hearing. Meta-analysis using random effects model found children with unilateral hearing loss to have

a verbal IQ score 9.1 points lower than normal hearing peers, 95% CI [-18.7 - 0.6]; however, this difference did not reach significance, p-value 0.066. Children with unilateral hearing loss had a significantly lower full scale IQ score, p-value 0.01, scoring 6.4 points lower than normal hearing peers, 95% CI [-11.2 - -1.5]. **Conclusions:** Meta-analysis found children with unilateral hearing loss to have lower verbal and full scale IQ scores than normal hearing peers, but the difference was only significant in the case of full scale IQ score. Additional investigations evaluating the impact of unilateral hearing loss are warranted.

8:59 **Q&A**

9:05 - 10:00 **MANAGEMENT OF PEDIATRIC "SINUSITIS"**
Moderator: Scott C. Manning, MD FACS, Seattle, WA
Panelists: Kenny H. Chan, MD FACS, Aurora, CO
Michael J. Cunningham, MD FACS, Boston, MA
Hassan H. Ramadan, MD FACS, Morgantown, WV

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

8:05 - 10:00 CONCURRENT SESSION 2
GENERAL

CALIFORNIA CABANAS

Moderators: Donald T. Donovan, MD FACS, Houston, TX
Steven M. Parnes, MD FACS, Albany, NY

8:05 - 9:05 **PREPARING FOR PRACTICE - IS FEE FOR SERVICE DYING?**
Moderator: Fred D. Owens, MD, Dallas, TX
Panelists: Susan R. Cordes, MD FACS, Indianapolis, IN
Sigsbee W. Duck, MD FACS, Rock Springs, WY
David R. Edelstein, MD FACS, New York, NY
Michael Setzen, MD FACS, Great Neck, NY

9:05 **Factors Affecting Patient Decision Making Involving Elective Surgery: Implications for Educating Referring Providers**
Maya G. Sardesai, MD MEd, Seattle, WA; Jessica A. Au, ARNP, Seattle, WA; Joseph Y. Shen, BSc, Seattle, WA; Sara Kim, PhD, Seattle, WA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the factors that influence patient decision making about elective procedure involving the head and neck.

Objectives: To determine the relevance of factors that influences a patient's decision to pursue elective surgery involving the head and neck. **Study Design:** Prospective survey study. **Methods:** Adult patients undergoing elective surgery involving the head and neck by one of several surgeons at a single institution were invited to participate in a voluntary survey study asking about the relative importance of 30 factors that might have influenced their decision to pursue surgery. **Results:** Complete data was obtained from 29 respondents. Most were undergoing nasal, palate or tonsil procedures. More than half the subjects reported having made the decision to proceed with surgery prior to their initial consultation with their surgeon. These patients were more likely to weigh information received from their primary provider more heavily than did the other group. Interestingly, patients who decided to pursue surgery after meeting their surgeon tended to weigh information obtained from the internet more heavily. Subjects in both groups weighed their symptoms as a very important factor influencing their decision. Those who decided on surgery after meeting their surgeon rated concerns about medical bills more highly than those who had decided earlier. **Conclusions:** This study suggests that since many patients decide to pursue surgery even before meeting their surgeon, head and neck surgeons should ensure primary and referring providers are well educated about elective head and neck procedures. The study also confirms the importance of electronic media in patient education. Finally, the influence of insurance and medical costs on patients' medical decision making is highlighted.

9:12 **Assessment Impact on Learner Attitudes and Performance in Simulation Boot Camp**
Steven R. Kapeles, BS, Ann Arbor, MI; Marc C. Thorne, MD MPH, Ann Arbor, MI

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the impact of assessment on learner attitudes and performance in simulation course settings.

Objectives: To determine how faculty assessment affects learner attitudes and performance in a simulation boot camp. **Study Design:** Randomized prospective cohort study. **Methods:** 44 PGY1&2 learners were randomly assigned to covert or overt groups for faculty assessment on OSAT task trainers for myringotomy and tube placement and airway endoscopy. Those in covert group were unaware of assessment, while overt group were briefed before and after simulation on performance via OSAT rubric. Learner attitudes were assessed through pre/post-course questionnaires. Statistical analysis performed using Mann-Whitney-U and Wilcoxon signed rank tests. **Results:** For total population: n=44 (covert=22, overt=22), overall surgical performance (OSP) improved for endoscopy and tympanostomy tube simulation (p=<.0001, <.001 respectively) with statistically significant (p<.05) increases in all trainer subcategories. Paired comparison of learner pre and post-course self-assessment showed significant increase for 9/9 questionnaire items. 69.2% agreed/strongly agreed they felt assessed regardless of written feedback and this did not differ between covert/overt groups (p=.916), 5.2% reported preference for no assessment. There was no difference between covert/overt for OSP improvement in myringotomy and tube placement (p=.927); however, the overt group improved significantly more in OSP for the airway endoscopy trainer (p=.048). 52.4% of overt group agreed/strongly agreed formal assessment enhanced their learning. **Conclusions:** These findings suggest that learner's accept formal assessment in simulation settings. Overt assessment did not hinder learner performance and may potentially improve educational outcomes.

9:19 **Pediatric Persistent Obstructive Sleep Apnea: Identifying Gaps in Evidence**

Alice Tang, MD, Cincinnati, OH; Stacey L. Ishman, MD MPH, Cincinnati, OH; Sally R. Shott, MD, Cincinnati, OH; Raouf S. Amin, MD, Cincinnati, OH; Barbara Chini, MD, Cincinnati, OH; Matthew C. Gropler, BA, Cincinnati, OH

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the gaps in evidence for the management of children with persistent pediatric OSA.

Objectives: Up to 40% of children have obstructive sleep apnea (OSA) after adenotonsillectomy. We evaluated the basis of our treatment decisions for children in a clinic devoted to treatment of persistent pediatric OSA and found that a significant number were not evidence based decisions. The aim of this study was to identify the gaps in evidence for treatment of children with persistent pediatric OSA. **Study Design:** Prospective study. **Methods:** All decisions made by 12 fellowship trained pediatric specialists representing 8 specialties participating in upper airway clinics and weekly treatment conferences were collected in real time. Physicians were immediately queried regarding the basis of their decisions. Decisions that were then classified as evidence or experience based. **Results:** Over 2 months, 537 decisions (41/encounter) were made during 10 case conferences and 3 clinics. Decisions were experience based 43% (n=230) of the time and most commonly referred to the timing and appropriate subspecialty clinic followup location (112/230, 49%) as well as indications for polysomnography (45/230, 19%), especially in children at high risk for persistent OSA (e.g. children with Down syndrome or obesity). Additional gaps identified included the likelihood of OSA improvement from weight loss, surgical effectiveness of supraglottoplasty, lingual tonsillectomy, partial midline glossectomy and tongue suspension alone and/or in combination. **Conclusions:** Treatment decisions for children with persistent OSA were experience based 43% of the time. Gaps in the evidence base were identified for both surgical and medical treatment options and included time and location of followup, appropriate use of polysomnography for surveillance and effectiveness of surgical procedures in multiple patient populations.

9:26 **Complex Nontuberculous Mycobacteria Lesions of the Head and Neck: What is the Optimal Approach?**

Cristian Daniel Gonzalez, BS BA, Salt Lake City, UT; Matthew Miller, MD, Iowa City, IA; Matthew G. Petersen, BS, Salt Lake City, UT; Albert H. Park, MD, Salt Lake City, UT; Kevin F. Wilson, MD, Salt Lake City, UT

Educational Objective: At the conclusion of this presentation, the participants should be able to understand and utilize our recommended treatment algorithm for difficult cases of NTM cervicofacial lymphadenitis in pediatric patients.

Objectives: Assess the role of combined antimicrobial and surgical therapy for difficult to treat nontuberculous mycobacteria (NTM) lesions of the head and neck in children. **Study Design:** Retrospective cohort. **Methods:** Retrospective review of pediatric head and neck NTM lesions at a tertiary children's hospital from 1999-2012. **Results:** Seventy-three children were diagnosed with NTM lesions. Age of presentation ranged between 7 and 204 months of age. Many patients (41%) had multiple synchronous lesions. The most common sites of involvement were neck (68%), parotid (41%), and submandibular (21%). Treatment included incision and drainage, curettage, antibiotics, excision and any combination of surgery and antibiotics. The most common treatment was surgical excision alone with excellent outcome (3% disease recurrence). 14 cases (19%), however, required a combination of antibiotics and surgical excision because of the extent or location of the lesions. The outcome for these patients was also good, with disease recurrence occurring in 7% of patients. The most common complications included temporary or permanent facial nerve dysfunction (21.9%), Frey's syndrome (5.5%), and medication intolerance (4.1%). **Conclusions:** The majority of patients treated with complete surgical resection had an excellent outcome. 14 cases required a combination of antibiotic and surgical excision since complete surgical resection would result in significant morbidity. These patients also had an excellent outcome. In a minority of cases, there may be a role for antimicrobial therapy to achieve disease control. From our series, we recommend an algorithm for managing these difficult cases.

9:33 **The Diagnostic Assessment of Fish Bone and Chicken Bone Impactions in the Emergency Department Setting: Measuring the Utility of the Plain Film Screen**

Stanley Voigt, MD, Boston, MA; Karthik Devarajan, BSc, Boston, MA (Presenter); Scott G. Weiner, MD MPH, Boston, MA; Sunil Shroff, MD, Boston, MA; Richard O. Wein, MD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to explain how plain films of the neck may be a poor screening method in the evaluation of fish and chicken bone impactions. They should also be able to discuss the importance of associated system outcomes (such as length of stay, cost, and radiation exposure) when evaluating a diagnostic modality.

Objectives: Determining the presence of a foreign body after ingestion of a fish bone or chicken bone is challenging and is typically evaluated in the emergency department (ED) using a screening plain film. We sought to determine the accuracy of the plain film, and if this screening modality effectively spares true negative patients increases in length of stay, cost, and radiation exposure. **Study Design:** Retrospective case series. **Methods:** We reviewed patients 18 years old or older who presented to an urban academic emergency department over a four year period with a complaint of a retained fish or chicken bone and received an initial soft tissue plain film. **Results:** Seventy-eight total patients were included for analysis and 27 cases (31%) were ultimately determined to be positive for the presence of a bone. 6 of 25 initial plain film interpretations correctly identified the bone impaction, a sensitivity of 24.0% (95% confidence interval (CI) 9.4-45.1%). 45 of 50 initial plain film interpretations correctly demonstrated absence of bone impaction, a specificity of 90.0% (CI 78.2-96.7). For initial CT, i.e. a preliminary read from the on-call resident, sensitivity was 75% (CI 19.4-99.4%), and specificity was 100% (CI 59.0-100%). Length of stay (LOS), cost, and radiation dosage were not significantly different between patients who had true bone impactions and those who did not ($p > 0.05$). **Conclusions:** Plain films ordered in the investigation of a fish or chicken bone ingestion are a poor screening tool from both diagnostic and hospital outcomes perspectives as they do not result in decreases in LOS, cost, or radiation for true negative patients.

9:40 **An Assessment of Non-Otolaryngologist Awareness of Sialendoscopy as a Treatment for Radioactive Iodine Induced Sialadenitis**

Shawn M. Stevens, MD, Charleston, SC; Shivangi Lohia, MD, Charleston, SC; Denise M. Carneiro-Pla, MD, Charleston, SC; Marion B. Gillespie, MD, Charleston, SC

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) discuss the pathophysiology underlying radioactive iodine induced (RAI) sialadenitis and how it affects treatment options; 2) identify non-otolaryngologist populations that are unaware of sialendoscopy as a treatment option for RAI sialadenitis; 3) demonstrate knowledge sufficient to educate both patients and non-otolaryngologist colleagues on sialendoscopy for RAI sialadenitis.

Objectives: 1) Assess non-otolaryngologist awareness of the pathophysiology underlying radioactive iodine induced (RAI) sialadenitis and its effect on treatment strategies; and 2) determine if a knowledge gap exists amongst non-otolaryngologists regarding the role of sialendoscopy in the treatment of RAI sialadenitis. **Study Design:** Population study via anonymous questionnaire. **Methods:** An anonymous, twenty item questionnaire was distributed electronically to active members of the American Thyroid Association (ATA). Questionnaire items concerned practitioner demographics, practice geography, scope of practice, pathophysiologic knowledge, and practitioner understanding of surgical and nonsurgical treatment options for RAI sialadenitis. An assessment of referral patterns and responder comfort level with surgical counseling was performed. **Results:** 67 responses were obtained over a 3 month distribution. Endocrinology was the primary scope of practice for 74% of responders. 58% practiced in a large academic medical center. A majority had been in practice more than 10 years. Nearly all responders were very confident in diagnosing and nonsurgical treatment of RAI sialadenitis. Most responders had limited understanding of pathophysiology, and a majority (69%) had limited knowledge of sialendoscopy as treatment for RAI sialadenitis. Only 10% of responders felt comfortable enough with sialendoscopy to refer to an otolaryngologist. Responses did not differ significantly in terms of the practitioner's gender, age, or geography. **Conclusions:** A knowledge gap may exist amongst non-otolaryngologist physicians regarding the role of sialendoscopy in management of RAI sialadenitis. A renewed cross-specialty education initiative may be necessary to ensure cutting edge surgical therapies are consistently offered when indicated.

9:47 **Tongue Blade Bite Test Predicts Mandible Fractures**

John R. Neiner, MD, Shreveport, LA; Gloria C. Caldito, PhD, Shreveport, LA; Tara N. Moore-Medlin, BS, Shreveport, LA; Cherie-Ann O. Nathan, MD, Shreveport, LA

Educational Objective: At the conclusion of this presentation, the participants should be able to demonstrate the utility of the tongue blade bite test in diagnosing mandible fractures.

Objectives: Evaluate the utility of a simple tongue blade bite test in predicting mandible fractures to possibly use this test as an alternative diagnostic tool avoiding unnecessary CT scans. **Study Design:** Retrospective chart review. **Methods:** An IRB approved retrospective review of patients evaluated by the otolaryngology department at a single institution for facial trauma from 11/1/2011 to 2/6/2014 was performed. Patients who had a bite test documented were included in the study. CT had been performed in all cases and was used as the gold standard to diagnose mandible fractures. Variables analyzed included age, sex, fracture type/location on CT, bite test positivity, and operative intervention. **Results:** 86 patients met inclusion criteria and of those 12 were pediatric patients. Majority of the patients were male (80.2%) and adult (86.0% with average age 34.3 years). 57 patients had a negative bite test and on CT scans had no

mandible fracture. 23 patients had a positive bite test and a CT confirmed fracture. The bite test revealed a sensitivity of 88.5% (95% CI 69.8-97.6%), specificity of 95.0% (86.1-99%), PPV of 88.5% (69.8-97.6%) and NPV of 95.0% (CI 86.1-99.0%). Among pediatric patients, the sensitivity was 100% (CI 29.9-100%), specificity 88.9% (68.4-100%), PPV 75.0% (19.4-99.4%) and NPV 100% (63.1-100%). **Conclusions:** The tongue blade bite test is a quick, inexpensive, diagnostic tool for the otolaryngologist with high sensitivity and specificity for predicting mandible fractures. In the pediatric population, where avoidance of unnecessary CT scans is of highest priority, a wider range of data collection should be undertaken to better assess the utility.

9:54 **Q&A**

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

10:30 - 11:45 CONCURRENT SESSION 3
OTOLOGY

CROWN ROOM

10:30 - 11:45 **MANAGEMENT OPTIONS FOR SENSORINEURAL HEARING LOSS**
Moderator: Myles L. Pensak, MD FACS, Cincinnati, OH
Panelists: Craig A. Buchman, MD FACS, Chapel Hill, NC
Rick A. Friedman, MD PhD, Los Angeles, CA
John F. Kveton, MD FACS, New Haven, CT
Samuel C. Levine, MD FACS, Minneapolis, MN

10:30 - 11:45 CONCURRENT SESSION 4
HEAD AND NECK

CALIFORNIA CABANAS

10:30 - 11:45 **AVOIDING PITFALLS OF PARATHYROID SURGERY**
Moderator: David J. Terris, MD FACS, Augusta, GA
Panelists: Eric M. Genden, MD FACS, New York, NY
Douglas A. Girod, MD FACS, Kansas City, KS
Greg A. Krempl, MD FACS, Oklahoma City, OK
Joseph C. Sniezek, MD FACS, Seattle, WA

11:45 - 1:00 ***Lunch - Ballroom***

1:00 - 4:30 GENERAL SESSION

CROWN ROOM

1:00 - 2:30 **IS SUBSPECIALIZATION CHALLENGING OR STRENGTHENING OTOLARYNGOLOGY?**
Moderator: Jonas T. Johnson, MD FACS, Pittsburgh, PA
Panelists: Jeffrey P. Harris, MD PhD FACS, San Diego, CA
Henry T. Hoffman, MD FACS, Iowa City, IA
Richard W. Waguespack, MD FACS, Birmingham, AL

2:30 - 3:00 ***Break /Poster Viewing - Ballroom***

3:00 - 4:30 **WHAT WE WANT AND NEED FROM OUR FACULTY/RESIDENTS**
Moderator: Jesus E. Medina, MD FACS, Oklahoma City, OK
Panelists: Carol R. Bradford, MD FACS, Ann Arbor, MI
Paul A. Levine, MD FACS, Charlottesville, VA
Betty S. Tsai, MD, Oklahoma City, OK
Hamad Chaudhary, MD, Detroit, MI
Jessica M. Van-Beek King, MD, Augusta, GA

Saturday

4:30 **Introduction of Vice Presidents-Elect by Section Vice Presidents**

5:00 - 9:00 ***MEET THE AUTHORS POSTER RECEPTION/POSTER AWARDS WRAP UP PARTY - Ballroom***

Facial Plastic Reconstructive Surgery

1. Warping Characteristics of Costal Cartilage: The Influence of Thickness, Width, and Initial Curvature

Allen Foulad, MD, Irvine, CA; Kevin Ganesh, BS, Irvine, CA; Brian J. Wong, MD, Irvine, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to minimize warping of costal cartilage grafts by understanding the influence of thickness, width, and initial curvature.

Objectives: To determine the influence of thickness, width, and initial curvature of costal cartilage grafts on the amount of warping over time. **Study Design:** Ex vivo animal model. **Methods:** Costal cartilage slices, measuring 40mm in length and 10mm in width, were obtained from the peripheral region of porcine ribs. These slices were cut having 1mm, 2mm, or 3mm thicknesses. A fourth group with smaller widths was formed by cutting the 40mm x 10mm x 2mm slices in half longitudinally, which yielded slices measuring 40mm x 5mm x 2mm. Each of the groups consisted of a sample size of 15 slices. The cartilage slices were immersed in phosphate buffered saline during the entire study and photographed at 0 minutes, 30 minutes, 1 hour, 5 hours, and 24 hours. The angle of curvature was calculated from the photographs at each time point. **Results:** The slices with smaller thicknesses warped significantly more than the slices with greater thicknesses. Specifically, the 1mm thick slices warped more than the 2mm thick slices and the 2mm thick slices warped more than 3mm thick slices. In addition, the slices with the smaller width (5mm) significantly warped more than the slices with the larger width (10mm). There was a positive correlation between the amount of initial curvature and the amount of warping over time. **Conclusions:** The amount of warping in costal cartilage grafts can be minimized by using slices that are thicker, wider, and have a smaller initial curvature.

2. Decreasing Nasal Fracture Recovery Period: A Review of Over-the-Counter Orthotic Face Guards and NCAA Division I Consumer Trends

Jessica R. Gandy, BS, Irvine, CA; Cyrus T. Manuel, BS, Irvine, CA; Natalia M. Molinatti, HS, Irvine, CA; Brian J.F. Wong, MD PhD, Irvine, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) compare and select the appropriate over-the-counter (OTC) orthotic face guards with regards to product design, sport applicability, price, and customer reports; and 2) understand usage trends among NCAA Division I athletic programs.

Objectives: Whether on the professional or amateur level, the answer of when to resume play post-nasal fracture remains vague. Face shields, both custom and OTC are used in order to speed up recovery. While custom face shields are expensive, OTC shields fit universally and are cost effective. There are only a handful of products, and neither current literature review nor evaluation to guide selection by surgeons and consumers exists. The objectives are two-fold: 1) to develop a comprehensive database of OTC face guards; and 2) to determine usage trends among NCAA Division I basketball programs. **Study Design:** Literature review and survey. **Methods:** A database of OTC devices available was generated using results from queries on PubMed and Google. Details about product design and price were acquired from manufacturers. Consumer trends were obtained by contacting athletic trainers at NCAA Division I programs (n=100). **Results:** Eleven OTC products were classified into four categories based on design, pricing ranging between $25.59 and $119.99. 150 schools were contacted and 100 responded, at least one school from each DI basketball conference. Custom guards claimed the majority (44%) with expenses and slow turnaround time being major decision factors. Programs distributing generic brands (24%) dealt with decreased athlete compliance, discomfort, and visibility. **Conclusions:** Many face guard products exist for consumers, but none of them have been scientifically reviewed. This project provides a comprehensive list of devices that can be purchased to protect the nose and face during athletic events, as well as detailing consumer trends among DI programs.

3. Pedicled Rim Flap for Vestibuloplasty

Sharon H. Gnagi, MD, Phoenix, AZ; Salvatore C. Lettieri, MD, Phoenix, AZ

Educational Objective: At the conclusion of this presentation, the participants should be able to identify vestibular stenosis as a complex surgical problem, recognize the different methods available to correct vestibular stenosis, and learn a new, simple technique to address vestibular stenosis.

Objectives: Recognize vestibular stenosis can cause cosmetic and functional problems that are difficult to surgically treat. Review the current methods available to correct vestibular stenosis and learn a new simple and effective technique. **Study Design:** Case report and literature review. **Methods:** A 51 year old male presented with progressive nasal obstruction secondary to vestibular stenosis. The patient had undergone a paramedian forehead flap with rib and auricular cartilage grafting for reconstruction twenty years prior following cancer resection. Since that time, he had 5 subsequent reconstructive surgeries including dorsum prosthesis and removal, V to Y advancements of the columella and bilateral ala, and a nasolabial flap to the columella. On physical examination, the flap encompassed approximately 75% of the nose with vestibular stenosis bilaterally. The ala was thick and scarred, leaving a slit-like vestibular opening with soft tissue collapse on inspiration. **Results:** The patient was taken for bilateral vestibuloplasty. This was performed by raising two inferiorly based inverted V shaped flaps on the lateral alar base and rotating them 90 degrees into the nasal floor. This simultaneously thinned the lateral ala while creating a larger vestibular opening and widening of the external valve. A nasal retainer was placed at the end of the case. Followup at one month revealed stable surgical results with significant symptomatic improvement. **Conclusions:** Nasal vestibular stenosis can be a complex and challenging problem for the otolaryngologist. This local flap technique is simple and may be performed under local or general

anesthesia. It is effective for treating vestibular stenosis with improved functional and cosmetic outcomes in this case.

4. Estimating Nasal Tip Support Using Computer Aided Design and 3D Printed Models

Eric J. Gray, BS, Irvine, CA; Marlon M. Maducdoc, BS, Irvine, CA; Cyrus T. Manuel, BS, Irvine, CA; Brian J.F. Wong, MD PhD, Irvine, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to compare the qualitative assessments of rhinoplasty surgeons evaluating nasal tip support with actual mechanical data from a realistic nasal model.

Objectives: Palpation of the nasal tip is essential during the preoperative rhinoplasty exam, however there are no studies comparing surgeons' qualitative assessments of tip support with actual mechanical behavior. In this study, five silicone nasal models of varying stiffness (e.g., Young's modulus) were constructed. Rhinoplasty surgeons evaluated tip support for each model and results were compared with actual mechanical behavior to identify the threshold stiffness for adequate and ideal tip support. **Study Design:** A digital nasal model was created using CT scans and CAD/CAM software. Facial skeletons were 3D printed in ABS plastic and the cartilage and skin components were cast in silicone of varying stiffness (0.042-0.302 MPa). Thirty rhinoplasty surgeons evaluated the tip support for each model, and then selected the model that satisfied their minimum requirement for: 1) adequate and 2) ideal tip support. **Methods:** Logistic regression was used to estimate the threshold for both adequate and ideal tip support. **Results:** Of thirty surgeons, four had practiced for 1-5 years; nine 6-15 years; seven 16-25 years; and ten 26+ years. Logistic regression found the minimum threshold for Young's modulus for adequate and ideal tip support to be 0.096 MPa and 0.154 MPa, respectively. **Conclusions:** This novel study attempts to correlate nasal tip support with actual mechanical behavior. 3D printing was used to create nasal simulacrum that allows for changing overall mechanical behavior while preserving intrinsic form factor. This allows analysis of mechanical response independent of object shape. This information will become increasingly important as sophisticated modeling techniques continue to enhance surgical planning.

5. Low Cost, Quantitative 3D Structural Imaging of the Nose and Other Facial Features Using Open Source Software

David H. Ho, HSD, Irvine, CA; Alan Badran, HSD, San Jose, CA; Rani Harb, PhD, Irvine, CA; Cyrus Manuel, BS, Irvine, CA; Brian J. Wong, MD PhD, Irvine, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to use open source software to create quantitative high resolution 3D models of the nose and other facial features using consumer digital cameras.

Objectives: In aesthetic surgery, quantitative 3D imaging is often used to create volumetric representations of human facial features. For rhinoplasty, quantitative 3D imaging can be used to rigorously track changes in nasal morphology and provide numerical outcome measures. However, commercial 3D imaging systems are expensive. This study describes how open source software and consumer cameras can be used to perform this task inexpensively and efficiently. **Study Design:** Laboratory based study. **Methods:** 123D Catch was used to generate the 3D representation of the 3D printed silicone nasal models derived from a CT scan. The model provided a Lambertian reference standard to consumer digital cameras including the Samsung Galaxy and Canon Rebel. Diffuse illumination was used. Total image number was varied along with imaging using surface registration landmarks. Point clouds were created and CloudCompare was used to compare each reconstruction with CT data from which the model was derived. Next, imaging of a subject's ears and nose were performed, and software measurements were compared with those directly measured using a micrometer. **Results:** 123D Catch accurately provided 3D nose and facial representations after comparison with CloudCompare by merging and aligning point clouds of the two programs. 123D Catch can clearly reconstruct both inanimate objects and facial attributes with excellent accuracy. **Conclusions:** 123D Catch can be used as an inexpensive, alternate method to 3D reconstruct the nose compared to commercial 3D programs. All materials can be obtained at local home improvement or craft stores. A high resolution digital camera works best for this program.

6. Pharyngovertebrocutaneous Fistula Reconstructed with a Supraclavicular Flap

Brittany E. Howard, MD, Phoenix, AZ; Thomas H. Nagel, MD, Phoenix, AZ; Carrlene B. Donald, PA-C, Phoenix, AZ; Richard E. Hayden, MD, Phoenix, AZ

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) describe a case of acquired pharyngovertebrocutaneous fistula; and 2) recognize the potential role of the pedicled supraclavicular flap in its management and reconstruction.

Objectives: 1) Describe a case of acquired pharyngovertebrocutaneous fistula; and 2) recognize the potential role of the pedicled supraclavicular flap in its management and reconstruction. **Study Design:** Case report. **Methods:** Case report and review of the literature. **Results:** A 24 year old quadriplegic female presented with a pharyngovertebrocutaneous fistula following cervical spine surgery with 4 prior failed attempts at closure. The fistula traversed from the posterior cervical esophagus, through a vertebral column defect at C6-C7, medial to the carotid, and exited the anterior cervical skin. The vertebral bony defect was consistent with reported prior expulsion of vertebral bodies through the fistula. During surgical repair, the entire fistula tract was resected including the anterior cervical skin,

and the esophagus was closed primarily. There was a resultant large defect posterior to the esophagus measuring 2.3 x 2.5 x 4.4 cm. A supraclavicular pedicled flap measuring 5 x 15 cm was harvested to resurface the anterior cervical cutaneous defect and provide vascularized tissue reconstruction. The tail of the flap was de-epithelialized and used to reinforce the esophageal repair. A swallow study obtained 2 weeks postop showed no evidence of a fistula and the patient resumed an unrestricted oral diet. Prior studies support the utility of the pedicled supraclavicular artery island flap for reconstruction of esophageal and cervical defects. **Conclusions:** The supraclavicular flap provides an excellent regional vascularized tissue reconstructive option for management of esophageal fistulas and cervical defects given its proximity, color match, rapidity of harvest, reliability, low donor site morbidity, and thin/pliable nature.

7. Surgical Management and Reconstruction of Hoffman's Disease (Dissecting Cellulitis of the Scalp)

Brittany E. Howard, MD, Phoenix, AZ; Carrlene B. Donald, PA-C, Phoenix, AZ; Richard E. Hayden, MD, Phoenix, AZ

Educational Objective: At the end of this presentation, the participants should be able to 1) identify the key clinical features Hoffman's disease, of an extremely rare dermatologic condition also known as dissecting cellulitis of the scalp; and 2) recognize surgical treatment options for patients with disease nonresponsive to medical management.

Objectives: 1) Identify the key clinical features Hoffman's disease, of an extremely rare dermatologic condition also known as dissecting cellulitis of the scalp; and 2) recognize surgical treatment options for patients with recalcitrant disease. **Study Design:** Case report and review of the literature. **Methods:** Report of 2 cases of dissecting cellulitis of the scalp treated by surgical excision and split thickness skin grafting with associated review of the literature. **Results:** Two patients presented with severe dissecting cellulitis of the scalp resulting in numerous persistent abscesses and fistula tracts within the hair bearing scalp. Both had failed prior treatment including topical antibiotics, isotretinoin, oral antibiotics, oral steroids, intravenous antibiotics, and immune modulators including Humira. Due to their failure to respond to maximal medical therapy, they were determined to be surgical candidates. They underwent serial partial thickness scalp excisions to levels deep to their disease process (galeal and subgaleal) with subsequent split thickness skin grafting. Six months after completing treatment both remain disease free with no evidence of recurrence. **Conclusions:** Dissecting cellulitis of the scalp is a severe form of folliculitis resulting in recurrent abscess and fistula tract development within the hair bearing scalp. For patients with refractory disease, excision with split thickness skin grafting is a surgical treatment option that can result in cure.

8. Over-the-Counter Mechanical Nasal Dilators: A Comparison of Available Devices

Nicole M. Kiyohara, BA, Irvine, CA; Tjoson Tjoa, MD, Irvine, CA; Brian J. Wong, MD PhD, Irvine, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to categorize and compare over-the-counter mechanical nasal dilators with regards to mechanism of action, price, and usage.

Objectives: The internal nasal valve is the narrowest area of the nose, and obstruction here causes increased resistance to nasal airflow, which can markedly impair breathing during exercise and sleep. Mechanical nasal dilators improve airflow by expanding the cross sectional area of the internal nasal valve. They offer a noninvasive alternative to surgery. There are a myriad of products available, and no current comprehensive literature review exists. The objective of this study is to review literature, provide a database of over-the-counter (OTC) mechanical nasal dilators, and classify them based on mechanical action. **Study Design:** Literature review. **Methods:** A database of devices available was generated using 1) PubMed with key words nasal dilator, nasal valve AND dilation, and breathe right; and 2) the Internet via Google search with terms nasal dilator, nasal stent, nasal strip, breathe well, and stop snoring. Details about product usage, price, and mechanism of action were acquired from the manufacturers. **Results:** Twenty-two products were discovered and subsequently classified into four categories based on mechanical action: external strip, nasal stent, nasal clip, and septal stimulator. Pricing ranges from $0.23 for daily disposable devices to $69 for lifetime reusable ones. Six of the twenty-two devices have previously been scientifically evaluated for degree and effect of nasal dilation. **Conclusions:** Many products exist internationally over-the-counter for consumers, but the majority has not been reviewed for efficacy in improving nasal airflow. Devices for which studies exist have demonstrated ability to dilate the nasal valve.

9. Delayed Extrusion of Malar Implants: Inherent Complication or Technical Error?

Marlon M. Maducdoc, BS, Irvine, CA; David Shamouelian, MD, Irvine, CA; Edward O. Terino, MD, Agoura Hills, CA; Brian J.F. Wong, MD PhD, Irvine, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss a rare complication of malar implants extruding into the maxillary sinus and compare all reported cases of malar implant extrusion in the literature.

Objectives: Complications of malar implants are rare and include asymmetry, and unnatural contours, which may lead to patient dissatisfaction. Even rarer is the migration of the malar implant with only a few published case reports. Typically, the complication of migration occurs decades after placement of the implant. **Study Design:** Case report with literature review. **Methods:** A case of a patient who presented and was treated for malar extrusion was reviewed. Possible etiologies of malar implant extrusion are discussed with emphasis on the placement of implant. The literature was reviewed for all reported cases of malar implant extrusion. The history, prevention and management of malar implant extrusion are also discussed. **Results:** The patient presented with recurrent drainage of purulent material over her right malar eminence and episodes of recurrent sinusitis, more than 20 years after the placement of bilateral

malar implants. CT showed the malar implant penetrating the anterior maxillary wall, traversing the antrum, and penetrating the lateral nasal wall into the nasal fossa. The malar implant was successfully removed through a sublabial approach without any complications. The patient recovered well and required no further intervention. **Conclusions:** The popularity of malar implants makes it important for facial plastic and reconstructive surgeons to be aware of this rare complication. With the majority of malar implants placed in the last two decades, incidence of the complication may increase in the subsequent years.

10. Safety and Utility of Cyanoacrylate Adhesives in Creating Layered Septal Cartilage Grafts in Open Structure Septorhinoplasty

Jeff Desmond Markey, MD, San Francisco, CA; P. Daniel Knott, MD, San Francisco, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to demonstrate safe and efficacious use of cyanoacrylate adhesives to create layered septal cartilage grafts in open structure septorhinoplasty.

Objectives: Reliable and reproducible results in open structure rhinoplasty depend upon structurally sound cartilage grafting. This may be very challenging among patients who have suffered nasal trauma or have undergone prior nasal/septal surgery. The creation of layered or overlapping grafts from shorter cartilage remnants is oftentimes tedious and difficult. Harvest of costal or conchal cartilage among patients with septal cartilage deficient noses results in secondary donor site morbidity. The present study evaluated the safety and utility of cyanoacrylate based adhesives in creating layered septal cartilage grafts for open septorhinoplasty. **Study Design:** Retrospective clinical review at a tertiary care center. **Methods:** Chart review identified patients undergoing primary or revision open structure rhinoplasty performed by senior author. All procedures involved creation of a layered caudal or dorsal strut graft that was constructed using at least two smaller autologous septal cartilage grafts. The grafts were adhered together with cyanoacrylate based adhesive(s) and 5-0 PDS suture to create a bolstered, elongated graft. The efficacy and safety of the procedure was subsequently assessed postoperatively. **Results:** Sixteen patients were identified by aforementioned criteria. Patient ages ranged from 15 to 65 years with an average age of 40. Fifty percent of patients had undergone prior nasal surgery: four patients had undergone at least one prior external rhinoplasty, one patient had undergone prior endonasal septoplasty, and three patients had undergone both an external rhinoplasty and an endonasal septoplasty. Median followup was 138 days (range 10-321 days). Postoperatively, one patient developed a fluid collection at the posterior septal angle, which resolved with in-office drainage and oral antibiotics. Two patients complained of postoperative columellar deviation. No other complications were encountered. **Conclusions:** Cyanoacrylate based adhesives appear safe and effective in the crafting of elongated, layered autologous cartilage grafts to provide reliable tip/dorsal support when performing external rhinoplasty.

11. Orbitocranial Approach for Adenoid Cystic Carcinoma of the Lacrimal Gland Reconstructed with an Osteocutaneous Free Flap: A Novel Technique

Akshay Sanan, MD, Philadelphia, PA; Greg Smith, MD, Philadelphia, PA; Jurij R. Bilyk, MD, Philadelphia, PA; Ryan N. Heffelfinger, MD, Philadelphia, PA

Educational Objective: At the end of this presentation, participants should understand the reconstructive options for adenoid cystic carcinoma (ACC) of the lacrimal gland. We report a novel reconstructive modality with an osteocutaneous free flap for a resection done via an orbitocranial approach for locally invasive ACC.

Objectives: To review a case of ACC of the lacrimal gland reconstructed with an osteocutaneous free flap and compare it with other reported cases in the literature. We describe the thought process and technical details of operative maneuvers to maximize the potential for successful future orbital prosthesis. **Study Design:** Case report and literature review. **Methods:** The case of a 20 year old woman who presented to a tertiary care academic medical center with a recurrent ACC of the right lacrimal gland is reported and reviewed. The patient's pertinent history, clinical findings and radiologic studies are examined. Figures and intraoperative photography will demonstrate surgical specifics. **Results:** The patient had a history of ACC of the right lacrimal gland diagnosed at age 11 and underwent local resection and adjuvant brachytherapy. Serial MRI and CT scan showed a mass involving the posterior orbit and lacrimal gland extending up into the skull base with orbital bone invasion. The patient underwent resection via orbitocranial approach. Resection included orbital exenteration and resection of the superior and lateral orbital rim on the right side. Reconstruction was done with a radial forearm osteocutaneous free flap. The bone of the forearm provided anatomical replacement of the orbital rims, while the thin fasciocutaneous soft tissue allowed for a concave reconstruction of the orbital cavity. Brow position was maintained. The patient's postoperative course was unremarkable. **Conclusions:** This is the first report of osteocutaneous free flap reconstruction for defect from ACC resection via orbitocranial approach. Prior studies have reported orbitocranial approach reconstruction with fasciocutaneous free flaps. Orbital bone removal for adequate margins and/or oncologic resection is a routine part of tumor resection for these malignancies. The osteocutaneous free flap allows for better aesthetic results and affords reconstruction of the normal orbital rim contours.

General/Clinical Fundamentals

12. Development and Validation of Mental Practice as a Training Strategy for Endoscopic Sinus Surgery

Aadil Ahmed, MD, Baltimore, MD; Douglas D. Reh, MD, Baltimore, MD; Nasir I. Bhatti, MD, Baltimore, MD

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the benefits of mental practice as a training strategy for otolaryngology procedures.

Objectives: Mental practice (MP) is one of the approaches which have been used successfully in sports and music that allows an individual to cognitively rehearse a task in the absence of overt physical movement. The study aims to develop and test a MP training for endoscopic sinus surgery (ESS). **Study Design:** Prospective observational study. **Methods:** Script development: three sinus surgeons were asked to imagine performing an ESS and recall the steps as they experience them in real settings. An MP script containing visual, cognitive and kinesthetic cues was developed through a coding process from their description of the procedure by two researchers. Script validation: Ten residents and six faculty members were asked to rehearse mentally an ESS using the developed script. A previously validated questionnaire was administered to the subjects before and after the MP training to assess the participants' imagery experiences. **Results:** The inter-rater reliability was assessed for the coding generated by two researchers during the first phase of script development. As for the script validation process, the internal consistency of the questionnaire was assessed to ascertain that it can be used as a scale to capture mental imagery and allow summation of individual items to a global score. Face, content and construct validity were then measured by assessing the global scores of novices and expert before and after the training. **Conclusions:** This is the first study to develop and validate MP for ESS. MP may serve as a time and cost effective transfer of covert knowledge of the procedure to the trainees which typically come with experience.

13. How Confident Are Our Graduating Residents?

Aadil Ahmed, MD, Baltimore, MD; Nasir I. Bhatti, MD, Baltimore, MD

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the confidence level of graduating residents in otolaryngology and identify the major areas of confidence deficits, helping programs to take necessary steps for remediation.

Objectives: The evolution of surgical training in the United States has significantly changed the learning experience of the residents. Similarly, advancements in the surgical techniques also affect the operative experience of a trainee. In this regard, this study aims to measure the confidence to know when to proceed, when to change plans, and when to ask for help, of graduating residents in performing otolaryngology procedures. **Study Design:** Prospective longitudinal study. **Methods:** A survey was developed and administered to final year otolaryngology residents nationwide. It consisted of questions regarding demographics, program characteristics, and residents' confidence in performing the major otolaryngology procedures. **Results:** The demographics and program related variables of the residents who showed confidence were compared with those who did not. Univariate and multivariate analyses were carried out to identify independently predictive factors associated with high confidence. **Conclusions:** Identifying and addressing the confidence deficits of graduating residents is primal for achieving safe and effective operative independence.

14. Video Assisted Intubation followed by Open Reduction and Internal Fixation of a Laryngeal Fracture from a Skydiving Injury

Joseph C. Clarke, MD, Iowa City, IA; Abraham M. Sheffield, MD, Iowa City, IA (Presenter); Augene H. Chang, MD, Iowa City, IA

Educational Objective: At the conclusion of this presentation, the participants should be able to recognize the role of history and physical exam and the constellation of clinical symptoms when planning treatment of laryngeal fractures in the setting of evolving mechanisms of injury.

Objectives: Laryngeal fracture is a rare injury with a high fatality rate necessitating urgent management. We report an unusual case in which a comminuted, displaced laryngeal fracture was treated by video assisted transoral intubation and open reduction and internal fixation followed by postoperative extubation and observation in the surgical intensive care unit. **Study Design:** Case report. **Methods:** Patient chart analysis and literature review. **Results:** A 25 year old male presented with dysphagia and voice changes having sustained a clothesline injury to the neck while skydiving. An overview of evaluation and treatment algorithms for laryngeal fracture is reviewed with attention to mechanism of injury which historically skews towards more severe injuries; blunt MVA trauma, penetrating trauma, suicide attempts. We have seen a recent increase in rates of laryngeal fracture in young, healthy adults secondary to mechanisms associated with sports and extreme sports. We review our approach including radiographic and intraoperative images documenting direct laryngoscopy followed by open reduction and internal fixation with subsequent extubation, foregoing tracheostomy in a patient with a comminuted, displaced laryngeal fracture without evidence of endolaryngeal mucosal injury. **Conclusions:** Laryngeal fractures are rare and must be addressed cautiously using available clinical algorithms. We present a case in which the radiographic evaluation was incongruent with the clinical presentation, permitting a conservative approach in which tracheostomy and prolonged intubation were deferred.

15. Diagnostic Challenge of Sublingual Dermoid Cysts

Deepa Danan, MD MBA, Charlottesville, VA; David C. Shonka Jr., MD, Charlottesville, VA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the clinical presentation, etiology, and treatment of sublingual dermoid cysts and compare the radiographic features of dermoids versus the differential diagnoses they are often mistaken for.

Objectives: 1) Describe two cases of sublingual dermoid cysts presenting clinically as submental neck masses; and 2) discuss radiographic features of dermoids compared to differential diagnoses they are often mistaken for. **Study Design:** Case series. **Methods:** Two patients presented with submental neck masses with no associated symptoms and unremarkable oral cavity exams (floor of mouth (FOM) soft). Both patients had ultrasound and CT or MRI that revealed well circumscribed, avascular cystic lesions in sublingual and submandibular spaces. One had a radiologic diagnosis of plunging ranula and the other ranula versus dermoid cyst. **Results:** Both patients underwent successful cyst excision via submental approach. While both masses appeared confined to the submental space without intraoral involvement on exam, intraoperatively both were superior to the mylohyoid with obvious FOM and submandibular space extension. The masses were delivered entirely via submental incision without capsular violation. Pathology for both returned as dermoid cyst. **Conclusions:** Dermoid cysts are relatively rare clinical entities in the head and neck. They are difficult to distinguish radiologically from simple and plunging ranulas, abscesses, lymphangiomas, and thyroglossal duct cysts. Involvement is generally confined to either the submental, submandibular, or sublingual space. These distinctions are important when considering clinical presentation and management: sublingual cysts tend to present as a FOM mass and are usually treated via intraoral approach, while submental and submandibular cysts tend to present as neck masses approached transcervically. Two unusual cases of sublingual dermoid cysts presenting as submental neck masses are described, and the relevant radiologic findings and pitfalls in determining this diagnosis are discussed.

16. An Incidental Mass near the Maxillary Alveolus

Shannon C. Fraser, MD, Pittsburgh, PA; Barton F. Branstetter, MD, Pittsburgh, PA; Grant Gillman, MD, Pittsburgh, PA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the appearance of various comestible intraoral foreign bodies on imaging and identify differences between foreign bodies and true otolaryngologic pathology.

Objectives: Comestible, or edible, foreign bodies can been found incidentally on CT scans that include the oral cavity. Recognizing a comestible foreign body is important so as to not misinterpret the radiographic findings as pathology and potentially subject the patient to unnecessary workup, testing or surgery. In this report we describe common appearances of intraoral foreign bodies on imaging studies. **Study Design:** Case report and review of the literature. **Methods:** A case report of a comestible intraoral foreign body identified on CT is discussed along with a review of relevant literature. **Results:** Comestible foreign bodies tend to be more radiodense than soft tissue, however their appearance can be variable. Large, hard candies generally are more easily distinguished from mucosal lesions compared to softer foreign bodies. The appearance of hard candies is more likely to mimic bone, odontogenic tumors, calculi or tooth fragments. Soft foreign bodies have more heterogenous densities and can conform to the mucosal surface thus mimicking enhancing mucosal lesions. **Conclusions:** Before undergoing imaging of the head and neck, patients are routinely asked to remove intraoral foreign bodies (dentures, chewing gum, candies, etc.). Occasionally patients are noncompliant with this request and foreign bodies are imaged unbeknownst to the examiner. In this way, comestible foreign bodies in the oral cavity can lead to diagnostic confusion and be misinterpreted for intraoral pathology. Familiarity with the appearance of various types of intraoral foreign bodies can minimize diagnostic errors, in order to avoid subjecting patients to unnecessary testing, surgical exploration or biopsy.

17. Do Otolaryngology Residency Applicants Relocate for Training?

Grant M. Gebhard, BA, Aurora, CO; Leah J. Hauser, MD, Aurora, CO; Miranda J. Dally, BA, Aurora, CO; David A. Weitzenkamp, PhD, Aurora, CO; Cristina E. Cabrera-Muffly, MD, Aurora, CO

Educational Objective: At the conclusion of this presentation, the participants should be able to determine whether there is an association between the geographic location of an applicant's undergraduate school, medical school, and residency program among matched otolaryngology residency applicants.

Objectives: To determine whether there is an association between the geographic location of an applicant's undergraduate school, medical school, and residency program among matched otolaryngology residency applicants. **Study Design:** Observational. **Methods:** Otolaryngology residency program applications to our institution from 2009 to 2013 were analyzed. The geographic location of each applicant's birth, undergraduate education, and medical education were collected. Online public records were queried to determine the residency program location of matched applicants. Applicants who did not match or who attended medical school outside the US were excluded. Metro area, state, and region were determined according to United States Census Bureau definitions. **Results:** From 2009-2013, 1,107 (79%) of 1,405 applicants who matched into otolaryngology residency applied to our institution. The number of applicants who attended medical school and residency in the same geographic region was 241 (22%) for metropolitan area, 305 (28%) for state, and 436 (40%) for region. There was no difference in geographic location retention by gender or age of the applicant. USMLE step 1 scores correlated with an increased likelihood of applicants staying within the same geographic region (p=0.03). **Conclusions:** The

majority of otolaryngology applicants leave their previous geographic area to attend residency. Although previous studies indicate geography as an important factor for residency applicants, final match statistics suggest applicants are open to matching in other geographic areas. Based on these data, the authors recommend against using geography as a factor when inviting applicants to interview or ranking applicants for the match.

18. Applicant Characteristics Associated with Successfully Matching into Otolaryngology Residency

Leah J. Hauser, MD, Aurora, CO; Grant M. Gebhard, BA, Aurora, CO; Miranda J. Dally, BA, Aurora, CO; David A. Weitzenkamp, PhD, Aurora, CO; Cristina Cabrera-Muffly, MD, Aurora, CO

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss applicant characteristics that increase or decrease a candidate's odds of matching into an otolaryngology residency.

Objectives: To identify resident applicant characteristics that increase the odds of matching to otolaryngology residency. **Study Design:** Cross-sectional analysis. **Methods:** Residency applications to our institution from 2009 through 2013 were reviewed. The available data represented 81.1% of the total applicants to otolaryngology programs nationwide. Online public records were searched to determine whether an applicant matched to an otolaryngology residency position. Data was analyzed using both univariate analysis and logistic regression modeling. **Results:** A total of 1,526 unique applications were identified. Of the 44 potential variables available for analysis, 26 were found to be significantly associated with matching to otolaryngology residency. At a level of $p<0.0001$, these included higher USMLE Step 1 and 2 scores, AOA membership, an allopathic degree, and prior research and volunteer experience. Attending a medical school ranked by US News and World Report ($p=0.0020$), the NIH ($p=0.0004$) or one with an otolaryngology residency program ($p=0.0003$) also increased the odds of matching. Foreign medical school graduates ($p<0.0001$), non-US citizens ($p<0.0001$), and those with prior board certification ($p=0.0070$) were less likely to match. White race ($p=0.0405$) was also associated with an increased likelihood of matching. **Conclusions:** Multiple factors are associated with successfully matching into an otolaryngology residency. Given the increasing competitiveness of the field, the ability to predict which characteristics lead to a successful match into otolaryngology residency will not only help selection committees focus on specific applicants, but will also allow medical students to have a more concrete idea of the strength of their application.

19. Bilateral Paranasal Subcutaneous Sarcoidosis

Benjamin L. Hodnett, MD PhD, Pittsburgh, PA; Simion I. Chiosea, MD, Pittsburgh, PA; Grant S. Gillman, MD, Pittsburgh, PA

Educational Objective: At the conclusion of this presentation, the participants should be able to recognize the clinical presentation of subcutaneous sarcoidosis of the head and neck, know how to establish a definitive diagnosis, and understand the relationship to systemic sarcoidosis.

Objectives: To present a rare case of bilateral paranasal subcutaneous sarcoidosis, an entity which has not previously been reported in the otolaryngic literature. **Study Design:** Case report. **Methods:** Medical records for the patient will be reviewed including presenting history and clinical findings, preoperative computerized tomographic (CT) imaging, the differential diagnosis, blood work, and preoperative photography. Gross pathology and histopathology of the resected specimen are presented. The clinical course of the patient is presented for discussion as well as a review of the literature pertaining to subcutaneous sarcoidosis of the head and neck and the relevance of this entity to more widespread systemic sarcoidosis. **Results:** A 51 year old woman presented with a 3 week history of enlarging bilateral external nasal masses. Computed tomography noted bilateral soft tissue densities overlying the nasal bones. Excisional biopsy and histopathology confirmed subcutaneous sarcoidosis. **Conclusions:** Subcutaneous sarcoidosis can be seen in up to 35% of patients with systemic sarcoidosis but may occur as an isolated entity without systemic disease. Presentation is more commonly seen in the extremities and much less frequently in the head and neck which can make it less familiar to the otolaryngologist. This case is thus intended to acquaint the surgeon with this entity, review the differential diagnosis and workup necessary to establish a definitive diagnosis, and discuss the treatment of subcutaneous sarcoidosis with or without systemic disease. While the differential for paranasal related soft tissue masses is broad, knowledge and recognition of this rare entity may be useful to practicing otolaryngologists.

20. Synovial Chondromatosis of the Temporomandibular Joint: Case Report of a Rare Clinical Entity as a Cause of Otalgia

Blake J. Hyde, MD, Omaha, NE; Eliza P. Drobny, DDS MD, Omaha, NE; Gary F. Moore, MD, Omaha, NE; Jason B. Untrauer, MD DDS, Omaha, NE

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the presentation, natural history, and diagnosis of synovial chondromatosis (SC) of the temporomandibular joint (TMJ), as well as physical exam findings, imaging characteristics, staging, surgical treatment options and the associated histologic findings.

Objectives: Case report. **Study Design:** Case report. **Methods:** Case report. **Results:** Case report. **Conclusions:** Synovial chondromatosis (SC) of the temporomandibular joint (TMJ) is a rare clinical entity, typically presenting as unilateral pain, swelling, and crepitus, with restricted mouth opening. Histopathologically it is characterized by synovial nodules formed from metaplastic transfor-

mation within mesenchymal rests of the native synovium. As a result, these cartilaginous nodules may detach into the superior joint space (loose bodies) and may calcify - causing graded stages of disease, which can be further classified as primary (idiopathic) or secondary. Here we present a case of secondary, stage 3 SC of the TMJ in an elderly woman with prior unilateral arthralgia refractory to serial intra-articular corticosteroid injections and dental extractions who was referred to our clinic with ipsilateral otalgia. Presentation, diagnostic images, surgical treatment, and histological findings are discussed. Otolaryngologists should consider SC as a diagnostic consideration in common TMJ presentations, only twice reported in the general otolaryngology literature to date. Additionally, to our knowledge, this patient represents the oldest age at diagnosis of SC of the TMJ.

21. E-Cigarette Safety? A Case of Combustion Causing Severe Intraoral Trauma

Joseph Richard Jacob, MD, Salt Lake City, UT; Richard K. Gurgel, MD, Salt Lake City, UT; Richard H. Wiggins, MD, Salt Lake City, UT; Loren G. Longenecker, MD, Salt Lake City, UT

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the risks of e-cigarettes and be better prepared to manage intraoral trauma caused by their malfunction.

Objectives: 1) To describe a rare complication of electronic cigarettes or e-cigarettes in which the electronic cigarette combusted causing serious oral-facial trauma; and 2) to help recognize that serious complications can occur while using e-cigarettes and encourage further research on safety. **Study Design:** Case report and literature review. **Methods:** We focused on one patient treated in 2013 who presented to the emergency room with severe intraoral trauma following an e-cigarette explosion. **Results:** A 50 year old male with a history of COPD presented to the emergency room after his electronic cigarette combusted during use. At presentation, the patient was coughing up carbonaceous sputum and had active bleeding from oral cavity wounds. Imaging showed a soft palate hematoma containing tooth shrapnel, soft tissue emphysema, and narrowing of the oropharyngeal airway. The patient was emergently taken to the OR for fiberoptic intubation, control of hemorrhage, debridement and repair. There was active arterial hemorrhaging from a soft palate laceration. The necrotic soft tissue was debrided and the palatal defect was repaired. Due to oropharyngeal edema, tracheostomy was performed and the patient was then transferred to the intensive care unit. The patient admitted to battery stacking (fitting of additional batteries) to increase power delivery and potency of the device. **Conclusions:** While rare, serious injury can occur from exploding e-cigarettes, causing significant oral-facial trauma. As we understand the risks of these devices, we will be better prepared to appropriately advise patients and manage these difficult situations.

22. Surgical Airway Education among Anesthesia Trainees

Russel R. Kahmke, MD, Durham, NC; Suraj Yalamuri, MD, Durham, NC; Bryant W. Stolp, MD PhD, Durham, NC; Liana Puscas, MD MHS, Durham, NC; Charles R. Woodard, MD, Durham, NC

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) explain the benefit of a focused educational program on improvement of emergency invasive airway access; and 2) discuss the knowledge, confidence, and procedural abilities of anesthesia trainees.

Objectives: When a provider encounters a can't intubate, can't ventilate situation where noninvasive techniques fail, emergency invasive airway access is necessary. Regardless of advanced airway training, a cricothyrotomy is easier, faster, and associated with less bleeding when compared to a tracheotomy. With this in mind, we set out to assess the knowledge, confidence, and procedural ability of our anesthesia residents in performing a cricothyrotomy. **Study Design:** Prospective. **Methods:** IRB approval was obtained. After successful intubation, anesthesia residents were provided a brief clinical vignette where the only viable option was emergency invasive airway access. They were given a marking pen and asked to perform a mock cricothyrotomy. A multimedia educational program illustrating anatomy, procedural details, and alternate options was subsequently provided. At least 4 weeks later, the residents were again presented with the opportunity to participate. **Results:** Nine residents consented to participate before and 18 after the educational component. There was no difference between the patients used in each group. Regardless of the number of years in training and size of the patient, there was no difference in accuracy between the pre- and post-intervention groups. The educational program produced a statistically significant time improvement for all comers. There was improvement in time for normal and overweight patients, with a more significant improvement for overweight patients. Both junior and senior level residents became faster without difference between the two. **Conclusions:** A knowledge and confidence deficit in emergency invasive airway management exists; directed education results in improved timing, especially with overweight patients.

23. A Review of in vitro Culture of Hair Cells and Supporting Cells

Mirko Manojlovic Kolarski, MD, Vancouver, BC Canada; Juzer A. Kakal, MSc, Vancouver, BC Canada; Desmond A. Nunez, FRCS(ORL) MD, Vancouver, BC Canada

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the variables involved in the efficient isolation and in vitro culture of inner ear cells.

Objectives: In vitro models of the inner ear are an effective method of studying inner ear disease. Several models have been described, but no comparison between different methods has previously been attempted. We aimed to summarize current knowledge and tech-

niques in inner ear cell culture, compare relative yields and viability, and determine the optimal culture method with regards to tissue source, harvesting technique, growth conditions, and cell characterization. **Study Design:** A systematic literature review. **Methods:** A search was conducted in Medline (1946-2014) and Embase (1976-2014). Only English language articles reporting the results of cell culture of non-neuronal tissue derived from inner ear sites were included. Studies reporting hair cell cultures derived from stem cells were included for media conditions and cell characterization. **Results:** 36 studies met the inclusion criteria. These studies exclusively used fresh tissue, primarily harvested from mice (42%) and rats (19%). There was little variation in tissue harvesting techniques. The cell type targeted for culture correlated with the culture media used. Immunocytochemistry was the predominant method of phenotypic characterization. There was variation in growth, culture techniques, and use of functional assays. Culture duration was limited primarily by fibroblast overgrowth. **Conclusions:** Characteristic inner ear cells can be cultured by several methods. There is insufficient data regarding yield and cell function for comparison of methods. Long term culture growth remains unsolved, but new culture techniques such as growing hair stem cells are promising in this regard.

24. Readability of Tracheotomy Patient Education Materials

Ross M. Mayerhoff, MD, Seattle, WA; Tanya K. Meyer, MD, Seattle, WA; Peter F. Svider, MD, Detroit, MI; Jean Anderson Eloy, MD, Newark, NJ; Albert L. Merati, MD, Seattle, WA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand what materials are available to patients to educate them about tracheotomy care and what the goals should be for ideal patient education materials.

Objectives: As health care providers, we have the responsibility of ensuring that our patients understand their condition and care. Because of the limited time spent between the provider and patient, written and electronic information is as important as counseling in person. This was recognized by CMS, as evidenced by the visit summary and patient education requirements for Meaningful Use. This study examines whether the readability of tracheotomy education materials meets the standards recommended by the American Medical Association and other organizations. Tracheotomy care is particularly important because of the intensity of care involved and consequences of improperly doing so. **Study Design:** Descriptive and correlational design. **Methods:** Available tracheotomy education materials were collected via an internet search and via hospital subscribed patient education libraries. Readability analysis was performed using two common tools: the Flesch Reading Ease (FRE) and Flesch-Kincaid Grade Level (FKGL). FRE rates readability on a scale of 0-100, with 100 being easiest to read. FKGL indicates that someone who has completed the indicated grade level should be able to understand the text. Both take into account word length and sentence length. **Results:** Mean FRE was 58.1 (range 39.7-83.5). Mean FKGL was 7.85, (range 4.1-11.2). **Conclusions:** The mean grade level of patient education resources is higher than the recommended sixth grade level, however less so than that of other otolaryngology patient education materials. Furthermore, some resources are available at lower reading levels. This is hopeful, showing that creating a simple document is an attainable goal for which clinicians should strive.

25. Healthcare in the Crusades

John E. Mourany, MD, Toledo, OH; Reginald F. Baugh, MD, Toledo, OH

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss and compare how the challenges of health disparity between the rich and poor, physician quality mandates and the subsidization of healthcare by the government were addressed by medieval societies. This new perspective may prompt participants to seek novel ways to address these concerns today.

Objectives: This manuscript seeks to demonstrate how nascent medieval societies responded to the challenges of health disparity between the rich and poor, physician quality mandates and the subsidization of healthcare by the government. **Study Design:** A literature search of the literature regarding the delivery of healthcare during the Crusades was undertaken. **Methods:** We use specific examples from the Byzantine empire, Islamic caliphate and the kingdom of Jerusalem to describe the changes in hospitals and physicians' duties and the roles played in society and medical education. We also examines medical regulation and licensing practices in the Islamic caliphate and the Crusader states by describing the hisba system, a series of regulations for all aspects of public life including medical practice, and the mustahib, the office created to enforce the hisba system. **Results:** The majority of medieval Europe did not provide acute medical care in a hospital setting. Medical licensing and regulation was not prevalent in Europe until the 14th century. The role the newly introduced hospitals played in European society evolved differently from its Middle Eastern origins. **Conclusions:** Understanding how the hospital as a medical institution was introduced into Europe provides insight and perspective useful to understanding our current healthcare environment.

26. Novel Compressive Dressing: A Mero-Excellent Alternative

Brian A. Nuyen, BS, La Jolla, CA; Christopher G. Tang, MD, Oakland, CA; Stanley M. Mui, MD, Oakland, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to demonstrate the effective technique of treating auricular hematomas with Merocel dressing.

Objectives: We describe the novel use of Merocel sponge as an effective bolster dressing for the treatment of an auricular hematoma.

We also review the literature of auricular hematoma management, highlighting recent innovations and the efficacies and shortcomings thereof. **Study Design:** The case in question involves a 30 year old female who presented to clinic with a two week history of an enlarging, slightly tender, cystic mass in her scaphoid/triangular fossa of her right ear. Needle aspiration revealed serosanguineous fluid consistent with an auricular hematoma. **Methods:** The auricular hematoma was drained, and a stab incision was made to allow further drainage. A 2cm x 2cm segment of Merocel sponge was wet with saline and used as a bolster dressing and sutured into place. The patient tolerated the procedure well. **Results:** Patient returned to clinic a week later for removal of the Merocel sponge pleased with aesthetic outcome and without complication. **Conclusions:** Auricular hematomas without proper drainage and treatment can progress to cauliflower ear from erosion of the underlying cartilaginous frame. After drainage of the fluid, bolsters are normally sutured into place to approximate the skin to the cartilage and prevent the suture from cutting through. This case report uses Merocel sponges in a unique, effective way as a semi-compressive bolster dressing to documented success.

27. Injection Pharyngoplasty with Hyaluronate and Dextranomer Co-polymer to Treat Velopharyngeal Insufficiency in Adults

Brandon W. Peck, MD, Rochester, MN; Becky S Baas, SLP, Rochester, MN; Shelagh A. Cofer, MD, Rochester, MN

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the pathology responsible for velopharyngeal insufficiency, discuss the treatment options, and compare the benefits of hyaluronate and dextranomer co-polymer injection pharyngoplasty to other materials.

Objectives: Describe results of injection of a hyaluronic acid and dextranomer co-polymer to treat velopharyngeal insufficiency (VPI) in adults. **Study Design:** Retrospective case series. **Methods:** Medical records of 19 adult patients with VPI seen and treated by otolaryngology and speech and language pathology at a referral VPI clinic were reviewed. Patients were treated with injection pharyngoplasty using a hyaluronic acid and dextranomer co-polymer. Data recorded included perceptual analysis of hypernasality, nasal emission, nasal grimace, nasalance, and estimation of velopharyngeal gap size on video nasendoscopy before and after intervention. **Results:** Our patients most commonly had VPI due to neurologic etiology, benign anatomic etiology, or acquired after treatment for head and neck malignancy. Patients either had local anesthesia, local with monitored anesthesia care, or general anesthesia for the procedure. Nearly all (18/19) patients demonstrated an improvement in a standardized VPI speech severity score. Patients with neurologic etiologies had more significant improvement than anatomic etiologies. Few (3/19) patients required multiple injections. Need for repeat injections and complications related to pain were more common in those with history of malignancy. **Conclusions:** Injection pharyngoplasty with a readily available hyaluronic acid and dextranomer co-polymer is safe and effective treatment for VPI based on review of this case series. The procedure is well tolerated, and when performed under local anesthesia or light sedation, allows titration to complete velopharyngeal closure.

28. How Should Unmatched Otolaryngology Applicants Proceed?

Josianna V. Schwan, BS, Aurora, CO; Cristina E. Cabrera-Muffly, MD, Aurora, CO; Mona M. Abaza, MD MS, Aurora, CO

Educational Objective: At the conclusion of this presentation, the participants should be able to determine the attitudes of otolaryngology residency program directors and chairpersons towards unmatched residency applicants, including whether a surgical internship or research year is preferred in considering re-applicants. Participants should also be able to provide consensus based advice for unmatched otolaryngology residency re-applicants.

Objectives: To determine the attitudes of otolaryngology residency program directors and chairpersons towards unmatched residency applicants, including whether a surgical internship or research year is preferred in considering re-applicants. To provide consensus based advice for unmatched otolaryngology residency re-applicants. **Study Design:** Cross-sectional survey. **Methods:** A 12 question web based survey was sent to otolaryngology residency program directors and chairpersons three times over a six week period. Responses were anonymous with no identifying characteristics collected from respondents. **Results:** 45% of those contacted responded to the survey. 69% of respondents were less likely or much less likely to offer an interview to a previously unmatched applicant. The most commonly recommended course of action for an unmatched applicant was completion of a PGY-1 surgery year (43%) or a year of research (31%). Program directors were more likely than chairpersons to recommend a year of research (p-value 0.014). 97% of the respondents felt it was important or essential to obtain new letters of recommendation prior to reapplying. Respondents ranked poor interview skills as the most common reason for applicants remaining unmatched (29%). **Conclusions:** Otolaryngology residency match is even more competitive for previously unmatched applicants. Unmatched applicants should be advised to proceed with either a research year or PGY-1 general surgery year. Before reapplying, applicants should obtain new letters of recommendation, and the importance of improving poor interviewing skills should be emphasized by advisors.

29. Predicting Operating Room Times in a Tertiary Care Academic Medical Center

Rosh K.V. Sethi, MD MPH, Boston, MA; Elliott Davin Kozin, MD, Boston, MA; Sidharth V. Puram, MD PhD, Boston, MA; Daniel J. Lee, MD, Boston, MA; Stacey T. Gray, MD, Boston, MA; Mark G. Shrime, MD MPH, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to identify predictors of operating room time and utilize this information to improve operating room efficiency.

Objectives: Hospital based and ambulatory surgical centers have financial incentives to accurately schedule operating room (OR) times. Literature exists regarding approaches to improve operating room flow; some conclude that surgeon predictions provide the most accurate estimate of procedural length. Many of these studies, however, use data across multiple surgical specialties and facilities, potentially confounding results. Herein, we aim to investigate a host of factors potentially associated with OR procedural times to determine accurate predictors of OR case duration. **Study Design:** Retrospective chart review. **Methods:** We identified our institution's most common otolaryngologic procedures (2009-2013): tonsillectomy with adenoidectomy, myringotomy with tympanostomy tube placement, septoplasty, adenoidectomy alone, nasal endoscopy with total ethmoidectomy, and direct laryngoscopy with tumor excision (N=17,342). Patient demographics, case characteristics, and scheduled OR time were entered into a multivariable linear regression to identify predictors of actual OR time. **Results:** All cases were completed faster than their originally scheduled time (P<0.0001). Predictors of increased OR time included higher ASA class, increased number of billed procedures per case, presence of surgical trainee (all p<0.0001), and younger patient age (p=0.009). Case start time, patient ethnicity, day of the week, and start time of procedure did not result in increased OR time. **Conclusions:** In this large retrospective multiyear study, we identified a significant discrepancy between scheduled and actual OR times with several notable predictors of increased OR time. This data may be immediately applicable to OR scheduling and ongoing studies include creation of a predictive OR time calculator that aims to improve scheduling accuracy.

30. Self-Decapitation Attempt Attributed to Tinnitus and Corticosteroid Use

Katelin E. Sisler, BS, St. Louis, MO; Annika M. Meyer, MD, St. Louis, MO; Sean M. Miller, MD, St. Louis, MO; Jastin L. Antisdel, MD FACS, St. Louis, MO

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the increased risk of suicidal ideation and attempts in patients with multiple risk factors, review the relationship between severe tinnitus and suicidal ideation, and describe a novel surgical repair for a laryngeal defect and vocal cord injury.

Objectives: 1) Review the relationship between severe tinnitus and suicidal ideation; including documented cases in the literature; 2) discuss the increased risk of suicidal ideation and attempts in patients with a history of psychiatric illness who receive high dose corticosteroid treatment; and 3) describe the novel surgical repair of laryngeal defect and vocal cord injury. **Study Design:** Case report. **Methods:** Case report describing a patient with multiple psychiatric comorbidities who received high dose corticosteroids to treat tinnitus with subsequent suicide attempt. **Results:** 49 year old male with a history of anxiety, depression, and schizoaffective disorder was suffering from severe, bilateral tinnitus. After completing a high dose steroid treatment for tinnitus given by another clinician, he attempted to commit suicide by acetaminophen ingestion and self-decapitation with a hand saw. Subsequent treatment included emergent neck exploration, tracheostomy, resuspension of his vocal cords/Broyles ligament, and closure of a laryngotracheal defect with an omohyoid myofascial flap. Patient recovered with good voice quality and no significant sequelae. Psychiatry further managed his mood disorders. **Conclusions:** Tinnitus is a very common and often easily dismissed diagnosis that is considered a nuisance by most who suffer from symptoms. In certain populations, the morbidity of tinnitus is severe, particularly those with coincident psychiatric illness. Clinicians must be cognizant of the impact that tinnitus can have on their patient's life and must select corticosteroid treatment appropriately, especially for those with a history of mood disorders. In the setting of severe cartilage loss, laryngotracheal defect repair with a local myofascial flap with vocal cord suspension can yield satisfactory results.

31. Submandibular Duct Sialocele Associated with Bartholin's Duct

Kristy H. Truong, MD, Iowa City, IA; Henry H. Hoffman, MD, Iowa City, IA

Educational Objective: At the conclusion of this presentation, the participants should be able to demonstrate knowledge of how the anatomic relationships of the sublingual gland (SLG), submandibular gland and their respective ducts contribute to mucus reaccumulation and guide surgical treatment.

Objectives: The purpose of this study was to evaluate a patient with a recognized Bartholin's duct associated with a submandibular duct sialocele. This case report examines the clinical relevance of anatomic variation in sublingual gland drainage. **Study Design:** Case report. PubMed literature review. **Methods:** We analyzed the clinical course of a 55 year old female with recurrent right submandibular swelling, who underwent sialendoscopy with complex ductoplasty and right submandibular resection. She subsequently developed a sialocele of the submandibular duct remnant. **Results:** Right submandibular sialendoscopy preceding gland removal identified a secondary duct orifice near the puncta of the submandibular duct consistent with Bartholin's duct draining the SLG into Wharton's duct. Despite Wharton's ductoplasty at the time of SMG removal to improve drainage of the SLG through Bartholin's duct, subsequent scarring resulted in recurrent fluid accumulation requiring repeated marsupialization. Magnetic resonance imaging demonstrated a cystic lesion in the sublingual space following the course of Wharton's duct, suggesting a submandibular duct sialocele and less likely a simple ranula (SLG mucocele). Formation of sialocele may have resulted from stricture of the submandibular duct diverting outflow of sublingual drainage from Bartholin's duct to accumulate in the submandibular duct remnant. The SLG was then removed without recurrence of swelling. **Conclusions:** Anomalous SLG drainage through Bartholin's duct may cause recurrent submandibular duct sialocele due to impaired emptying of the SLG causing sublingual secretions to accumulate in the duct remnant.

32. Improving International Standards in Otolaryngology Training through Comparative Operative Log Growth Charts

Vannipa Vathanophas, MD, Bangkok, Thailand; Noel Jabbour, MD, Pittsburgh, PA

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) develop operative log growth charts in any program where case log data is available; and 2) discuss the value of comparative case log growth charts to quality improvement efforts in international surgical education.

Objectives: 1) To develop operative log growth charts for otolaryngology training in an international program; 2) to use these growth charts to critically assess sufficiency of cases and parity of cases between residents; and 3) to compare these growth charts to available international standards for minimum case numbers. **Study Design:** Educational/quality improvement. **Methods:** Operative log growth charts were developed for key indicator procedures for graduating otolaryngology residents in 2012-2014 at a large teaching hospital in the capital city of a newly industrialized country. Comparisons were made between years of training and to required minimum case numbers published by the ACGME RRC for otolaryngology. **Results:** Data was available to create 7 key indicator operative log growth charts to include all available data from 2012-2014 residents. These growth charts were used to assess growth in operative procedures for residents in the program compared to historical norms in the program. Graduating residents surpassed ACGME minimum case numbers in bronchoscopy only and were below the minimum numbers for the other key indicators tested. **Conclusions:** There is significant heterogeneity in the standards for otolaryngology training between countries. It is possible to develop program specific and country specific operative log growth charts. While case exposure is not the equivalent of educational quality, a minimum exposure is essential for training. These growth charts may be used within a program to assess individual resident progress, to assess the effect of programmatic changes such as training length and resident complement in real time, and to compare case exposure to standards in other countries.

33. Necrotizing Fasciitis with Descending Mediastinitis Originating from an Infected Thyroglossal Duct Cyst

Jennifer A. Villwock, MD, Syracuse, NY; Tucker M. Harris, MD, Syracuse, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to describe a case of necrotizing fasciitis originating from an infected thyroglossal duct cyst, including clinical symptoms and signs and management.

Objectives: Necrotizing fasciitis (NF) is a soft tissue infection causing rapidly progressive necrosis of subcutaneous tissues, typically along fascial planes. The resultant systemic toxicity may result in death if not promptly recognized and treated. We report the first case of NF with descending mediastinitis originating from an infected thyroglossal duct cyst (TGDC) and review the clinical and radiologic signs of NF. **Study Design:** Case report and literature review. **Methods:** A case of infected TGDC leading to extensive NF with descending mediastinitis is described and the recent literature is reviewed. **Results:** A 74 year old woman presented from another hospital with worsening odynophagia, dysphagia, dyspnea, and extensive anterior neck edema and induration. CT imaging showed a midline neck abscess anterior to the trachea, tracking superiorly to the posterior hyoid bone, with subcutaneous air descending into the mediastinum and with involvement of the retropharyngeal space. Prompt surgical exploration revealed soft tissue necrosis along with abscess. Pathological analysis revealed a midline epithelial lined cyst consistent with a TGDC. Treatment consisted of surgical debridement, broad spectrum antibiotics, and local wound care. **Conclusions:** NF arising from a TGDC has not been previously reported. As with other NF etiologies, early surgical treatment is critical. Though not previously reported, infected TGDC—or other congenital neck masses—should remain in the differential diagnosis. Additionally, NF due to TGDC may influence surgical approach and potential need for a completion Sistrunk procedure after recovery from acute infection.

34. Outcomes of Infusion Drain for Treatment of Nasal Septal Abscess and Hematoma

Jennifer A. Villwock, MD, Syracuse, NY; Kristin A. Jones, MD, Lexington, KY; Sherard A. Tatum, MD, Syracuse, NY

Educational Objective: At the conclusion of this presentation, the participants should be familiar with the infusion drain as a treatment option for nasal septal abscess or hematoma.

Objectives: Nasal septal fluid collections are associated with cartilage loss, nasal deformity, or in the case of an abscess, local spread of infection. Many reports favor drainage of these fluid collections under moderate sedation or general anesthesia. We review the outcomes of infusion drain placement at the bedside, previously described at our institution. **Study Design:** Retrospective chart review. **Methods:** Institutional review board approval was obtained prior to accessing patient records. Patients treated for nasal septal abscess or hematoma between 2009 and 2013 were included for analysis. Primary outcomes include duration of hospitalization, resolution of infection, complications, and need for additional treatment. **Results:** Five patients were identified; four with nasal septal abscess and one with septal hematoma. Two cases required admission for intravenous antibiotics due to associated cellulitis. All cases were treated with bedside incision, drainage, and infusion drain placement. Unremarkable resolution was universally experienced. One patient did experience recurrent widening and fluctuance of his anterior nasal septum. This required Penrose drain placement into a dry septal pocket and nasal packing to resolve edema. **Conclusions:** Infusion drain placement is a viable treatment option for nasal septal abscess or hematoma. All abscess patients experienced complete resolution of infection. Complications were limited to local edema that resolved with repeat incision and packing.

35. Percutaneous Ultrasound Guided Approach to Reestablish Parotid Duct Patency

Jarrett E. Walsh, MD PhD, Iowa City, IA; Henry T. Hoffman, MD, Iowa City, IA

Educational Objective: At the conclusion of this presentation, the participants should be able to recognize the utility of ultrasound guidance in procedures to address disease of the parotid duct to permit gland preservation.

Objectives: Parotid duct scarring may result from salivary disease as well as from iatrogenic causes to create severe stenosis that makes standard retrograde endoscopic duct exploration impossible. We report a successful procedure to address parotid duct stenosis in an antegrade approach using ultrasound guidance to permit parotid gland preservation. **Study Design:** Case report. **Methods:** Patient chart analysis and literature review. **Results:** A 44 year old male presented with a 5 year history of recurrent left parotid swelling. An overview of causes of parotid duct stenosis and operative management of parotid stenosis is presented. An ultrasound guided percutaneous approach to sialodochoplasty is presented with radiographic and intraoperative images documenting use of this technique to address a complex parotid duct stenosis. **Conclusions:** Percutaneous, ultrasound guided sialodochoplasty may allow parotid preservation in cases of severe duct stenosis unable to be addressed by traditional endoscopic techniques.

36. Sialosis: Recognizing a Growing Problem

Jarrett E. Walsh, MD PhD, Iowa City, IA; Nathan M. Schularick, MD, Iowa City, IA; Bruno A. Policeni, MD, Iowa City, IA; Robert A. Robinson, 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 recognize the characteristic pathology, radiology and conditions associated with sialosis and discuss current treatment options.

Objectives: Sialosis is chronic, non-inflammatory swelling of the salivary glands, predominantly affecting the parotid glands and associated with endocrine disorders, pharmacologic agents or nutritional deficiencies. We report case examples of sialosis including characteristic pathology and radiology as well as management options supported by a literature review. **Study Design:** Case report and literature review. **Methods:** Patient chart analysis and literature review. **Results:** A 63 year old male with greater than twenty years of bilateral parotid gland swelling is presented. Workup of salivary swelling and ultimate diagnosis of sialosis will be discussed. Sialendoscopy, sialograms, MRI and gross pathology sections are reviewed. Decision making regarding medical and surgical management in this case is discussed, including use of botulinum toxin injection, tympanic neurectomy and steroid infusions. **Conclusions:** Sialosis is a likely underdiagnosed entity with classic histopathologic, radiographic and clinical findings. Recognition of this diagnosis and initiation of intraluminal steroid infusions can impact the clinical course of the disease.

37. Thyroid Abscess: A Case Report and Review of Literature

Frederick Yoo, MD, Los Angeles, CA; Kevin A. Peng, MD, Los Angeles, CA; Edward C. Kuan, MD, Los Angeles, CA; Dinesh K. Chhetri, MD, Los Angeles, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the clinical presentation, patient characteristics and treatment of thyroid abscess.

Objectives: To describe a case of thyroid abscess and to summarize literature recommendations for management. **Study Design:** Retrospective case report. **Methods:** The medical records of a patient with a unilateral thyroid abscess treated at a tertiary academic medical center were reviewed. The Medline database was searched for thyroid abscess and intrathyroidal abscess. **Results:** An otherwise healthy 27 year old female presented to the emergency department with a one day history of worsening left neck and throat pain. Physical examination revealed a fullness over the left anterior neck; flexible laryngoscopy revealed fullness of the left piriform sinus with restricted mobility of the ipsilateral true vocal fold. Computed tomography with intravenous contrast was performed, revealing an abscess contained wholly within the left thyroid gland. Incision and drainage was performed via a low lateral collar incision, and cultures were positive for Eikenella corrodens, Streptococcus viridans, Fusobacterium spp., Peptostreptococcus spp. and Prevotella spp. The infection abated with appropriate antibiotic coverage. On literature review, an abscess of the thyroid was first described in 1894. The most common pathogens include Streptococcus and Staphylococcus species, but oral and respiratory flora, fungal, and mycobacterial infections have also been described. Anatomical anomalies, such as branchial cleft cysts or sinuses, may be present, but are not consistently demonstrated. Recommended therapy is surgical drainage with culture directed antibiotics. **Conclusions:** Thyroid abscess is an uncommon condition which can lead to airway obstruction and thyrotoxicosis. Timely treatment with antibiotics and surgical drainage and workup for underlying immunocompromised state and anatomical causes are warranted for management of these cases.

38. Reinventing the Pediatric Tracheostomy Utilizing Design Thinking Methodology and User Empathy to Reconsider the Standard Tracheostomy Tube

Elizabeth A. Zambricki, MD MBA, Stanford, CA; Anna H. Messner, MD, Stanford, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to empower budding and established otolaryngologists to utilize their own skills of observation and creative reasoning to rethink and redesign current devices or systems within our field. An innovative alternative to the pediatric tracheostomy tube will be described herein while simultaneously laying out the

broader basic framework of design thinking and its application to the field of otolaryngology.

Objectives: The pediatric tracheostomy tube is largely designed for in-hospital use as evidenced by its ability to interface with ventilatory devices. However, many tracheostomy users are living in the home and participate in normal daily activities. The bulky and medical appearing design of current tracheostomy tubes does not address the user needs of a low profile, nonmedical appearing, customizable device. This study seeks to use design thinking principles to reconsider how our current tracheostomy tubes look and function in the outside world. **Study Design:** Design thinking, solutions oriented case study. **Methods:** Emersion into the lives of four pediatric tracheostomy users allowed for characterization of the difficulties faced by this population and development of a logical and innovative solution. Traditional design thinking principles were used including: building empathy for the context of the problem, creative generation of insights and solutions, and rationality in analyzing and fitting various solutions to the problem context. **Results:** A preliminary patent will be filed for a new pediatric tracheostomy device that utilizes magnets to maintain a low profile aesthetic, even when utilizing connective devices such as Passy Muir valves or humidified moisture exchangers. The device also allows for customizability so that users can tailor it to their personal needs. **Conclusions:** Otolaryngology today is ripe with challenges and therefore opportunities to transform the way we practice, provide patient care, and innovate for the future. By focusing on a niche solution for pediatric tracheostomy users and their families, we hope to both provide a skeletal framework for creative action, as well as expose the audience to the broader implications of design thinking.

Head & Neck

39. Local Control of Pediatric Sarcoma with Free Flap Reconstruction Obviating the Need for Radiotherapy: Case Series and Comment on Literature

Syed A. Ali, BA, Columbus, OH; Charles A. Elmaraghy, MD, Columbus, OH; Kris R. Jatana, MD, Columbus, OH; Jonathan M. Grischkan, MD, Columbus, OH; Theodoros N. Teknos, MD, Columbus, OH; Matthew O. Old, MD, Columbus, OH

Educational Objective: At the conclusion of this presentation, the participants should be more knowledgeable of the myriad indications for surgical resection and free flap reconstruction in pediatric patients. They should also be able to compare the outcomes and adverse effects of surgery with free flaps versus radiotherapy for local control in this population.

Objectives: 1) To report two cases of head and neck sarcoma malignancies successfully repaired by free flap reconstruction in pediatric patients; and 2) to add data to the literature to aid the evolution of local control algorithms for pediatric malignancies, specifically in avoidance of radiotherapy and its long term consequences. **Study Design:** Case series, review of literature, and commentary. **Methods:** Detailed clinical histories, preoperative imaging, intraoperative photographs, and post-surgical outcomes are presented and current literature is reviewed. **Results:** A 4 year old male presented with an enlarging, bleeding tongue mass; biopsy revealed synovial cell sarcoma. Intraoperative course involved subtotal glossectomy and floor of mouth resection with radial forearm free flap. Postoperative course displayed excellent flap viability and no post-surgical complications. A 9 year old male presented with newly diagnosed Ewing's sarcoma of the right mandible. He was treated with neoadjuvant induction chemotherapy for 12 weeks, following which the decision was made for surgical excision. Intraoperative course involved right mandibulectomy and floor of mouth resection, with osteocutaneous fibular free flap. Postoperative course involved delayed wound healing with excellent flap viability. **Conclusions:** As evidenced by our case series and literature review, surgical resection followed by free flap transfer holds the potential of achieving clear pathologic margins with good cosmetic and functional outcomes in the pediatric head and neck cancer population, thereby bypassing the multitude of short term and long term adverse effects associated with radiotherapy control.

40. Rare Case of Tonsillar Lymphangiomatous Polyp with Supraglottic Extension

Amir Allak, MD MBA, Charlottesville, VA; Akeesha Shah, MD, Charlottesville, VA; Helen P. Cathro, MB ChB, Charlottesville, VA; David C. Shonka Jr., MD, Charlottesville, VA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the typical clinical presentation of a lymphangiomatous polyp and acknowledge that presentation in the supraglottis is a rare occurrence.

Objectives: To present a patient with a tonsillar lymphangiomatous polyp (LAP) and its previously undescribed extension into the supraglottis. **Study Design:** Case report. **Methods:** Records of a patient diagnosed with LAP were reviewed and literature search was performed. **Results:** A 67 year old male patient presented with a history of right aural fullness and intermittent otalgia. He had no history of smoking, alcohol, or chemical exposure. Flexible nasolaryngoscopy revealed a diffuse bulky polypoid mass that extended from the right tonsillar fossa to the ipsilateral aryepiglottic fold, pharyngeal wall, lingual surface of the epiglottis, and arytenoid mucosa. Computed tomography confirmed these findings and showed no cervical lymphadenopathy. He was taken to the operating room for direct laryngoscopy and biopsy/debulking of the mass, and, given the supraglottic bulk of the lesion, had a difficult fiberoptic nasotracheal intubation. Pathology revealed squamous epithelium covered fronds with no dysplasia. Dilated lymphatic channels and blood vessels were present within the submucosa. Tonsillar tissue was present at the base of the mass and extending to the tips of some of the fronds. Flow cytometric studies demonstrated no immunophenotypic evidence of B cell monoclonality or aberrant T cell expression. **Conclusions:** LAP is reported in the literature to present in the upper aerodigestive tract, most commonly limited to the palatine tonsils without extension to other subsites. This patient had significant extension into the pharyngeal wall and supraglottis, representing an exceptional case not

previously described.

41. Expanding the Utilization of the Osteocutaneous Radial Forearm Free Flap Beyond Mandibular Reconstruction

Brian T. Andrews, MD MA, Kansas City, KS; Dustin A. Silverman, BA, Kansas City, KS; Wojciech H. Przylecki, MD, Kansas City, KS; Yelizaveta Shnayder, MD, Kansas City, KS; Terry A. Tsue, MD, Kansas City, KS; Douglas A. Girod, MD, Kansas City, KS

Educational Objective: At the conclusion of this presentation, the participants should be able to understand indications and techniques to utilize the osteocutaneous radial forearm free flap in modern head and neck reconstruction.

Objectives: The osteocutaneous radial forearm free flap (OCRFFF) has been well described and its use in mandibular reconstruction has been well published. Its use should be considered for other composite head and neck defects and should be part of every reconstructive microvascular surgeon's armamentarium. **Study Design:** A retrospective chart review. **Methods:** All subjects who underwent OCRFFF reconstruction at a tertiary academic center between January 2004 and July 2014 were included. Data collected included basic demographics, clinic notes, operative logs, and inpatient hospital records. **Results:** Five patients were identified who underwent OCRFFF head and neck microvascular reconstruction for indications other than segmental mandibulectomy. Indications for OCRFFF reconstruction included: midface maxillary reconstruction (n= 2), orbit reconstruction (n=1), frontal sinus and forehead reconstruction (n= 1), and laryngofissure reconstruction (n= 1). There were no immediate perioperative complications and all subjects demonstrated successful microvascular reconstruction. On long term followup one subject developed a nasocutaneous fistula following radiation requiring maxillary hardware removal. **Conclusions:** The OCRFFF is a versatile and reliable tool in microvascular reconstruction. Its use in head and neck reconstruction expands well beyond mandibular reconstruction and it should be considered a first line choice in many complex reconstructions requiring both soft tissue and bone.

42. Standard of Care for Salivary Preservation during Radioactive Iodine Treatment

Christopher M. Ayers, MD, Charleston, SC; Charley S. Coffey, MD, San Diego, CA; Margaret A. Ogden, MD, St. Louis, MO; Stephen Y. Lai, MD, Houston, TX; Ralph P. Tufano, MD, Baltimore, MD; Marion B. Gillespie, MD, Charleston, SC

Educational Objective: At the conclusion of this presentation, the participants will understand the need for a randomized control trial to evaluate techniques to prevent sialoadenitis after radioactive iodine therapy.

Objectives: 1) Determine best practices for preventing sialoadenitis secondary to radioactive iodine treatment (RIT); and 2) compare instructions provided to patients to evaluate consistency of care across geographical region. **Study Design:** Survey. **Methods:** Physicians currently performing salivary endoscopy at five institutions were contacted to locate any instructions provided to patients concerning the protection of salivary gland function during RIT. Responses were received from 4 institutions: institution 1, institution 2, institution 3, and institution 4. Primary outcome measurements included the presence or omission of recommendation for use of hydration and analgesics, as well as recommendations both for and against the use of sialogogues. **Results:** All four institutions advise hydration anywhere from 2-3 to 10 days post-RIT and analgesics, including acetaminophen and ibuprofen, if salivary glands become tender. Recommendations regarding sialogogue use vary greatly, with only institution 3 recommending use for every patient, beginning the day after therapy. Institution 1 counsels patients to use sialogogues only upon presentation of mouth/gland tenderness, while institution 4 provides no recommendation for or against the use of sialogogues. Institution2 specifically recommends against the use of any sialogogues post-RIT. **Conclusions:** It is not surprising that there is significant variation in recommendations among institutions regarding the use of sialogogues given the paucity of evidence. Based on an extensive review of the literature and these findings, we support the need for a randomized controlled trial to evaluate different protective agents to prevent salivary gland dysfunction after RIT.

43. Mid-Cervical Scar Satisfaction in Thyroidectomy Patients

Amy R. Best, MD, Indianapolis, IN; Taha Z. Shipchandler, MD, Indianapolis, IN; Susan R. Cordes, MD, Ukia, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss overall long term patient satisfaction with conventional thyroidectomy scars and the effect of thyroidectomy scars on a patient's quality of life in a given study population.

Objectives: To assess long term patient satisfaction and quality of life associated with conventional thyroidectomy scars. **Study Design:** Validated survey administration and retrospective review of clinical and demographic data. **Methods:** Using current procedural terminology (CPT) coding, 528 patients who underwent conventional thyroidectomy through years 2000-2010 were identified and attempted to be contacted by telephone. Subjects reached were administered the Patient Scar Assessment Questionnaire (PSAQ). Mean satisfaction, appearance, and scar consciousness scores were calculated from the collected data. Thirty-seven patients also measured the length of their current scar. Patient demographic and operative data were collected retrospectively from the medical record. Data were analyzed with one way variant analyses and independent samples t-testing. **Results:** Sixty-nine of 528 patients were able to be reached and completed the questionnaire. Sixty-seven patients (97.1%) were satisfied with the overall appearance of their scar. Mean total satisfaction score (TSS) was 17.3 (< 26 indicates a high level of satisfaction). Fifty-six (81.2%) were not at all self-conscious of their scar; 65 (94.2%) reported no attempt to hide their scar. Seven patients (10.1%) indicated any likelihood of pursuing scar revision. Females

had significantly higher TSS, consciousness scores, and satisfaction with appearance scores ($p < 0.05$). The effect of "perceived" scar length was significant for scar consciousness, not patient satisfaction ($p < 0.01$). **Conclusions:** The majority of patients were satisfied with their conventional thyroidectomy scar appearance. Few patients reported a desire to hide the scar or pursue revision. Women were more likely to be dissatisfied than men, and length may play a role in scar consciousness.

44. Undiagnosed Systemic Sclerosis Causing Exaggerated Radiation Induced Fibrosis

Andy M. Courson, MD, Phoenix, AZ; Lisa R. Crujido, SLP, Phoenix, AZ; Michael L. Hinni, MD, Phoenix, AZ

Educational Objective: At the conclusion of this presentation, the participants should be able to recognize that patients with systemic sclerosis may develop a markedly exaggerated fibrotic reaction in response to radiation.

Objectives: To present a case of exaggerated radiation induced fibrosis in a patient with undiagnosed systemic sclerosis who received radiation for oropharyngeal squamous cell carcinoma. **Study Design:** Case report with review of the literature. **Methods:** The patient is a 51 year old male with a history of T2N0M0 squamous cell carcinoma of the palatine tonsil. He was treated at an outside institution with tonsillectomy with subsequent 70 cGy of radiation in 35 fractions to the bilateral neck and tonsil area and concurrent cisplatin every 3 weeks. Three months after completing treatment, the patient began having severe trismus, dysphagia, reflux with aspiration, and hand and foot swelling. He presented to our clinic 9 months after finishing treatment with the above symptoms and a 50 pound weight loss. Physical exam and swallow study showed severe neck fibrosis, near laryngeal fixation, and aspiration. The patient was diagnosed with systemic sclerosis with Raynaud's phenomenon and an exaggerated fibrotic response to radiation. **Results:** The patient underwent an esophageal dilation and swallowing therapy with some modest benefits in dysphagia and aspiration. A gastrostomy tube was placed in order to supplement the patient's nutrition. There is no other treatment for the fibrosis in the neck and this will likely worsen with time. **Conclusions:** Patients with systemic sclerosis may have exaggerated responses to therapeutic doses of radiation. This can be progressive, extend beyond irradiated fields, and eventually be fatal in severe cases. Patients with systemic sclerosis and cancer should be counseled on the risks of an exaggerated fibrotic response prior to a decision on treatment.

45. Lloyd Storrs, MD Resident Research Award
Prognostic Value of Albumin in Patients with Head and Neck Cancer

Deepa Danan, MD MBA, Charlottesville, VA; David C. Shonka Jr., MD, Charlottesville, VA; Yamil Selman, MS, Charlottesville, VA; Zenia Y. Chow, MBBS, Charlottesville, VA; Mark J. Jameson, MD PhD, Charlottesville, VA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the prognostic value of albumin in patients with head and neck cancer.

Objectives: Albumin is an indicator of nutritional status and has recently been investigated as a predictor of cancer survival and perioperative outcomes. Several studies across specialties have associated low preoperative serum albumin in cancer patients with poorer overall survival and increased risk of postoperative complications. There are limited data, however, on the role of hypoalbuminemia in patients with head and neck cancer (HNC). The effect of hypoalbuminemia has also been investigated in the context of microvascular free tissue transfer due to known anticoagulant properties of albumin. The purpose of this study is to determine the prognostic value of preoperative serum albumin in patients who undergo surgery for HNC with respect to overall survival (OS), recurrence free survival (RFS), length of stay (LOS), flap complications, postoperative wound infections, and pneumonia. **Study Design:** Retrospective cohort study. **Methods:** A chart review was performed of patients who underwent HNC resection and reconstruction over a 5 year period at a single institution. Statistical analyses performed include Cox proportional hazards models, Kaplan-Meier estimation, and logistic regression. Preoperative albumin level was analyzed as a continuous variable. **Results:** 124 patients were included in the study. There was no statistically significant association between albumin and RFS, postoperative wound infections, pneumonia, flap complications, or LOS. There was a statistically significant association between albumin and OS (HR =0.60, p=0.033). **Conclusions:** In patients with HNC, lower preoperative serum albumin is associated with significantly poorer OS. In this study, each unit increase in albumin reduced the instantaneous risk of death by 40%. However, albumin is not significantly associated with perioperative complications.

46. An Unusual Case of Cervical Lymphadenopathy: Kikuchi-Fujimoto Disease in a Caucasian Female

Nicholas L. Deep, MD, Phoenix, AZ; Rachel B. Cain, MD, Phoenix, AZ; Carrlene B. Donald, PA-C, Phoenix, AZ; Richard E. Hayden, MD, Phoenix, AZ

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the findings in Kikuchi-Fujimoto disease (KFD), also known as histiocytic necrotizing lymphadenitis, a condition commonly mistaken for malignant lymphoma, and discuss the differential diagnosis, workup, and histopathology of KFD.

Objectives: 1) Review a case of Kikuchi-Fujimoto disease (KFD), also known as histiocytic necrotizing lymphadenitis, a condition commonly mistaken for malignant lymphoma; 2) discuss the differential diagnosis, workup, and histopathology of KFD; and 3) review the literature of the 25 reported cases of KFD in the United States. **Study Design:** Case report and review of the literature. **Methods:** 25 reported cases in the USA are discussed. **Results:** A 25 year old female presented with a persistent 2.5 cm hypermetabolic neck mass unchanged over 5 months despite oral antibiotics and steroids. Infectious serology testing was negative. Needle biopsies revealed

only necrosis and fibrosis. Excision of the fibrotic, matted lymph nodes was performed. Pathology revealed benign lymph nodes with follicular and paracortical hyperplasia, karyorrhectic debris, and scattered foci of necrosis without neutrophils or plasma cells, consistent with KFD. KFD is incredibly rare, with only 25 reported cases in the United States. It presents with cervical lymphadenopathy (100%), fever (75%), leukopenia (45%) and an elevated erythrocyte sedimentation rate (50%). Females (60%) and Asians are predominantly affected. The pathogenesis is unknown, although viral and autoimmune mechanisms have been proposed. Most cases are self-limited, with an average duration of 4 to 6 months. **Conclusions:** KFD is an idiopathic, benign, self-limited disorder of the young adult population. It is characterized by tender cervical lymphadenopathy often accompanied by fever and night sweats. KFD is commonly misdiagnosed as malignant lymphoma or systemic lupus erythematosus, resulting in unnecessary and potentially toxic treatments. Effective communication between the surgeon and pathologist is crucial for clinicopathologic recognition of KFD.

47. Targeted Next Generation Sequencing of TP53 in Non-tobacco Related Oral Tongue Squamous Cell Carcinoma

Daniel L. Faden, MD, San Francisco, CA; Chase M. Heaton, MD, San Francisco, CA; Andrew P. South, PhD, Dundee,; Joe L. Derisi, PhD, San Francisco, CA; Sarah T. Arron, MD PhD, San Francisco, CA; Steven J. Wang, MD, San Francisco, CA

Educational Objective: At the conclusion of this presentation, the participants should be able discuss what is known regarding the role of mutations in the gene TP53 in non-tobacco related oral tongue cancer.

Objectives: To better elucidate the role of mutations in the gene TP53 in patients with oral tongue cancer (OTSCC) who lack traditional risk factors. **Study Design:** DNA from 46 FFPE samples from patients with OTSCC underwent next generation sequencing. All patients had no history of tobacco use, radiation exposure or previous head and neck cancer. Results were compared to Sanger sequencing of TP53 from the same samples, as well as whole exome sequences (WES) of similar cohorts of samples. **Methods:** Genomic DNA was isolated using the QIAamp DNA FFPE tissue kit. DNA underwent 454 pyrosequencing to identify variants in TP53, NOTCH and RAS using the GS junior system and Fluidigm PCR amplicon libraries. **Results:** 23 of 46 samples had deleterious mutations in TP53. 33% of patients under 45 years of age had mutations while 56% of patients over 45 had mutations. The TP53 mutation rate was 30% higher compared to Sanger sequencing. TP53 mutations rates from WES of small cohorts of OTSCC show mixed results (20-94%). **Conclusions:** The role of TP53 mutations in non-tobacco related OTSCC is poorly understood. Previous WES and Sanger sequencing studies of TP53 have yielded variable results. Here, we conducted the largest targeted next generation sequencing of TP53 in non-tobacco related OTSCC, to date. 50% of patients possessed TP53 mutations, indicative of considerable genomic heterogeneity. Mutation rates differed by age, although this difference was not statistically significant. Additional next generation sequencing investigations of TP53 in OTSCC in large, well curated cohorts are needed.

48. Awake Tracheostomy: The 5 Year Experience at an Urban Tertiary Center

Christina H. Fang, BS, Newark, NJ; Priscilla E. White, BS, Newark, NJ; Remy Friedman, BS, Newark, NJ; Leila J. Mady, MD PhD, Pittsburgh, PA; Evelyne Kalyoussef, MD, Newark, NJ

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the common indications, presentations, complications and outcomes of patients who undergo awake tracheostomy.

Objectives: There are few studies that discuss the issues surrounding emergent awake tracheostomy. We aim to review the indications, anesthesia used, complications and outcomes of patients undergoing urgent awake tracheostomy. **Study Design:** Retrospective chart review. **Methods:** Medical charts of patients who underwent an awake tracheostomy at our institution affiliated tertiary care center over a 5 year period from 2009 to 2014 were reviewed. Data were collected from inpatient, outpatient and operative records. **Results:** Sixty-eight patients underwent awake tracheostomy. No patients were converted from cricothyroidotomy. Over half presented with hoarseness (n=36, 52.9%) and/or stridor (n=37, 54.4%). Acute upper airway obstruction secondary to malignancy was the most common indication and accounted for 58 cases (85.3%). Thirty-nine (70.1%) of the 55 patients with squamous cell carcinoma presented with advanced disease (stage III or IV). Other indications included glottic or subglottic stenosis (4.4%), failure to intubate (2.9%), and other (7.4%). Local anesthesia was used alone in 35.3% of cases and in combination with conscious sedation in 64.7% of cases. Mild bleeding occurred postoperatively in 5 patients (7.4%). There were no other postoperative complications. Nineteen patients were lost to followup. The mean followup of 49 patients was 7.2 weeks, ranging from 2 to 261 weeks. Long term complications occurred in 3 patients and included tracheitis (4.1%) and suprastomal granuloma (2.0%). Eleven patients (22%) were decannulated at a mean of 11.8 months following tracheostomy. **Conclusions:** Awake tracheostomy should be considered in patients with impeding airway obstruction and is a safe and effective method to secure an airway in these patients.

49. Extrathyroidal Hashimoto's Thyroiditis of the Strap Muscles: A Case Report

Laura R. Garcia-Rodriguez, MD, Detroit, MI; Becky L. Massey, MD, Milwaukee, WI

Educational Objective: At the conclusion of this presentation, the participants should be able to recognize that ectopic thyroid tissue does not always present itself as a malignant entity.

Objectives: Ectopic thyroid gland is a rare occurrence with a prevalence of 1 per 100,000 - 300,000 people. Hashimoto's thyroiditis

involving ectopic thyroid tissue is particularly unusual. Our objective is to describe the presentation, workup, surgical management, and brief review of literature. **Study Design:** Retroactive, case report. **Methods:** Review of patient record. As a case report, this project was exempt from institutional review board approval. **Results:** We present a case of ectopic thyroid tissue located in the strap muscles with concurrent Hashimoto's thyroiditis; this tissue was initially believed to represent metastatic follicular thyroid carcinoma. **Conclusions:** Whenever ectopic thyroid tissue is encountered the possibility of benign thyroid tissue should not be excluded even if the thyroid histology initially appears to be malignant in nature.

50. **Shirley Baron Resident Research Award**
Development of a Chemoradiation Therapy Toxicity Staging System for Oropharyngeal Carcinoma
Ryan P. Goepfert, MD, San Francisco, CA; Sue S. Yom, MD PhD, San Francisco, CA; William R. Ryan, MD, San Francisco, CA; Steven W. Cheung, MD, San Francisco, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to articulate the importance of simplifying treatment toxicity outcomes to enhance shared decision making in management of oropharyngeal carcinoma, explain provider representations of overall stages of treatment toxicity, discuss provider determinations of the most and least distressing chemoradiation therapy outcomes, and outline the importance and utility of this information as foundation for a prospective, patient-centric study.

Objectives: Develop an innovative tool to standardize representation of treatment toxicity and enable shared decision making by mapping provider based outcome descriptions to four overall stages of toxicity from chemoradiation therapy for oropharyngeal carcinoma. **Study Design:** Cross-sectional, provider based questionnaire. **Methods:** Five short and five long term treatment outcomes of cisplatin and intensity modulated radiation therapy for oropharyngeal carcinoma were chosen by a focus group of head and neck oncologists. A pilot survey was developed in an online platform and feedback from extramural head and neck oncologists was used to refine it for IRB submission and formal deployment. Respondents were surgical, radiation, and medical oncologists with experience in treating oropharyngeal carcinoma. 105 responses were analyzed, of which 67% were from providers with >10 years in practice and 79% who treat >15 new oropharyngeal carcinoma patients per year. **Results:** A particular overall chemoradiation toxicity class is accounted for by two adjoining distress levels (>90% occurrence) for both short and long term outcomes. Providers deemed mucositis and nausea, and pain and xerostomia the most distressing short and long term toxicities, respectively. Providers were split as to their impression of the relative importance that patients place on short versus long term outcomes when considering treatment options. **Conclusions:** A clinical tool to represent overall chemoradiation toxicity considering short and long term outcomes has been developed by analyzing provider-centric responses to a realistic clinical scenario. Results from this pilot study enhance patient counseling and shared decision making, and serve as foundational information for a prospective, longitudinal patient-centric observational study.

51. **Radiation Induced Angiosarcoma of the Scalp Following Occupational Exposure to Radioactive Materials**
Lucas D. Harless, MD, Oakland, CA; Christopher G. Tang, MD, Oakland, CA; Deepak Gurushanthiah, MD, Oakland, CA

Educational Objective: To describe a case of radiation induced angiosarcoma of the scalp related to occupational exposure to radioactive material with no previous history of malignancy or radiation therapy.

Objectives: To present a case linking occupational radiation exposure of the scalp to development of angiosarcoma. **Study Design:** Case report. **Methods:** Case report of patient treated by department. **Results:** A 62 year old male presents to the head and neck surgery clinic with a history of occupational skin exposure to radioactive material. The patient worked at a nuclear power plant and had radioactive material spilled on his skin 8 years ago resulting in severe burns to the scalp, chest, and upper extremity. Biopsied for scalp pruritus and enlarging scalp lesions found to be angiosarcoma. The patient received a wide local excision of the scalp lesions, superficial parotidectomy, a right level II - V neck dissection, and a split thickness skin graft. Negative margins were difficult to obtain for the scalp lesion. Periosteum and a portion of the outer table of cortical bone on the calvarium were taken; 21 of 25 nodes positive for malignancy. The patient presented to the head and neck surgery clinic one month postoperatively with increased right facial swelling and was determined to have recurrent angiosarcoma. Over the next month further imaging revealed widely metastatic disease. **Conclusions:** Of all etiologies of angiosarcomas, radiation induced angiosarcomas are one of the least common and often portend a poor prognosis as they are locally aggressive with high recurrence rates. This case demonstrates an aggressive angiosarcoma due to an unlikely source of radiation exposure, outside of radiotherapy, and suggests a direct correlation between an occupational radiation exposure and development of angiosarcoma of the head and neck.

52. **Dean Lierle, MD Resident Research Award**
Elective Central Node Dissection: Comparison of Standard Open to Minimally Invasive Video Assisted Approach
Matthew S. Hensler, MD, Cincinnati, OH; Mercedes Falciglia, MD, Cincinnati, OH; Abid Yaqub, MD, Cincinnati, OH; Huaitao Yang, MD PhD, Cincinnati, OH; David L. Steward, MD, Cincinnati, OH

Educational Objective: At the conclusion of this presentation, the participants should be able to compare the outcomes of standard open to minimally invasive video assisted elective central node dissection.

Objectives: Compare outcomes of concomitant primary thyroidectomy with elective central neck dissection (CND) by the standard open vs. minimally invasive video assisted (MIVA) approach. **Study Design:** Case series with chart review, single institution, tertiary referral center. **Methods:** CPT code 60252 was used to identify patients undergoing CND from February, 2005 through June, 2012. Therapeutic CND and revision cases were excluded. MIVA approach was performed only in patients with low risk thyroid carcinoma (cT1 or 2, cN0). Primary outcomes included lymph node yield, complications, and recurrence. **Results:** Of 87 eligible patients, 38 were open and 49 were MIVA. The MIVA group was more likely female (88% vs. 68%, p=0.03), but groups were similar in age (46 vs 48.6 mean years, p=0.37) with a similar percentage of unilateral dissection (69.4% vs. 71.0%, p=0.86). Pathologically, the MIVA group was more often T1 or 2 (86.9% vs. 76.5%, p=0.02), but the groups had similar N0 rates (56.5% vs. 64.7%, p=0.46). Nodal yield was similar between the groups (6.4 vs. 6.8, p=0.73). Transient recurrent laryngeal nerve injury rates were similar (4.1% vs. 2.6%, p=0.71). Transient hypoparathyroidism (PACU PTH<15pg/ml) was lower in the MIVA group but not statistically significant (29.2% vs. 45.2%, p=0.15). Recurrence rates were similar both clinically (2.0% vs. 0.0%, p=0.29) and biochemically (most recent Tg median) (0.0ng/mL vs. 0.0ng/mL, p=0.78). **Conclusions:** Concomitant MIVA thyroidectomy with elective central neck dissection appears a safe and effective alternative to the standard open approach for low risk thyroid carcinoma.

53. The Safety and Feasibility of Outpatient Parathyroidectomy: Identifying Predictors for Postoperative Complications

Yan W. Ho, MD, New York, NY; Sarah M. Kidwai, BS, New York, NY; Arjun K. Parasher, MD, New York, NY; Marita S. Teng, MD, New York, NY; Eric M. Genden, MD, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the incidence of complications after parathyroidectomy and preoperative or intraoperative characteristics that are predictive of these complications.

Objectives: 1) Understand the incidence of complications after parathyroidectomy; and 2) identify preoperative or intraoperative characteristics that are predictive of postoperative complications. **Study Design:** Single institution retrospective chart review. **Methods:** A retrospective chart review was performed for 228 patients who underwent parathyroidectomy from 2009 to 2012. Preoperative, intraoperative, and postoperative data were collected. A complication was defined as any patient who had postoperative symptoms that required outpatient or inpatient management. The control group was defined as patients who did not experience a complication. Student t-tests were used to determine if there was a significant difference in preoperative or intraoperative factors in those patients who experienced a complication compared to those who did not. **Results:** The total number of complications was 39. The median preoperative parathyroid hormone (PTH) level was significantly higher among patients with a complication than among patients without a complication (139 pg/ml vs 99 pg/ml, p=0.0037). The median percent drop in PTH at 20 minutes intraoperatively among patients with a complication was significantly different from the control group (87.18% vs 84.87%, p=0.0421). Furthermore, patients with a complication had higher preoperative hypercalcemia (calcium > 11.0) and elevated calcium (calcium >12.0) than those who did not have a complication (22.47% vs. 11.61%, p=0.054, and 35.71% vs. 15.56%, p=0.067, respectively). These results were borderline significant. **Conclusions:** In this study, we have identified preoperative and intraoperative factors that may predict postoperative complications in patients who have undergone outpatient parathyroidectomy. We propose the use of a standard postoperative protocol for monitoring calcium and preventing hypocalcemia in order to prevent postoperative complications.

54. Comparison of Harmonic Scalpel and Cold Knife in Parotidectomy

Jeffrey S. Jumaily, MD, Boston, MA; Robert W. Dolan, MD, Burlington, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to compare the harmonic scalpel device and conventional cold knife technique in parotidectomy.

Objectives: The aim of this study is to compare the efficacy of the harmonic scalpel and the conventional cold knife in parotidectomy with regard to several operative parameters and postoperative complications. **Study Design:** Nonrandomized retrospective study by a single surgeon. **Methods:** Retrospective chart review of 36 patients who underwent parotidectomy at a single academic institution by a single surgeon. Parotidectomy performed for malignant lesions were excluded (n=7). Categorical and numerical data were compared using Chi squared test and Student t-test, respectively. **Results:** Twenty-nine patients were eligible for final analysis; twenty underwent harmonic scalpel (HS) parotidectomy while nine underwent parotidectomy using the cold knife technique. The size of tumor, American Society of Anesthesia (ASA) score, postop pain, operating time, duration of postoperative drainage and procedure estimated blood loss were examined and did not show significance between the two groups. Postoperative drainage was significantly higher in conventional group at 84.8mL compared to the HS group total drainage of 35.8mL (p=0.008). There is no statistical difference in sialocele formation. Postoperative pain was difficult to quantify retrospectively. There was one incident of facial nerve weakness in each group classified House-Brackmann (HB) 5/6. There was good recovery in the HS group (HB 3/6) but persistent HB 5/6 in the conventional group. **Conclusions:** Harmonic scalpel was shown in prior studies to improve some surgical parameters such as surgical time, blood loss, and facial nerve injury. This report shows significant improvement in postoperative drainage which can translate into shorter hospital stay and cost savings.

55. Transoral Robotic Resection of Follicular Dendritic Cell Sarcoma of the Oropharynx and Nasopharynx: A Case Report and Review of the Literature

Irene A. Kim, MD, Los Angeles, CA; Keith E. Blackwell, MD, Los Angeles, CA; Sunita M. Bhuta, 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 common histopathological characteristics of follicular dendritic cell sarcomas, their behavior in nodal and extranodal sites, and the current consensus on optimal treatment strategies.

Objectives: To discuss the pathology, clinical course, and current treatments of follicular dendritic cell sarcomas (FDCS) and to illustrate the potential of transoral robotic surgery (TORS) in optimal tumor resection. **Study Design:** Case report and comprehensive English language literature review. **Methods:** A unique case of a patient with a previously treated right tonsillar FDCS who presented with a recurrent right oropharyngeal/nasopharyngeal disease and neck metastasis is presented along with a literature review. **Results:** A 76 year old male status post standard tonsillectomy 8 years previously for FDCS of the right tonsil presented with a right neck mass and a large right oropharyngeal/nasopharyngeal tumor. Following tissue confirmation of the FDCS recurrence, the patient underwent an ipsilateral neck dissection and TORS right lateral pharyngectomy. Intraoperatively, a large submucosal tonsillar tumor with significant extension into the soft palate and nasopharynx was visualized. The pharyngectomy resulted in negative oncologic margins. The patient was recommended to undergo radiotherapy given positive neck disease, but he declined. Four months following his surgery, he shows no evidence of recurrence and has been functioning well without an obturator. **Conclusions:** FDCS are known to behave like low to intermediate grade sarcomas, and clinical outcomes are variable. Treatment recommendations stress the importance of obtaining negative surgical margins. This is a case of a previous right tonsillar FDCS excised by standard tonsillectomy with questionable surgical margins. Recurrence was successfully treated by a robotic approach; it highlights the potential for TORS to optimally achieve negative margins while resulting in excellent functional outcomes.

56. A Unique Presentation of a Synchronous Angiosarcoma of the Scalp and Squamous Cell Carcinoma of the Tonsil

Edward C. Kuan, MD, Los Angeles, CA; Kevin A. Peng, MD, Los Angeles, CA; Frederick Yoo, MD, Los Angeles, CA; Scott D. Nelson, MD, Los Angeles, CA; Elliot Abemayor, MD, Los Angeles, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to recognize the rare presentation and management of synchronous mesenchymal and epithelial malignancies of the head and neck.

Objectives: Although the lifetime risk of developing a second primary head and neck cancer is estimated to be as high as 20 percent, the incidence of a synchronous carcinoma and sarcoma within the head and neck is exceedingly small, especially in the absence of previous radiation therapy. We report the unique case of a primary angiosarcoma of the scalp and a synchronous second primary squamous cell carcinoma (SCC) in situ of the right tonsil in a 69 year old male and discuss diagnosis and management. **Study Design:** Retrospective chart review. **Methods:** The medical records of a single patient treated at a tertiary academic medical center for angiosarcoma of the scalp and SCC of the tonsil in situ were reviewed. **Results:** A 69 year old male presented to the head and neck surgery clinic with a one month history of bleeding scalp mass. He denied tobacco use or prior exposure to ionizing radiation, but did endorse a history of heavy alcohol use. Physical examination revealed a 6 x 6 cm scalp vertex mass with biopsy confirming epithelioid angiosarcoma as well as a 2.5 cm friable, tender right tonsillar mass. He underwent a wide local excision of the scalp, direct laryngoscopy, and tonsillectomy. Negative margins were achieved, and pathology for the tonsillar mass returned as SCC in situ. He was referred for postoperative radiation therapy for both primary sites. **Conclusions:** Synchronous malignancies of the head and neck are defined as malignancies in two separate anatomic sites diagnosed within 6 months of each other. Though rare, they pose a unique challenge for the otolaryngologist. Optimal management involves considering each malignancy separately while remaining cognizant of the impact of the treatment of one on the other.

57. Angiosarcoma of the Tongue: Case Report and Literature Review

Edward C. Kuan, MD, Los Angeles, CA; Kevin A. Peng, MD, Los Angeles, CA; Frederick Yoo, MD, Los Angeles, CA; Scott D. Nelson, MD, Los Angeles, CA; Elliot Abemayor, MD, Los Angeles, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to recognize the presentation of angiosarcoma of the tongue and to understand that surgery, often followed by chemoradiation, is the mainstay of treatment.

Objectives: Angiosarcoma of the tongue is an exceedingly rare malignancy of the head and neck. They can be primary in nature or arise secondary to prior radiation. We report a case of primary angiosarcoma of the right oral tongue in a 57 year old male and review the literature. **Study Design:** Retrospective chart review and review of the literature via a Medline search. **Methods:** The medical records of a patient treated at a tertiary academic medical center for angiosarcoma of the tongue were reviewed. A Medline search was performed for the key words angiosarcoma and tongue. **Results:** A 57 year old male presented to the head and neck surgery clinic with a 3 month history of right sided sore throat, tongue pain, and otalgia. He denied any prior exposure to ionizing radiation. Physical examination revealed a 3.5 cm right lateral tongue mass with biopsy confirming high grade angiosarcoma. He underwent right subtotal glossectomy and neck dissection with anterolateral thigh free flap reconstruction, and was referred for postoperative chemoradiation

due to the presence of high risk features. Including the current case, fewer than 20 cases have been reported in the western literature. **Conclusions:** Angiosarcoma of the tongue is a rare but aggressive tumor, accounting for less than 1 percent of all head and neck malignancies. The mainstay of treatment is surgical resection with negative margins, with consideration given to adjuvant chemoradiation if high risk features are present.

58. Rhabdomyosarcoma in the Neck as a Presenting Sign of Lynch Syndrome

Marissa P. Lafer, BA, New York, NY; David R. Friedmann, MD, New York, NY; Jonathan Melamed, MD, New York, NY; Mark D. Delacure, MD, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to consider genetic predisposition given family history and patient factors even with sarcomatous tumors of the head and neck.

Objectives: To describe a case report of pleomorphic rhabdomyosarcoma in the neck in a young man leading to a diagnosis of Lynch syndrome, hereditary nonpolyposis colorectal cancer (HNPCC). **Study Design:** Case report. **Methods:** Chart review. **Results:** A 35 year old Ecuadorian man with an unremarkable medical history presented with an enlarging right neck mass over several months. Family history was significant for multiple first degree relatives who died at young ages of malignancy. Physical exam revealed a firm, nonpulsatile 7cm neck mass underlying the sternocleidomastoid muscle without overlying skin changes. Fine needle aspirate demonstrated indeterminate pathology with abundant histiocytes. Repeat biopsy was positive for malignant cells consistent with pleomorphic rhabdomyosarcoma. Staging PET/CT revealed a colonic mass with high SUV. Subsequent colonoscopy revealed a synchronous colon adenocarcinoma. Given his family history and the multiple malignancies at a young age, genetic testing was obtained and confirmed the patient was positive for mutations in the DNA mismatch repair gene MLH1 consistent with HNPCC, a rare autosomal dominant cancer syndrome. The patient was taken for wide local excision of the neck mass followed by hemicolectomy and adjuvant treatment as dictated by pathology. The neck mass was resected without complication, though metastases to regional lymph nodes were noted. Genetic testing of both the rhabdomyosarcoma and adenocarcinoma contained the MLH1 mutation. **Conclusions:** Sarcomas are not often associated with Lynch syndrome, and this report of pleomorphic rhabdomyosarcoma of the neck in an adult patient with HNPCC underscores the importance of considering genetic predispositions when confronted with patients with multiple malignancies, especially at a young age.

59. The Impact of VTE Chemoprophylaxis on Head and Neck Inpatients

Brian R. Langford, MD, Charlottesville, VA; Stephen S. Schoeff, MD, Charlottesville, VA; Christopher J. Hill, BS, Charlottesville, VA; Mark J. Jameson, MD PhD, Charlottesville, VA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the use of VTE chemoprophylaxis in otolaryngology head and neck surgery, discuss the incidence of VTE events in otolaryngology head and neck surgery and compare this to other surgical subspecialties, and discuss the impact of VTE chemoprophylaxis use on bleeding events in otolaryngology head and neck surgery.

Objectives: To establish the impact of VTE chemoprophylaxis on the incidence of VTE and bleeding events in head and neck surgery inpatients. **Study Design:** Retrospective cohort study at a tertiary care academic medical center. **Methods:** All head and neck surgery admissions in 2005 and 2013 (n = 367) were reviewed retrospectively. Main outcome measures of VTE events (DVT, PE) and bleeding events were recorded. **Results:** Three patients had VTE events (2 DVT, 1 PE) and 11 had bleeds (9 neck, 1 oropharynx, 1 thigh, 1 intracranial). The overall incidence of VTE was 0.82%: 1.48% with prophylaxis (PPx) and 0.43% without (NPPx). This difference was not statistically significant (Fisher's exact p=0.30). The overall risk of bleeding was 3.0%: 5.19% in the PPx group and 1.72% in the NPPx group. This difference approached statistical significance (Fisher's exact p=0.062). The relative risk of bleeding in PPx vs. NPPx patients was 3.0 (95% CI 0.90-10.1). The attributable risk of bleeding due to prophylaxis was 3.46% and the number needed to harm was 29. Bleeding events were treated with 1 emergency bedside procedure, 10 urgent operations, and 1 intravascular embolization. The patient who had an intracranial bleed expired 17 days postop. **Conclusions:** While it did not reduce the incidence of VTE events, chemoprophylaxis may have increased the risk of bleeding. Further study is required to clarify the risk-benefit profile of VTE chemoprophylaxis in patients undergoing head and neck surgery, as it may differ from other surgical fields.

60. A Rare Case of Intraductal Papilloma Arising from the Sublingual Gland

Adam N. Master, MD, Shreveport, LA; Shabnum I. Chaudhery, MD, Shreveport, LA; Cherie-Ann O. Nathan, MD, Shreveport, LA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the presentation, radiographic findings, treatment course and pathologic characteristics of a rare benign tumor.

Objectives: To describe the clinical, radiological, and pathologic presentation of intraductal papilloma of the sublingual gland, as well as detail the surgical management. **Study Design:** Case report. **Methods:** We reviewed the clinical presentation of a single case of intraductal papilloma including clinical presentation, radiographic imaging, operative report and pathological findings. **Results:** A 63 year old white male presented to our clinic with a 5 month history of intermittent swelling and fullness under the right side of his tongue.

CT scan was performed which showed a mass in the right sublingual gland. After cannulating Wharton's duct a diagnostic sublingual gland excision was performed. Histology showed a well circumscribed, unicystic tumor with luminal papillary proliferations that partially filled the dilated portion of a duct. The papillary fronds contained delicate fibrovascular cores with uniform, bland, cuboidal and columnar epithelium consistent with an intraductal papilloma. Patient has had complete resolution of his symptoms. **Conclusions:** Intraductal papilloma is a rare benign tumor of the salivary glands. In this report we describe the second only reported case of intraductal papilloma arising within the sublingual gland as well as successful treatment with excision of the sublingual gland.

61. Transient Facial Nerve Paralysis following Abdominal Fat Graft Reconstruction

David J. Mener, MD MPH, Baltimore, MD; Derek K. Boahene, MD, Baltimore, MD; Samuel L. Oyer, MD, Baltimore, MD; David W. Eisele, MD, Baltimore, MD

Educational Objective: At the conclusion of this presentation, the participants should be able to explain the neurophysiologic causes of facial paresis following local anesthetic.

Objectives: Transient facial nerve paralysis has been previously described in case reports following administration of local anesthetic with lidocaine due to sodium channel blockade. However, there is no data in the literature describing temporary facial nerve paresis after placement of tissue for reconstruction of a parotidectomy defect where local anesthetic was administered for abdominal fat graft harvest only. **Study Design:** We describe a case report of transient facial nerve paralysis following direct contact with abdominal fat graft reconstruction following superficial parotidectomy for a 1.7 cm oncocytoma, where local anesthetic with lidocaine was administered to the abdomen only prior to fat graft harvest. **Methods:** Case report. **Results:** Ten cubic centimeters of 1% lidocaine with epinephrine was injected into the periumbilical region prior to abdominal fat graft harvest. The fat graft was then placed into the parotid bed in an overlay fashion superficial and with direct contact to the facial nerve. Following surgery, the patient experienced significant facial nerve paresis (House Brackmann IV/VI), which resolved completely within four hours. This transient facial nerve paresis was thus attributed to abdominal fat absorbed lidocaine having direct contact with the facial nerve causing sodium channel blockade. **Conclusions:** Facial nerve paresis following administration of local anesthetic prior to parotidectomy is documented; however, caution should be used prior to administration of local anesthetic to reconstructive harvest sites in order to prevent sequela of transient paresis from direct contact secondary to sodium channel blockade.

62. Inflammatory Changes following PET/CT in a Patient with Squamous Cell Carcinoma of Unknown Primary

Luke D. Midlo, MD, La Crosse, WI; Ryan M. Manz, MD, La Crosse, WI (Presenter); Andrew V. Brekke, La Crosse, WI; Patrick D. Conway, MD, La Crosse, WI

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss a unique case of oropharyngeal inflammation following PET/CT.

Objectives: To review a case of mucosal inflammation of the soft palate. **Study Design:** A case report and literature review. **Methods:** A case report and review of the relevant literature. The patient's medical history, clinical findings and imaging studies are reviewed. **Results:** An 82 year old male with a history of tobacco abuse and COPD was referred to otolaryngology for a right sided neck mass. Physical exam revealed a right sided 3.5 cm firm and fixed neck mass. Fine needle aspiration revealed moderately differentiated squamous cell carcinoma. Comprehensive head and neck exam as well as flexible fiberoptic laryngoscopy was performed without visualization of any ulcerations, lesions, or masses concerning for a primary malignancy. This exam was repeated by multiple otolaryngologists with similar results. A PET/CT with fluorine 18-FDG demonstrated asymmetric right tonsillar/palatal uptake, a large hypermetabolic right neck mass consistent with metastatic adenopathy and a few smaller adjacent metastatic lymph nodes. The patient was examined approximately 1 hour following PET/CT revealing a new 3 cm erythematous lesion on the right lateral soft palate extending into the right tonsil region consistent with the imaging findings. **Conclusions:** We are presenting a unique case of mucosal inflammation at the location of a primary head and neck SCCa immediately following PET/CT. Although there has been a case described of a body rash and itching following exposure to fluorine 18-FDG, we believe this to be the first described case of this specific condition.

63. Prognostic Factors Affecting Cure and Survival in Medullary Thyroid Carcinoma

Suhael R. Momin, MD, Cleveland, OH; Deborah Chute, MD, Cleveland, OH; Robert Lorenz, MD, Cleveland, OH; Mumtaz Khan, MD, Cleveland, OH; Brian Burkey, MD, Cleveland, OH; Joseph Scharpf, MD, Cleveland, OH

Educational Objective: At the conclusion of this presentation, the participants should be able to explain various prognostic factors affecting cure and survival rates in medullary thyroid cancer, discuss the role of central and lateral neck dissections.

Objectives: Medullary thyroid carcinoma is an uncommon malignancy. We review our experience with MTC to identify factors affecting outcomes. **Study Design:** Retrospective series examining patients treated with curative intent between 1997 and 2013. Patients who received prior treatment were excluded. **Methods:** 67 patients were included. Average age was 51. Average followup time was 38 months. 19 patients had germline RET mutations. The remainder was sporadic (44) or untested (4). 41 patients were staged as T1, 8 as T2, 11 as T3, 7 as T4. Preoperatively, 50 were staged N0 while 17 were N+. **Results:** 37 patients underwent a central neck dissection and 15 underwent a lateral neck dissection. 22 patients had metastatic disease in at least one node. 5 year overall survival was 91%.

5 year survival without gross disease was 92%. 40 patients achieved biochemical cure and 5 year survival without biochemical evidence of disease was 86.5%. Tumor size was positively correlated with the risk and number of cervical metastases. Preoperative calcitonin was positively correlated with cervical metastases. Tumor size and the number of neck metastases were negatively correlated with biochemical cure. There is no effect of central or lateral neck dissection on biochemical cure, biochemical survival or disease free survival in N0 patients. Most N+ patients underwent neck dissection, so no subgroup analysis is possible. **Conclusions:** MTC has a significant risk of cervical metastasis, which increases with tumor size and preoperative calcitonin levels. This study finds no significant impact of neck dissections on cure and survival rates in N0 disease, however this is likely due to excellent survival rates and study size.

64. Wegener's Granulomatosis Presenting as a Parapharyngeal Mass

Ryan E. Nelson, BA, New Orleans, LA; Douglas M. Hildrew, MD, New Orleans, LA (Presenter); Tyler K. Deblieux, MD, New Orleans, LA; Jesse A. Guittard, MBA, New Orleans, LA; Todd M. Brickman, MD PhD FACs, New Orleans, LA

Educational Objective: At the conclusion of this presentation, participants should be able to 1) recognize that head and neck lesions refractory to initial medical and/or surgical management may represent underlying Wegener's granulomatosis; and 2) appreciate that the use of a multidisciplinary team can lead to optimized inpatient and outpatient management of such patients.

Objectives: The objective of this case report is to describe how a patient presenting with a parapharyngeal mass refractory to multiple medical and surgical therapies was subsequently diagnosed with Wegener's granulomatosis (WG). Clinical presentation, employed testing/imaging, and a discussion of the limited relevant literature is presented. **Study Design:** Case report and review of the literature. **Methods:** A patient's case was reviewed. A Medline search was performed using the terms: Wegener's granulomatosis AND Lemierre's syndrome AND parapharyngeal mass. **Results:** This case report describes the hospital course of a patient with an atypical presentation of WG. We discuss the workup necessary to arrive at the final diagnosis of WG as well as the utility of classic clinical signs and laboratory tests. **Conclusions:** To our knowledge, this report is the first description of a patient presenting with a parapharyngeal mass causing superior cervical chain compression with simultaneous Lemierre's syndrome who was ultimately diagnosed with WG. We advocate that WG should be included within the differential diagnosis of atypical head and neck lesions refractory to multiple treatment regimens. Moreover, we demonstrate how the assembly of an interdisciplinary medical team leads to an expeditious diagnosis, optimized inpatient management, and coordinated outpatient care for such patients.

65. Ethnic Variability in Thyroid Cancer

Khanh K. Nguyen, MD, Loma Linda, CA; Daniel I. Kwon, MD, Loma Linda, CA (Presenter); Patrick S. Moon, MD, Loma Linda, CA; Andrew W. Evelsizer, BS, Loma Linda, CA; Salem O. Dehom, MPH, Loma Linda, CA; Alfred A. Simental, MD, Loma Linda, CA; Steve C. Lee, MD PhD, Loma Linda, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to risk stratify patients who may have a malignant thyroid nodule based on demographic information.

Objectives: Previous studies showed that Asian patients have a higher incidence of thyroid cancer. This has been taken to suggest that nodules in patients of Asian descent are more likely to be malignant. The purpose of this study is to determine if the increased incidence of malignancy in certain ethnic groups is reflected by a thyroid nodule's likelihood for malignancy. **Study Design:** Retrospective chart review. **Methods:** At our medical center a retrospective chart review was performed of patients who underwent thyroid surgery between 2003 and 2012. Patient demographics, FNA results, size of nodules on ultrasound, and surgical pathology were collected for analysis. Telephone interviews were done to confirm ethnicity. Pearson chi-square tests, Fisher's Exact test, and independent samples t-test were done. **Results:** 1108 patients were identified, which was comprised of 5.3% Asian, 10% black, 19.3% Hispanic, and 64.3% white. There were 741 benign cases and 367 malignant according to surgical pathology. FNA data were available for 565 patients with 22% benign, 12.9% indeterminate, 42% follicular, and 22.7% malignant. There were no differences between ethnic groups and FNA results. The average age of patients with thyroid cancer was 48 versus 52 in benign cases. A greater proportion of male patients (42%) had malignancy compared to females (30%). A significantly greater proportion of Asian (40.7%) and Hispanic (42.5%) patients had a malignancy compared to black (23%), and white (31%) patients. **Conclusions:** Among patients who undergo thyroidectomy, there is a higher malignancy rate among those who are younger in age, male, and of Asian or Hispanic descent.

66. Gingival Lesion as the Presenting Manifestation of Stage IV Lung Adenocarcinoma: Lessons from a Case and Literature Review

Brian A. Nuyen, BS, La Jolla, CA; Christopher G. Tang, MD, Oakland, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to diagnose gingival manifestations of solid cancer metastases.

Objectives: We describe a rare case of a gingival lesion that was the presenting symptom of stage IV lung adenocarcinoma. We also review the literature of gingival manifestations of metastases from solid cancers. **Study Design:** The case involves a 59 year old non-smoking male without lung cancer family history who presented to clinic with a left alveolar ridge mass over tooth 11 associated with a bony defect. In January 2014, he noticed a sore that was evaluated by two dentists as infection vs. cyst. Biopsy in March with subse-

quent oncological workup revealed features consistent with a metastasis from a primary adenocarcinoma of the lung. **Methods:** After counseling, patient chose a palliative regimen of chemoradiation for management. Literature review of gingival manifestations of solid cancer metastases was conducted using search terms gingival and metastasis on PubMed. **Results:** Literature review has shown that among men, primary neoplasia in the lung is the most common solid cancer tumor to metastasize to the gingiva. Next most common neoplasias are kidney and skin. Our patient currently is tolerating a palliative regimen of chemoradiation well. **Conclusions:** This case report anecdotally highlights a rarely encountered but clinically important finding that gingival metastases from solid cancers like lung and kidney among men should influence the clinician's differential of oral mucosal lesions.

67. Squamous Cell Carcinoma of the Nasal Cavity in Granulomatosis with Polyangiitis (Wegener s): Case Report and Review of the Literature

Kevin A. Peng, MD, Los Angeles, CA; Edward C. Kuan, MD, Los Angeles, CA; Joel A. Sercarz, MD, Los Angeles, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to recognize the incidence of nasal cavity squamous cell carcinoma in patients with granulomatosis with polyangiitis (Wegener's granulomatosis).

Objectives: To present a case of squamous cell carcinoma (SCC) of the nasal cavity arising in a patient with granulomatosis with polyangiitis (GPA, formerly known as Wegener's granulomatosis) and to summarize literature recommendations for management. **Study Design:** Retrospective case report. **Methods:** The medical records of a patient with longstanding GPA treated at a tertiary academic medical center were reviewed. The Medline database was searched for squamous cell carcinoma with either granulomatosis with polyangiitis or Wegener. **Results:** A 35 year old male who had been diagnosed 15 years previously with GPA and treated at various intervals with cyclophosphamide, corticosteroids, mycophenolate mofetil, methotrexate, etanercept, and rituximab for sinonasal, pulmonary, and renal involvement presented for followup at the head and neck surgery clinic complaining of right sided orbital and cheek pain and nasal obstruction. These symptoms had developed since his last endoscopic sinus surgery 10 months prior. Repeat endoscopic sinus surgery was performed, revealing a friable, exophytic mass involving the right lateral nasal wall and septum. Pathological analysis demonstrated well differentiated SCC. A comprehensive literature review yielded only three additional cases of SCC arising in patients with GPA. **Conclusions:** The sinonasal symptoms associated with GPA are consistent with those seen in patients with chronic rhinosinusitis, but the presence of unilateral symptoms should raise suspicion for a neoplastic process, however rare. Cyclophosphamide and corticosteroids have previously been implicated in the pathophysiology of this malignancy, but equally plausible is the oncogenic role of chronic inflammation from GPA. Oncologic management closely parallels that in patients without GPA.

68. Endoscopic Resection of Sinonasal Malignancy: A Systematic Review and Meta-analysis of 1026 Patients from 1991-2014

Rounak B. Rawal, MD, Chapel Hill, NC; Zainab Farzal, BS, Chapel Hill, NC; Jerome J. Federspiel, PhD, Chapel Hill, NC; Brian D. Thorp, MD, Chapel Hill, NC; Adam M. Zanation, MD FACS, Chapel Hill, NC

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the results, limitations, and applicability of this meta-analysis on survival outcomes for patients undergoing endoscopic resection of sinonasal malignancy.

Objectives: Craniofacial resection continues to be the current gold standard for resection of sinonasal malignancy. The use of endoscopic endonasal approaches (EEA) has exponentially increased in the past twenty years, but overall survival outcomes data is limited secondary to worldwide rarity of disease and relatively new use of surgical technique. Here we present the first meta-analysis of endoscopic resection of all cause sinonasal malignancy. **Study Design:** Systematic review and meta-analysis. **Methods:** MeSH terms including endoscopic AND (esthesioneuroblastoma OR sinonasal adenocarcinoma OR squamous cell carcinoma OR sinonasal undifferentiated carcinoma) were used to search PubMed and Cochrane Library databases. English studies including survival outcomes data for patients having undergone EEA or EEA assisted resection and a mean followup of 24 months or greater were included. Exclusion criteria included previously reported patient data and case series of <2 patients. Individual study results were averaged using inverse variance weighing in a fixed effect meta-analysis model. PRISMA reporting guidelines were followed. **Results:** Of 276 studies reviewed, 34 case series were included for analysis with a total of 1026 patients having undergone EEA or EEA assisted resection. Mean followup was 41.8 months. Two year overall survival rate was 82.4%, two year disease free rate was 65.8%, with overall recurrence rate of 27.4% during the study period. Stratification by histopathology, EEA vs EEA assisted resection, AJCC/Kadish stage, and recurrence rate is presented with accompanying Kaplain-Meir analysis. **Conclusions:** EEA for sinonasal malignancy has overall favorable survival rates as compared to the literature. With continued use and increased experience, the EEA shows promise to become the primary surgical method for resection of sinonasal malignancy.

69. MYB Break Apart Tumor Status and Predictors of Recurrence and Survival in Adenoid Cystic Carcinoma of the Head and Neck

Eleni M. Rettig, MD, Baltimore, MD; Marietta Tan, MD, Baltimore, MD; Shizhang Ling, MD PhD, Baltimore, MD; Yonescu Raluca, MD, Baltimore, MD; Carole Fakhry, MD MPH, Baltimore, MD; Patrick K. Ha, MD, Baltimore, MD

Educational Objective: At the conclusion of this presentation, the participants should be able to describe prognostic factors for adenoid cystic carcinoma and describe the clinical significance of the MYB-NFIB fusion gene.

Objectives: Salivary gland adenoid cystic carcinoma (ACC) is rare, aggressive, and challenging to treat. Many ACCs have a t(6;9) chromosomal translocation resulting in a MYB-NFIB fusion gene, although the clinical significance remains unclear. The purposes of this study were to describe the clinicopathologic factors impacting survival, and to determine the prevalence and clinical significance of MYB-NFIB fusion. **Study Design:** Single institution case series. **Methods:** The medical records of patients treated for ACC of the head and neck from 1974-2011 were reviewed and clinicopathologic data recorded. FISH was used to detect breaks in the MYB containing chromosomal region 6q23.3 in archival tumor tissue. **Results:** One hundred fifty-eight patients were included with a median followup of 75.1 months. The median overall survival was 171.5 months, and disease free survival was 112.0 months. Advanced stage was independently associated with decreased overall survival (aHR 5.15, 95%CI=2.12-12.54, p<0.001), and positive margin status was independently associated with decreased disease free survival (aHR 8.80, 95%CI=1.25-62.12, p=0.029). Ninety-three tumors were evaluated using FISH, and 54 (58%) had evidence of a MYB break apart event (MYB-positive). MYB positive tumor status was independently associated with minor salivary gland site (aOR 7.17, 95%CI=1.75-20.31, p=0.006). MYB positive tumors were more likely to recur (OR 1.19, 95%CI=0.81-5.92, p=0.12) and had decreased disease free survival (HR 1.61, 95% CI=0.82-3.19, p=0.17), though these differences were not statistically significant. **Conclusions:** Stage and margin status are important prognostic factors for ACC. Tumors with evidence of MYB-NFIB fusion are more likely to originate in minor salivary glands and may be associated with more aggressive disease.

70. Bilateral Basaloid Squamous Cell Carcinoma of the Parotid Gland: Case Report and Review of Literature

Alexander R. Rivero, MD, Oakland, CA; Barry M. Rasgon, MD, Oakland, CA; Christopher G. Tang, MD, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to demonstrate understanding of basaloid squamous cell carcinoma and explain the features consistent with its presentation.

Objectives: Describe a case of bilateral basaloid squamous cell carcinoma of the parotid gland and review existing literature. **Study Design:** Case report and literature review. **Methods:** A 70 year old white male presents to clinic with a 2cm enlarging mass in the tail of the right parotid. MRI and CT were performed showing enlarged adenopathy throughout with a pathologic appearing lymph node in the right level 2b. FNA of the mass and lymph node revealed a high grade malignancy with squamous features. The patient received a right total parotidectomy with facial nerve preservation as well as a modified radical neck dissection on the right. Final pathology revealed a basaloid squamous cell carcinoma. Patient was clear of disease for 4 years. **Results:** Four years after initial resection patient presents with an enlarging left parotid mass. FNA revealed identical pathology of high grade malignancy. MRI and CT were performed again showing enlarged lymph nodes on the left. Patient received a total parotidectomy with facial nerve preservation and a modified radical neck dissection on the left. **Conclusions:** This is a unique case of bilateral basaloid squamous cell carcinoma of the parotid. Squamous cell carcinoma with basaloid features is a rare and aggressive type of squamous cell carcinoma. To our knowledge this is the first case report of bilateral parotid basaloid squamous cell carcinoma.

71. Palpation of the Neck—Assessment of a Novel High Fidelity Simulator

Shanmugappiriya Sivarajah, London, ON Canada; Jordan Glicksman, MD MPH, London, ON Canada; Winsion Chow, MD, London, ON Canada; Gord Campbell, PhD, London, ON Canada; Kevin Fung, MD FRCSC, London, ON Canada

Educational Objective: At the conclusion of this presentation, the participants should be able to engage in an informed discussion on the validity and advantages of using a novel high fidelity lymphadenopathy simulator.

Objectives: Training simulators provide an environment for trainees to develop new skills, while improving patient safety. We designed an inexpensive, practical, high fidelity model to improve the acquisition of technical skills related to the assessment of lymphadenopathy. The purpose of this study was to assess construct validity for this model. **Study Design:** Prospective randomized controlled trial. **Methods:** Six first year medical students with prior procedure training (novices), and six otolaryngology residents of various stages of training (experts), performed the lymph node exam using the construct. Two medical school faculty members, blinded to participant identity, evaluated the subjects on their performances using validated instruments—a global rating scale and a task based checklist. **Results:** The simulator demonstrated construct validity by distinguishing skill level between experts and novices. There was a statistically significant difference between groups, whereby residents scored higher on the global rating scale (GRS) than medical students (p=0.008). There was a trend towards better scores on the task based checklist evaluation for residents, as compared to medical students (p=0.085). **Conclusions:** This is the first reported study to use task specific assessment tools to demonstrate construct validity of a high fidelity lymphadenopathy simulator. A palpable neck model can allow for the insertion of various pathologies. The simulator can be used as an effective educational tool, both for teaching medical students and for evaluating their skills. The global rating scale and task based checklist are useful metrics for providing formative feedback and evaluating competency at stages of professional training.

72. Sclerosing Polycystic Adenosis: A Rare Salivary Gland Tumor

Christopher G. Tang, MD, Oakland, CA; Justin B. Fong, Walnut Creek, CA; Karen L. Axelsson, MD, Oakland, CA; Deepak Gurushanthaiah, MD, Oakland, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to diagnose and treat a case of sclerosing polycystic adenosis of the salivary gland.

Objectives: 1) Describe a case of sclerosing polycystic adenosis of the salivary gland; and 2) review the literature on sclerosing polycystic adenosis. **Study Design:** A single case report of a patient with sclerosing polycystic adenosis is described. **Methods:** A 74 year old female presents to head and neck surgery clinic with a 4 year history of a growing, painful left sided neck mass. Two years ago, patient received a fine needle aspirate (FNA) which was negative for malignancy. The mass persisted, and continued to enlarge for an additional two years. At presentation, the patient had a firm 3.5cm mass in the tail of the left parotid. An FNA performed at the time of presentation suggested well differentiated adenocarcinoma. **Results:** Patient received a superficial parotidectomy as well as level 2a, 2b selective neck dissection. Final pathology revealed a 3.5cm well circumscribed tumor consistent with sclerosing polycystic adenosis. **Conclusions:** Sclerosing polycystic adenosis is a rare inflammatory process that causes fibrocystic changes in the salivary gland. Apocrine-like metaplasia as well as epithelial atypia are common features. To our knowledge, only a total of 38 cases have been described in the English literature.

73. The Utility of Preoperative Imaging for Benign Parotid Tumors

James A. Teng, MD, Charlottesville, VA; Stephen S. Schoeff, MD, Charlottesville, VA; David C. Shonka, MD, Charlottesville, VA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the impact of imaging on surgical outcomes for benign parotid tumors and propose an algorithm for evaluation of a palpable parotid mass.

Objectives: Debate exists regarding the necessity for preoperative imaging for parotid tumors. Previous studies have sought to identify risk factors for postoperative complications in parotid surgery. We hypothesized that preoperative imaging for benign parotid tumors diagnosed on fine needle aspiration (FNA) would decrease the incidence of postoperative complications and shorten operative times. **Study Design:** Retrospective chart review. **Methods:** All patients undergoing parotidectomy at a tertiary care center between 2/5/2010 and 12/9/2013 were analyzed. Exclusion criteria included patients undergoing parotidectomy for cutaneous malignancies, non-palpable masses, or malignancies diagnosed on FNA. A data set was constructed using age, gender, physical exam findings, FNA diagnoses, surgeon, tumor size, medical comorbidities, operative time, and postoperative complications. Statistical analysis included independent t-test and binary logistic regression. **Results:** Eighty patients were included in the study. Preoperative imaging was available for 68 patients. Physical exam findings ($p = 0.54$) and nondiagnostic FNA ($p = 0.19$) did not have an impact on the decision to obtain preoperative imaging. There were 17 minor complications and no major complications. Preoperative imaging did not correlate with decreased operative time ($p = 0.01$). In multivariate analysis, there was no correlation between postoperative complications and availability of preoperative imaging ($p = 0.68$). Age was the only variable that trended toward significance ($p = 0.13$) in predicting postoperative complications. **Conclusions:** Preoperative imaging for benign parotid tumors does not decrease the incidence of postoperative complications or significantly shorten operative time. This evidence supports avoidance of costly imaging studies prior to surgery for benign parotid masses.

74. Melanoma Characteristics in Patients with a History of UV Tanning Bed Usage

Kristy H. Truong, MD, Iowa City, IA; Sarah L. Bell, MS, Iowa City, IA; Nitin A. Pagedar, MD, Iowa City, IA; Mohammed M. Milhem, MD, Iowa City, IA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand how tanning bed (TB) usage affects TNM staging and 5 year survival rate.

Objectives: This study evaluated how UV TB usage affects melanoma pathologic and demographic characteristics as well as 5 year overall survival. **Study Design:** Retrospective study of 141 patients seen at our institution between 1984 and 2014 who completed a baseline questionnaire within 1 year of pathologic diagnosis of melanoma. **Methods:** Patients were categorized into one of two groups: 1) no history of UV TB usage; or 2) any history of TB usage. Analysis (chi-squared test, Fisher's exact test, and t-test where appropriate) looked for group differences (tanning bed usage Y/N) on the following variables: TNM staging, mitotic index, positive lymph nodes, history of melanoma, and basic demographic variables. Additionally, TB usage effect on 5 year overall survival was studied with a Cox proportional hazards model. **Results:** A higher percentage of women (48.28%) reported TB usage compared to men (26.51%, $p<0.01$). Additionally, the average age at biopsy for those with TB usage was significantly ($p<0.01$) lower compared to those with none. There was a trend of higher pathologic TNM stage ($p=0.10$) and lower mitotic index ($p=0.26$) for those with TB usage. After controlling for the effects of gender and nodal status, TB usage is not a significant independent predictor of 5 year overall survival ($p=0.77$). **Conclusions:** TB usage may be associated with earlier age of melanoma presentation, higher pathologic stage and lower mitotic index, but does not affect 5 year overall survival rate.

75. Knowledge, Attitudes, Practices Regarding Human Papilloma Virus Vaccination in an Ethnically Diverse Urban Population and Changes following Community Based Education

Jacqueline E. Weinstein, MD, New Orleans, LA; Ashwin Ananth, BS, New Orleans, LA; Jacob P. Brunner, BS, New Orleans, LA; Marjorie E. Bateman, BS, New Orleans, LA; John M. Carter, MD, New Orleans, LA; Paul L. Friedlander, MD, New Orleans, LA

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) identify pervasive knowledge gaps regarding HPV, its link to cancer, and indications for vaccination; and 2) define prevalent attitudes and practices regarding HPV

vaccination, government recommendation for vaccination, as well as how those attitudes, practices may be informed by education.

Objectives: This study examines knowledge, attitudes, and practices regarding HPV vaccination among an ethnically diverse urban population in the United States at baseline and after a brief, community based educational session. **Study Design:** Prospective cohort study. **Methods:** 128 participants at multiple churches, community centers were administered survey examining knowledge, attitudes, and practices regarding HPV vaccination before and after a 10 minute presentation discussing HPV virus, its link to cancer, and HPV vaccination. **Results:** On self-assessment, baseline knowledge of HPV, its causal relationship to cancer, and existence of a vaccine against cancer were extremely poor, with respondents rating their knowledge of a vaccination against HPV, on a scale from 1-4 (with 4 representing strongest knowledge), at an average of 1.68, as compared to 2.69 following a brief educational session ($p<0.001$). Prior to educational session, respondents rated their worry with regard to government recommendation of vaccination against a sexually transmitted infection and against cancer (on a scale of 1-4, with 1 signifying no endorsement of worry and 4 signifying strong endorsement of worry), at 2.43 and 2.27, respectively, as compared to 2.40 and 2.38 post-educational session ($p=0.77$, 0.35). While, prior to session, only 33% of respondents would have their child receive the HPV vaccine, post-session, 60% stated they would want their child vaccinated, marking a statistically significant increase ($p=0.02$). **Conclusions:** Lack of knowledge regarding HPV vaccination and unwillingness to undergo vaccination is pervasive, despite low levels of suspicion regarding government recommendation of vaccination. Community based educational sessions successfully teach the link between HPV and various cancers, decrease perceived danger in government recommendation of vaccination, and increase willingness to receive HPV vaccination.

Laryngology/Bronchoesophagology/Sleep

76. Primary Subglottic Neuroendocrine Carcinoma: A Case Report and Literature Review

Shethal Bearelly, MD, San Francisco, CA; Amber L. Nolan, MD PhD, San Francisco, CA; Katherine C. Yung, MD, San Francisco, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the manifestations of laryngeal neuroendocrine carcinomas and a rare presentation within the subglottic larynx.

Objectives: To report the first known case of a neuroendocrine carcinoma primarily originating within the subglottic larynx and to review the usual manifestations and treatment of laryngeal neuroendocrine carcinomas. **Study Design:** Case report and literature review. **Methods:** Case report and literature review. **Results:** A literature search of neuroendocrine carcinomas revealed it to be an uncommon entity within the larynx. The rare cases of reported laryngeal neuroendocrine carcinoma have arisen from the glottis or supraglottis. Currently, there have been no published cases of primary neuroendocrine carcinoma of the subglottis. Therefore, we report the first known case of primary subglottic neuroendocrine carcinoma in an 80 year old gentleman who presented with progressive dyspnea. He was treated with microdirect laryngoscopy for excisional biopsy and his pathology was confirmed histologically. We review the classification, histologic and immunologic staining patterns for diagnosis, and the general treatment for laryngeal neuroendocrine carcinomas. **Conclusions:** Primary neuroendocrine carcinoma of the subglottis is a rare entity without any reported cases in the literature. This case highlights the symptoms, pathologic diagnostic elements, and the treatment options for subglottic neuroendocrine carcinoma.

77. Augmentation Autologous Adipose Injections in the Larynx

Michael S. Benninger, MD, Cleveland, OH; Andrea D. Hanick, BS, Cleveland, OH (Presenter)

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) assess the role of autologous adipose injection in the larynx; 2) estimate short and long term success rates for adipose injection in the larynx; and 3) understand benefits and limitations of adipose injections in the larynx.

Objectives: Autologous adipose injection (AAI) is a recognized method for augmenting vocal folds with various pathologies. The purpose of this study is to explore the short and longer term outcomes of AAI. **Study Design:** Retrospective review. **Methods:** A review of all patients undergoing AAI by one surgeon over 5 years. Voice Handicap Index (VHI), maximum phonatory time (MPT), patient perception of outcome and ultimate disposition were evaluated. **Results:** 44 patients underwent AAI with 38 having at least 6 weeks followup (18 paralysis, 8 paresis, 6 bowing/presbylarynges, and 6 scar/sulci). Mean followup was 33 weeks. There was a gradual loss of patients to followup over time. 37/38 (97%) had improvement at 6 weeks, 21/31 (68%) had improvement at 3-6 months, with 7/14 sustaining their improvement for 1-3 years (50%). One patient recovered motion and 2 patients had AAI at the same time as a reinnervation procedure and have been followed for 3-6 months. Mean VHI and MPT were measured preoperatively (66.6, 12.2 seconds), 6 weeks (38, 17.3 seconds), 3-6 months (48, 18 seconds), and greater than 1 year (46, 13.3 seconds). Six patients went on to medialization laryngoplasty with silastic and one elected non-treatment. There was no notable difference in successful treatment or proceeding with medialization laryngoplasty based on diagnosis. **Conclusions:** AAI is successful in augmenting the vocal folds in short term outcomes with some gradual decrease in effectiveness over time. Although attrition of patients limited firm conclusions, long term benefit can be expected in about 50% of patients, regardless of the indications.

78. Obstructive Reinke's Edema: An Ominous Lesion

Paul C. Bryson, MD, Cleveland, OH; Melin Tan, MD, Bronx, NY; Kyra Osborne, MD, Cleveland, OH; Michael S. Benninger, MD, Cleveland, OH

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the variable airway obstructive presentations of Reinke's edema and consider a new classification system for this pathology.

Objectives: Reinke's edema is a benign disease of the vocal folds that can develop into large obstructive lesions that compromise the airway. In some cases, the compromised airway requires urgent intervention. We describe the presentation and management of this cohort and propose a staging system to include obstructive lesions. **Study Design:** Retrospective review of 24 patients with severely compromising obstructive Reinke's edema lesions. **Methods:** Retrospective review from two tertiary care centers. **Results:** Twenty-four patients presented with clinically obstructive lesions. All patients underwent surgical intervention with resolution of obstruction and improvement of voice. Two of the 24 patients underwent emergent tracheotomy with subsequent successful decannulation after surgical excision. Two patients were presented as intraoperative consultations by other services during airway management for other procedures. An additional four patients presented to the emergency room in respiratory distress requiring urgent surgical intervention. **Conclusions:** While Reinke's edema is a benign disease of the vocal folds, there is a clear spectrum of clinical severity with the potential for developing airway obstruction requiring surgical intervention. A new staging system of Reinke's edema lesions will allow for standardization of clinical description.

79. Vocal Fold Dysplasia and Chronic Laryngitis during Infliximab (Remicade) Therapy

Paul C. Bryson, MD, Cleveland, OH

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the potential for chronic laryngeal inflammation and malignant degeneration in patients undergoing therapy with tumor necrosis factor alpha inhibitors.

Objectives: The risk of malignancy in patients undergoing treatment with tumor necrosis alpha inhibitors has not been completely elucidated. Current disease states encountered by the otolaryngologist treated with these agents include rheumatoid arthritis, Crohn's disease, sarcoidosis, ankylosing spondylitis, psoriasis, and granulomatosis with polyangiitis (formerly Wegener's granulomatosis). To date, there have been disparate reports regarding the risk of malignancy in these patients treated with these agents. There has been one reported case of early glottic carcinoma in a patient with sarcoidosis treated with infliximab. Herein is presented the first reported case of laryngeal dysplasia and chronic laryngitis in a patient receiving infliximab for ulcerative colitis. Upon discontinuation of infliximab, his voice improved and his endoscopic examination returned to normal. **Study Design:** Case report. **Methods:** Retrospective case review. **Results:** There was dramatic improvement in voice and videostroboscopic appearance of true vocal folds with the discontinuation of infliximab therapy. **Conclusions:** This case report is the first to report vocal fold dysplasia and chronic laryngeal inflammation in a patient receiving infliximab treatment for ulcerative colitis. His vocal function and laryngeal exam dramatically improved following discontinuation of this medication. Otolaryngologists should be aware of the possible inflammatory, premalignant and malignant potential in the larynx in patients receiving treatment with tumor necrosis factor alpha inhibitor medications. Once diagnosed, routine surveillance and multidisciplinary management is recommended.

80. Circadian Preference in Medical Residency and Job Satisfaction

Anthony L. Chin-Quee, MD, Detroit, MI; Kathleen L. Yaremchuk, MD, Detroit, MI

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the concept of chronotype and its possible implications on resident satisfaction and performance.

Objectives: There has been extensive research to support the idea of circadian preference, or the tendency of individuals to be more alert and effective in the morning (larks) or the evening (owls). Given the rigors of medical residency training, and perceived lifestyle differences among specialties, circadian preference may play a role in choice of medical specialty, and subsequent job satisfaction during training. This study aims to determine the circadian preferences of residents in various specialties and correlations with specialty choice and job satisfaction. **Study Design:** Cross-sectional survey study. **Methods:** A modified version of the Horne-Ostberg Morningness-Eveningness questionnaire was administered to 160 medical residents at a tertiary care institution. The residents represented specialties within medicine and surgery. Results of the survey were analyzed to determine correlations between circadian preference and specialty choice, as well as job satisfaction. **Results:** Ten specialties within medicine and surgery were represented. The mean chronotype scores of all specialties fell within category neither morning nor evening type, and ranged from 46.18 - 54.76 (SD ± 0.87 - ±7.76). There was a significant difference in chronotype between emergency medicine residents and residents from anesthesiology ($p=0.0007$), surgery ($p < 0.0001$), and medicine ($p=0.0005$). Residents in the surgical specialties trended towards morning chronotype. There was no significant correlation between chronotype and job satisfaction. **Conclusions:** The results of this study may have implications for counseling medical students in their choice of specialties and for designing resident on-call schedules to align with chronotype testing.

81. Successful Application of Laryngeal Botox after Lysis of a Posterior Glottic Scar Secondary to Inhalation Injury

Joseph C. Clarke, MD, Iowa City, IA; Douglas J. Van Daele, MD, Iowa City, IA; Douglas K. Henstrom, MD, Iowa City, IA

Educational Objective: At the conclusion of this presentation, the participants should be able to recognize the potential role of botulinum toxin injection to help prevent reformation of posterior glottic scarring/stenosis.

Objectives: Posterior glottic scarring and stenosis can be recalcitrant to surgical lysis techniques including cold steel and CO2 laser lysis. We present a case of endoscopic lysis of a posterior glottic scar band followed by laryngeal Botox injection in a patient with inhalation injury which resulted in sustained relief of the scar band. **Study Design:** Case report. **Methods:** Patient chart analysis and literature review. **Results:** An 18 year old male underwent emergent tracheotomy due to laryngeal swelling and mucosal injury sustained from keyboard cleaner inhalation. On postoperative day 4, he was noted on flexible fiberoptic laryngoscopy to have a posterior glottic scar forming, limiting vocal cord mobility. He was taken to the operating room for direct laryngoscopy, scar lysis and Botox injection to the laryngeal adductors. At 1 and 2 month followup, the posterior glottis remained paralyzed in the abducted position, preventing reformation of the scar. At 4 month followup the posterior glottis remained free from scar reformation with return of vocal cord mobility and the patient was decannulated. **Conclusions:** Posterior glottic scaring and stenosis can be a frustrating clinical problem due to its recurrent nature. We present the successful use of Botox to prevent scar reformation. This is a simple procedure compared to laryngofissure or mucosal flap techniques described in the literature. The downside of this approach is several months of laryngeal paralysis.

82. Vice President's Resident Research Award

Mandibular Advancement Device for Obstructive Sleep Apnea in the Veteran Population

Aaron J. Feinstein, MD MHS, Los Angeles, CA; Michael Zaki, BA, Los Angeles, CA; Soroush Zaghi, MD, Los Angeles, CA; Tracey Tajima, DDS, Los Angeles, CA; Marilene B. Wang, MD, Los Angeles, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss treatment options for obstructive sleep apnea, explain these alternatives to their patients, and make recommendations based on the specific clinical scenario of the individual patient.

Objectives: Obstructive sleep apnea (OSA) is a common health problem with significant cardiovascular complications. Treatment options include continuous positive airway pressure (CPAP) as well as mandibular advancement devices (MAD). We sought to investigate the role of MAD in treatment of OSA among the veteran population. **Study Design:** All patients receiving a custom fit MAD from the department of dentistry at a single veterans health center between December 2007 and August 2013 were retrospectively reviewed. **Methods:** Patient demographic and clinical characteristics were collected and reviewed. Binomial univariate logistic regression models were utilized to assess for the association of these characteristics with the primary outcome, compliance at six months after delivery of the MAD. **Results:** There were 48 patients meeting inclusion criteria. The average BMI was 30.4 ± 4.76, and the average AHI on the pre-intervention polysomnogram was 32.1 ± 26.5. Compliance among all patients was 66.8% at two weeks and 58.3% at six months. Among the subgroup of patients identified as having limited social circumstances, the compliance was 100% at two weeks and 100% at six months. **Conclusions:** The MAD is a valuable first line treatment option for mild or moderate OSA, particularly in patients anticipated to have difficulty complying with CPAP.

83. Persistent Oroantral Fistula Related to BiPAP Use for Obstructive Sleep Apnea

Aaron J. Feinstein, MD MHS, Los Angeles, CA; Tracey Tajima, DDS, Los Angeles, CA; Marilene B. Wang, MD, Los Angeles, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to recognize the benefits and risks of sinus augmentation and understand how to manage complications of these procedures.

Objectives: Obstructive sleep apnea (OSA) is a significant health problem that may be treated with positive airway pressure; this treatment may interfere with healing after oral surgery. **Study Design:** Case report. **Methods:** Report of a patient with oroantral fistula treated between 2011-2013. **Results:** An 80 year old gentleman with multiple comorbidities and severe OSA managed with BiPAP sought treatment with a community dentist for tooth loss. The patient underwent right maxillary sinus lift and augmentation in anticipation of dental implants. Following surgery, he developed an oroantral fistula and sinusitis. Medical treatment for sinusitis was prescribed. Five months later, a periodontist extracted three remaining right maxillary teeth in conjunction with bone grafting to close the communication. The patient was seen in followup and found to have a persistent fistula. He described blowing of air through the fistula when he used his BiPAP machine, which likely hindered the healing process. Consultation with sleep medicine yielded the option of a tongue retaining device and head-of-bed elevation in place of BiPAP postoperatively. Seven months later, a buccal sliding flap was performed but examination two weeks later disclosed persistent fistula. The patient subsequently underwent a third surgical repair which was successful in closing the fistula. **Conclusions:** Maxillary sinus augmentation entails a risk of oroantral fistula. Many patients with oroantral fistula develop sinusitis, which may require medical or surgical treatment. Surgery is indicated to close a persistent oroantral fistula. Use of positive pressure devices for OSA in the postoperative setting may delay or prevent healing of the fistula and should be discussed in the informed consent.

84. Removal of Impacted Dentures from the Oropharynx: Case Report and Review of Literature of Airway Management

Remy P. Friedman, BA, Newark, NJ; Rami Y. Abdou, MD, Newark, NJ (Presenter); Evelyne Kalyoussef, MD, Newark, NJ

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the incidence, presentation and management of oropharyngeal airway foreign bodies.

Objectives: To understand the principles of airway management in cases of airway foreign bodies. **Study Design:** Case report and review of literature. **Methods:** A 55 year old stroke patient with a four month history of worsening dysphagia following an EGD procedure was referred to the ENT clinic by the speech therapy department following the discovery of a dental prosthetic lodged in her oropharynx upon modified barium swallow examination. The dental prosthetic was impacted in the vallecula, completely obstructing view and access to the laryngeal introitus. **Results:** Removal of the dentures was accomplished via awake tracheostomy followed by direct laryngoscopy. While these procedures have previously been reported to remove impacted objects of the trachea either for airway management or instrumentation, this is the first reported case to our knowledge in which an oropharyngeal foreign body, lying in the transverse plane and completely obstructing access to the larynx, necessitated an awake tracheostomy. **Conclusions:** This case highlights important principles of airway management in an ill patient with chronically impacted oropharyngeal foreign body.

85. A Management Algorithm for Iatrogenic Laryngeal Fractures following Emergency Surgical Airways

Amal Isaiah, MD DPhil, Baltimore, MD; Elizabeth A. Guardiani, MD, Baltimore, MD

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the benefits of early revision surgery following incorrectly placed surgical airways.

Objectives: To describe the nature, management and outcomes of iatrogenic laryngeal fractures. **Study Design:** Retrospective review. **Methods:** We report a series of laryngeal fractures specifically involving the thyroid cartilage following an emergent surgical airway. Determinants of successful management included decannulation, voice and swallow function. **Results:** We report three cases of can't intubate, can't ventilate scenarios, following which a cricothyroidotomy or a tracheostomy was attempted by the first responding surgical team and the airway was instead placed through the thyroid cartilage. In one patient, the injury was immediately recognized and a rapid conversion to a formal tracheostomy was performed with open reduction of the fractures followed by laryngeal stenting. In another patient, the injury was not recognized until several days later, after which he underwent a conversion to tracheostomy with repair of laryngeal injuries and stenting 10 days following the initial injury. The third patient underwent conversion to tracheostomy only, greater than 2 weeks after the initial surgical airway. **Conclusions:** The two patients who underwent laryngeal fracture repair were successfully decannulated and regained a functional voice and swallow. The patient who was not repaired developed severe glottic stenosis and is tracheostomy and gastrostomy tube dependent. Based on our small series, it appears that when iatrogenic laryngeal fractures are identified and treated early, excellent functional recovery can be expected.

86. Solute Flux as a Quantitative Permeability Measure in a Stem Cell Derived Laryngeal Mucosa Replacement

Ashley E. Kita, BS, Los Angeles, CA; Jordan A. Hardy, BS, Los Angeles, CA; Jennifer L. Long, MD PhD, Los Angeles, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the protective and functional roles of vocal fold epithelium and to explain current methods of characterizing barrier function.

Objectives: Vocal fold mucosa, essential for phonation, also plays an important role in protecting underlying tissue from chemical and mechanical damage. A tissue engineered mucosa has been developed using adipose derived stem cells in a three dimensional structure in vitro. Histologically this structure resembles the epithelium and lamina propria of the vocal fold. Current efforts aim to evaluate the fidelity of these layers by investigating the barrier function of the epithelial layer in three dimensional vocal fold replacement tissue. **Study Design:** We produced confluent tissue engineered epithelium and compared its barrier function with that of normal epithelium using spectrophotometric measurement of solute flux. **Methods:** Epithelial transport was quantified by determining phenol red permeability through either excised vocal folds or tissue engineered constructs. Basement membrane and junctional protein maturity was assessed by immunohistochemistry. **Results:** Solute flux of tissue engineered mucosa is greater than of excised vocal folds. The permeability is influenced by construct design. Immature basement membrane components are present. **Conclusions:** This project examined the development of an epithelialized three dimensional structure in vitro with immunohistochemistry and spectrophotometry, a novel method of comparing barrier function between tissue engineered vocal fold mucosa and human samples. This work is relevant not only to tissue engineering, but also to the emerging appreciation of the barrier function of laryngeal mucosa.

87. Sinonasal Outcomes in Obstructive Sleep Apnea Syndrome

Edward C. Kuan, MD, Los Angeles, CA; Bobby A. Tajudeen, MD, Los Angeles, CA; Kevin A. Peng, MD, Los Angeles, CA; Marilene B. Wang, MD, Los Angeles, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to recognize the relationship between obstructive sleep apnea syndrome and sinonasal quality of life outcomes.

Objectives: Obstructive sleep apnea syndrome (OSAS) is a common adult and pediatric sleep disorder which, if left untreated, is associated with severe medical consequences. Otolaryngologists are often challenged by the impact of OSAS on nasal airway patency, as well as by the contribution of primary nasal disorders on exacerbation of OSAS. The objectives of this study are to explore the relationship between patients with known OSAS and sinonasal quality of life outcomes as measured by SNOT-22 questionnaire scores. **Study Design:** Retrospective chart review. **Methods:** Patients with a polysomnographic diagnosis of OSAS completed SNOT-22 questionnaires. SNOT-22 questionnaire items were subcategorized into rhinologic, non-rhinologic otolaryngic, sleep, and psychological symptoms. Total and subcategorized SNOT-22 scores were correlated with apnea-hypopnea index (AHI) and other parameters using Spearman's rank correlation. **Results:** A total of 30 consecutive OSAS patients were included in the analysis. AHI was positively correlated with sleep symptoms (p=0.029) and total SNOT-22 scores (p=0.021). There was a trend towards positive correlation between rhinologic (p=0.097) and psychological (p=0.075) symptoms and AHI. No correlation was found between AHI and lowest desaturation or AHI and sleep efficiency. **Conclusions:** The severity of OSAS appears to correlate with worse sinonasal outcomes, especially those symptoms impacting sleep. As such, addressing nasal airway patency is of utmost importance in optimizing management of OSAS patients.

88. Laryngotracheal Proteomics

David G. Lott, MD, Phoenx, AZ; Christine M. Pauken, PhD, Phoenix, AZ; Yourka D. Tchoukalova, MD PhD, Phoenix, AZ; Vincent B. Pizziconi, PhD, Phoenix, AZ

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the differing protein compositions of the various laryngeal and tracheal cartilages.

Objectives: Determine the proteomic differences between the laryngotracheal cartilages. **Study Design:** Laboratory study using limited scope tandem mass spectroscopy. **Methods:** Studies using thyroid, cricoid and tracheal cartilages from three male individuals were sequentially extracted to isolate extracellular matrix (ECM) associated proteins (ECMap), cytoplasmic proteins, and cross-linked ECM components. Limited scope tandem mass spectroscopy was performed to identify the proteins present. **Results:** The 35-55 kDa sized proteins contain about 400 proteins in the ECMap and almost 200 proteins in the cross-linked ECM extract. Within the cross-linked ECM, the cartilages have over 160 proteins in common, while each cartilage has 19 or more unique proteins. Analysis of the common proteins suggests differences in the levels of some proteins between the three cartilages. Similar results were seen when analyzing proteins in the 100-150 kDa range. **Conclusions:** There are subtle but significant differences in the protein composition of the ECM of the various laryngeal and tracheal cartilages. Findings of this study help to create more specific biomimetic scaffolds for laryngeal tissue regeneration.

89. Urologic Stone Extractors in Office Based Laryngeal Surgery: A Novel Technique

Matthew J. Lutch, MD, Sacramento, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to describe indications and technique for use of flexible urologic stone extractors for excision of benign laryngeal lesions in the office environment. Using video examples, participants can apply lessons learned from this presentation to extend their office based laryngeal surgery capabilities.

Objectives: Office based laryngeal surgery has experienced a renaissance in recent years, motivated by increased availability of high definition endoscopic equipment in concert with economic factors and pressures on optimizing patient access. Novel application of existing equipment from other surgical specialties has extended our capabilities in the office environment to facilitate these worthwhile developments. We describe indications and technique for use of urologic stone extractors with working channel laryngoscopes for resection of benign laryngeal lesions. We will present video documentation of resection of lesions including a laryngeal angioma, a hemorrhagic polyp and a myxoid polyp with Cook N-Circle stone extractors. **Study Design:** Retrospective case series. **Methods:** Preoperative videoendoscopy and a visual grading system were used to assess the lesions pre and postoperatively. All lesions were resected in the office under local anesthesia with Cook N-Circle stone extractors. **Results:** Three patients were treated with lesion resection with flexible stone extractors via the working channel of a flexible laryngoscope. All had complete resection of their lesions and subjectively improved voicing postoperatively. **Conclusions:** Urologic flexible stone extractors are a viable and valuable addition to the laryngeal surgeon's armamentarium. These devices extend our capabilities in the office based environment, providing rapid access and definitive care for lesions classically addressed under general anesthesia with rigid endoscopy. Moreover, this provides an alternative pathway to treat patients who are poor candidates for direct laryngoscopy due to medical comorbidities contraindicating general anesthesia or anatomic factors impairing optimal exposure. To our knowledge, this represents the first report of urologic instrumentation for office based laryngeal surgery.

90. Anaplastic Lymphoma Kinase Positive Large B-cell Lymphoma Presenting as a Rapidly Enlarging Subglottic Mass: A Challenging Diagnosis and Rare Presentation

Jacob S. Majors, MD, San Antonio, TX; Mitzi J. Palazzolo, DDS, San Antonio, TX; Brian R. Haney, MD, San Antonio, TX; Ryan H. Devine, MD, San Antonio, TX; Matthew P. Connor, MD, San Antonio, TX; Nelson S. Howard, MD, San Antonio, TX

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) know the differential diagnosis of subglottic masses; 2) understand the clinical, morphological and immunohistochemical features of ALK+ LBCL; 3) explain the treatment course and prognosis for ALK+ LBCL.

Objectives: Less than 100 cases of ALK-positive DLBCL have been reported in the literature since the first description by Delsol and colleagues. Extranodal involvement of the head and neck is extremely rare with a few reported cases in the nasopharynx, the tongue and nasal cavity. To the best of our knowledge this is the first report of an ALK-positive DLBCL presenting as an intraluminal laryngeal mass. According to the literature ALK-positive DLBCL is an aggressive tumor with a poor response to conventional therapies. The clinical, morphological and immunohistochemical features of this rare diagnosis, as well as proposed treatment course, are discussed in this case report. **Study Design:** Case report. **Methods:** The patient's records were retrospectively reviewed in preparing this case report. **Results:** The final diagnosis was determined to be Ann Arbor stage IVA anaplastic lymphoma kinase positive diffuse large B-cell lymphoma. The patient was started on modified hyper-CVAD therapy. **Conclusions:** Lymphoma, although a less common presentation for a subglottic mass, must be included in the differential when working up a patient presenting with subglottic lesions. Adequate biopsies for pathological evaluation are critical for sufficient processing and diagnosis of this type of mass. It is important for hematopathologists as well as general surgical pathologists to be aware of ALK+ LBCL as it is believed to be under recognized due to its overlap with other hematologic and non-hematologic entities. Although ALK+ LBCL is an aggressive tumor with a poor response to conventional therapies, an appropriate treatment course can only be designed with an accurate diagnosis.

91. Systematic Review of Diagnostic and Non-CPAP Treatment Options for Children with Persistent Pediatric Obstructive Sleep Apnea

P. Vairavan Manickam, MD, Cincinnati, OH; Sally R. Shott, MD, Cincinnati, OH; Emily F. Boss, MD MPH, Baltimore, MD; Raouf S. Amin, MD, Cincinnati, OH; Stacey L. Ishman, MD MPH, Cincinnati, OH

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the gaps in evidence for the management of children with OSA after adenotonsillectomy.

Objectives: While adenotonsillectomy is accepted as first line therapy for pediatric obstructive sleep apnea (OSA), there is no current standard for the diagnosis and treatment of children with persistent OSA (POSA) after adenotonsillectomy. The aim of this study was to systematically review the English language literature on the diagnosis and treatment of children with OSA after adenotonsillectomy. **Study Design:** Systematic review. **Methods:** We searched all indexed years of PubMed, Embase, Cochrane CENTRAL, DynaMed, UpToDate, CINAHL, and Scopus for English language papers containing original human data, with > 7 subjects, and age < 18 years old. Data was systematically collected on study design, patient demographics, clinical characteristics/outcomes, level of evidence and risk of bias. 2 investigators independently reviewed each manuscript. **Results:** Of the 608 identified abstracts, 46 articles were ultimately included. The total study population was 2755 patients. 35/46(76%) articles described diagnostic methods including polysomnography (21/46), cine MRI (3/46), drug induced sleep endoscopy (2/46) and alternative imaging (4/46). All were case control studies. Treatment options included lingual tonsillectomy (N=4) with success rates of 41-88% and supraglottoplasty (N=2) success rates of 58%. Additional treatments included medications (e.g. nasal steroids and montelukast) and extended surgical (e.g. partial midline glossectomy and tongue suspension). Children with obesity and Down syndrome were included in 5 and 8 studies, respectively. **Conclusions:** Sleep endoscopy and cine MRI are the most commonly reported diagnostic tools for children with POSA, however they have not been linked to outcomes. The evidence for treatment is extremely limited and little is reported regarding appropriate patient selection.

92. Virtual Surgery for Children with OSA: Computational Modeling of the Airway for Surgical Planning

Goutham G. Mylavarapu, PhD, Cincinnati, OH; Sally R. Shott, MD, Cincinnati, OH (Presenter); Dhananjay R. Subramaniam, MS, Cincinnati, OH; Ephraim J. Gutmark, PhD, Cincinnati, OH; Robert J. Fleck, MD, Cincinnati, OH; Raouf S. Amin, MD, Cincinnati, OH; Stacey L. Ishman, MD MPH, Cincinnati, OH

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the advantages of computational modeling of the airway for surgical planning in the treatment of obstructive sleep apnea, both for identifying WHERE surgery should be done, and also HOW MUCH tissue to remove to achieve surgical success.

Objectives: Success rates in treating persistent obstructive sleep apnea (OSA) after T&A in children are 40-60% for both medical and surgical options. Assessments of residual obstruction are largely subjective and don't define effects of multi-level obstruction. Our objective was to use 3D models of the upper airway, along with computational fluid dynamics (CFD) to calculate airflow velocity and resistance, and to perform virtual surgery to assess potential changes in airflow with various surgical interventions. **Study Design:** Prospective cohort study. **Methods:** Patients with Down syndrome (DS) and persistent OSA were prospectively enrolled in our study.

3D airway models were reconstructed from MRIs of patients with persistent OSA after T&A. CFD is used to evaluate upper airway airflow. Four virtual surgeries were performed on the baseline airway that included 2 different base of tongue resections (2mm and 4 mm) as well as virtual palatoplasty. Upper airway resistance (UAR) was then calculated from CFD for both peak inspiratory and expiratory airflow for all surgical combinations. **Results:** At 10 liters/minute of airflow, UAR decreased by 46% for 2mm and 48% for 4mm base of tongue resection in the virtually altered airways. When the palate was also excised, UAR decreased a further 16%. **Conclusions:** Computational modeling of the airway and associated virtual surgery allow for preoperative planning that provides the surgeon with information both on where to operate and on how much tissue to remove for potentially improved postoperative success.

93. The Role of Indole-3 Carbinol in the Treatment of Adult Recurrent Respiratory Papillomatosis: A Retrospective Review

Jessica L. Riccio, MD, Albany, NY; Jay J. Agarwal, BS, Albany, NY; Stanley M. Shapshay, MD, Albany, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the effect of indole-3 carbinol on videostroboscopy scores in patients with adult recurrent respiratory papillomatosis.

Objectives: To determine the impact that indole-3 carbinol (I3C) has on videostroboscopy scores in patients with adult recurrent respiratory papillomatosis (RRP). **Study Design:** Retrospective chart review. **Methods:** Patients in the treatment group were those who were placed on I3C therapy and those treated with standard surgical therapy alone represented the control group. In-office flexible fiberoptic videostroboscopy was used along with a standardized grading system to give a score for each patient's clinical progress. These scores were used to compare trends between patients in the treatment versus control group. **Results:** Twenty patients met inclusion criteria in the study. Eight patients met criteria for the treatment group and twelve patients were placed in the control group. Mean followup was 24.3 months and 30 months in the treatment and control group, respectively. For patients in the treatment group, the mean videostroboscopy score at initial visit was 23.5 (n=6) and 16.6 (n=6) at the last recorded visit. These results show a 29.4% improvement in scores from the initial to final visit (p=0.04). The mean videostroboscopy score in the control group at the initial visit was 23.7 (n=7) and 20.6 (n=7) at the last recorded visit. This was a 13% improvement, however, not statistically significant (p=0.4). **Conclusions:** This is the first study to assess the efficacy of I3C for RRP based on videostroboscopy score. Our results show that patients treated with adjuvant I3C had a statistically significant improvement in videostroboscopy scores when compared to control patients. However, future prospective studies with a larger patient population are necessary.

94. Robotic Microlaryngeal Surgery: New Retractor that Provides Superb Access to the Glottis

Jennifer P. Rodney, MD, Oklahoma City, OK; Nilesh R. Vasan, MD, Oklahoma City, OK

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the limitations of robotic surgery in otolaryngology and the need for more refined instrumentation. The difficulty of robotic surgery in small spaces such as the glottis will be explained as will the method in which the Vasan retractor allows the otolaryngologist to successfully overcome these obstacles. The structure and function of the Vasan retractor will be demonstrated as will the superb access to the glottis that it provides.

Objectives: To demonstrate the feasibility and success of robotic microlaryngeal surgery using a new retractor called the Vasan retractor. **Study Design:** Case report. **Methods:** A 56 year old man presented with progressive hoarseness and dysphagia for 8 months. Nasopharyngoscopy revealed redundant supraglottic mucosa that fell into the glottic airway with associated plicae ventricularis, retroflexed epiglottis and prolapsed aryepiglottic folds. The patient was deemed a good candidate for robotic assisted surgery using the Vasan retractor. The Vasan retractor was inserted into the oral cavity using a curved blade and was suspended using the Vasan suspension block. The retractor gave excellent access to the larynx. The robot was then docked with a Maryland dissector to the left and a needle driver on the right that would allow mobilization and use of the OmniGuide CO2 laser. The redundant mucosa on the superior aspect of the arytenoid cartilage on the left was excised completely using the laser at 15 watts. **Results:** The supraglottic mucosa that was prolapsing into the glottis was easily and successfully removed. No complications occurred and the patient went home the same day of surgery. **Conclusions:** Robotic microlaryngeal surgery using the Vasan retractor allows for effective resection of glottic lesions. Few in vivo studies have been done to investigate the efficacy of robotic microlaryngeal surgery. We propose that by using this retractor, robotic microlaryngeal surgery may be superior to traditional techniques.

95. Laryngeal Trauma: A Ten Year Experience from a Level I Trauma Center

Joseph Y. Shen, BSc, Seattle, WA; Tanya K. Meyer, MD, Seattle, WA; Maya G. Sardesai, MD MEd, Seattle, WA

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the findings and implications from one of the largest reported case series involving laryngeal trauma.

Objectives: To retrospectively review the presentation, management and treatment outcomes associated with laryngeal trauma treated at a level I trauma center over a ten year period. **Study Design:** Retrospective case series. **Methods:** All records of patients seen in two hospitals in a single institution that included an international classification of diseases (ICD) diagnosis code involving laryngeal trauma during a ten year period were identified. Retrospective chart review was performed and data regarding demographics, presentation, treatment details, and clinical outcomes were extracted. Descriptive statistical analysis was applied. **Results:** Clinical records

from 240 patients were reviewed. Over half had undergone surgical intervention. Males represented 81% of cases, and mean age was 39.9 years. Caucasians represented the majority of the cohort. Dysphonia was an initial presenting symptom in about half of subjects, and less than half presented with airway complaints. Isolated laryngeal trauma represented 37% of cases while the remainder had associated injury. Plate fixation was used in 29% of surgical cases while 23% had suture fixation. Stents were used in 22% of cases, though stent use was more frequent in the earlier cases in the cohort. At discharge, 49% had reportedly normal airway, and 47% had voice complaints. Tracheostomy dependence was noted in 10% of patients at last followup. **Conclusions:** Though laryngeal trauma is uncommon, presenting symptoms may underestimate the severity of disease. Approach to management appears to be changing over time, and may reflect changes in diagnostic and therapeutic technology. Longer term consequences associated with laryngeal trauma continue to appear to be significant.

96. The Effect of Medialization Laryngoplasty on Aspiration in Patients with Unilateral True Vocal Cord Paralysis

Jeffrey T. Steitz, MD, Louisville, KY; John D. Gettelfinger, BA, Louisville, KY; Elizabeth D. Cash, PhD, Louisville, KY; Swapna K. Chandran, MD, Louisville, KY

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the significant improvement of functional oral intake scores and 8 point aspiration scores following medialization laryngoplasty for patients with unilateral vocal cord paralysis.

Objectives: To determine the effect of medialization laryngoplasty on aspiration in patients with unilateral true vocal cord paralysis. **Study Design:** Institutional review board approved retrospective analysis. **Methods:** The records of patients who underwent medialization laryngoplasty with a diagnosis of unilateral vocal cord paralysis, at a single institution, between July 2010 and July 2013 were reviewed. The effect of medialization laryngoplasty on aspiration was analyzed by using functional oral intake score, 8 point aspiration scale, laryngeal elevation and epiglottic deflection as determined by modified barium swallow study or fiberoptic endoscopic evaluation of swallow. **Results:** A total of 51 patients underwent medialization laryngoplasty for unilateral vocal cord paralysis in the 3 year span. Of those 51 patients, 16 had swallowing evaluation prior to and following surgical intervention with modified barium swallow study or FEES. The average functional oral intake score preoperatively was 3.3 with 62.5% of patients being gastrostomy tube dependent. The postoperative FOIS showed statistically significant improvement to an average of 5.4 with only 12.5% being gastrostomy tube dependent ($p<0.05$). 8 point aspiration scale improved from 6.36 preoperatively to 3.64 postoperatively ($p<0.05$). There was no statistically significant change in epiglottic deflection or laryngeal elevation. **Conclusions:** Medialization laryngoplasty successfully improves both functional oral intake and aspiration symptoms in patients with unilateral vocal cord paralysis alone. There is significant reduction in gastrostomy tube dependence. Less predictable results can be expected when there are other laryngeal deficits.

97. Hypopharyngeal Venous Malformation Presenting with Chronic Globus and Intermittent Dysphagia

Andrew M. Vahabzadeh-Hagh, MD, Los Angeles, CA; Ali R. Sepahdari, MD, Los Angeles, CA; Elliot Abemayor, MD PhD, Los Angeles, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to explain the nature and natural history of venous malformations. They should be able to compare and contrast the utility different imaging modalities in the diagnosis and characterization of these lesions. They should also be able to discuss the treatment options and prognosis for venous malformations of the head and neck.

Objectives: Vascular malformations, malformed vascular channels lined by endothelium, remain a diagnostic and therapeutic challenge. They are congenital lesions that never regress and grow proportionally with time, trauma, and/or hormonal changes. In the head and neck, venous malformations (VM) are the third most common vascular mass. VMs within the head and neck may be seen within the muscles of mastication, lips, tongue, or elsewhere within the upper aerodigestive tract. Here, through a case presentation, we highlight the importance of proper imaging selection for diagnosis and treatment planning of VMs. **Study Design:** A case report and literature review. **Methods:** We investigate a unique cause of globus through thorough physical examination, endoscopy, and key imaging selection. **Results:** The timing and quality of VM presentations is largely a function of their location, size, and growth pattern. Here we present the case of a 64 year old female with over 40 years of globus and intermittent dysphagia found to have a hypopharyngeal venous malformation. The imaging she presented with was at first misleading, but with laryngoscopy demonstrating a bluish hued hypopharyngeal mass and an MRI with T2 hyperintensity and heterogeneous contrast enhancement, her diagnosis was solidified. Here we also discuss the three pillars of therapy; surgery, sclerotherapy, and laser treatment while highlighting the importance of controlling this disease with periodic therapy and maintaining close long term followup. **Conclusions:** All globus is not the same. Clinicoanatomic correlation and the selection of appropriate imaging studies is crucial for the localization, diagnosis, and therapeutic planning for venous malformations.

98. Endoscopic Surgical Management of Adult Laryngotracheal Stenosis

Katherine C. Yung, MD, San Francisco, CA; Faizan Malik, BS, San Francisco, CA; Mark S. Courey, MD, San Francisco, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the indications and outcomes

for endoscopic management of laryngotracheal stenosis in adults.

Objectives: To report our experience and assess the efficacy of endoscopic surgical management of laryngotracheal stenosis (LTS) in adults. **Study Design:** Retrospective case series. **Methods:** All patients treated for LTS at our center from 2004 to 2013 were reviewed. Subjects with LTS secondary to granulomatosis with polyangiitis (GPA), iatrogenic LTS, and idiopathic LTS were included. Patients with cartilaginous involvement, history of open framework surgery, and tracheotomy at presentation were excluded. Patient demographics, procedures performed, date of interventions, and pulmonary function test measurements were extracted. **Results:** 42 patients, 7 male and 35 female, were included in our analysis with a mean age of 47 years. The most common etiology of LTS was idiopathic (57%), followed by iatrogenic (26%), and GPA (17%). 43% of subjects had a GERD diagnosis or were treated with PPI therapy. 114 total procedures were performed with 14 patients requiring only one intervention. The average interval between repeat surgery was 14 months with 4 patients ultimately undergoing open resection. Preoperative pulmonary function testing data was evaluated in 18 patients showing a mean peak inspiratory flow (PIF) of 2.8 L/s, a mean peak expiratory flow (PEF) of 3.6 L/s, and a mean total peak flow (TPF) of 6.3 L/s. Postoperative improvement in these measures was noted at mean PIF of 3.4 L/s, PEF of 4.7 L/s, and TPF of 8.1 L/s. No complications were noted and no patients required subsequent tracheotomy. **Conclusions:** The endoscopic surgical management of LTS is safe and efficacious. Further study on objective outcome measures is needed.

99. Dysphonia and Voice Related Quality of Life in Older African-Americans

Nina W. Zhao, MD, San Francisco, CA; Douglas R. Farquhar, BA, Philadelphia, PA; George M. Maliha, BA, Philadelphia, PA; Natasha Mirza, MD, Philadelphia, PA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the relationships between the GRBAS scale, VHI, and V-RQOL questionnaire in African-American seniors without known vocal disorders and explain how severity of perceived dysphonia relates to quality of life in this population.

Objectives: 1) To assess how severity of dysphonia, as judged by perceptual voice ratings (GRBAS), relates to patient reported voice related quality of life (VHI, V-RQOL) in non-treatment seeking African-American seniors; and 2) to determine relationships between two validated quality of life questionnaires in this population. **Study Design:** Cross-sectional, validated survey based. **Methods:** English speaking persons self-identifying as Black or African-American ages 65 and older without known vocal disorders were recruited from an urban senior community center. Perceptual voice evaluation was conducted using the Grade, Roughness, Breathiness, Asthenia, Strain (GRBAS) scale. Voice related quality of life was assessed using two validated instruments: the Voice Handicap Index (VHI) and the Voice-Related Quality of Life (V-RQOL) questionnaire. Pearson correlation coefficients (r) were calculated to assess relationships between scores. **Results:** Of 70 subjects, 51 (73%) were female and 19 (27%) were male. Age range was 65 to 92 with mean of 76. Cumulative GRBAS score ranged from 0 to 7 with a mean of 2.8±1.8. Total VHI score ranged from 0 to 55 with mean of 10.4±15.0. V-RQOL score ranged from 67.5 to 100 with mean of 96.6±6.5. There were significant correlations between total VHI and V-RQOL scores ($p<0.001$, $r=-0.71$). There were no significant correlations between GRBAS and VHI or V-RQOL. **Conclusions:** Mild to moderate dysphonia is noticeable in African-American seniors not currently seeking vocal treatment. VHI and V-RQOL are strongly correlated in this population; however, increasing severity of dysphonia does not necessarily correlate with self-reported quality of life. Further evaluation of these methods is needed to understand their applications to different patient populations.

Otology/Neurotology

100. Can a Low Cost Digital Hearing Aid Help Unaided Patients with Typical Hearing Losses?

Seilesh C. Babu, MD, Farmington Hills, MI

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the benefit of a low cost digital hearing aid for patients with mild to moderately severe hearing loss with improved user satisfaction scores.

Objectives: To analyze the technical specifications of a low cost (<$400) digital hearing aid and to determine if it can achieve adequate user satisfaction scores for those with mild to moderately severe hearing loss. **Study Design:** Retrospective study was then conducted over a 6 month period on patients with mild to moderately severe hearing loss from a private practice setting using satisfaction surveys to determine quality of life improvement. **Methods:** The MDHearingAid® AIR was evaluated using a Fonix 6500c Hearing Aid Analyzer, measured according to the American National Standards Institute (ANSI) S3.22-1996 hearing aid specification standard (ANSI, 1996). The measurements included saturated sound pressure level curve, high frequency average full on gain, frequency response, total harmonic distortion, equivalent input noise level, and input-output curve. A retrospective study was then conducted over a 6 month period on patients with mild to moderately severe hearing loss from a private practice setting. Satisfaction surveys were sent to patients using this hearing device. They were asked to wear the device for a minimum of 30 days and complete 2 self-reported surveys: International Outcome Inventory Hearing Aids (IOI-HA) and Satisfaction with Amplification in Daily Living (SADL). **Results:** The low cost hearing aid met gain and output targets previously described in the literature. 230 respondents completed the surveys. The device exceeded the mean score for all 7 items in the IOI-HA and met or exceeded the mean scores for all 5 categories of SADL. **Conclusions:** A low cost hearing aid was found to be electroacoustically adequate and a reasonable solution to meet the needs of those value and cost conscious patients who were not using amplification via a custom hearing device due to cost considerations.

101. Prevalence of Third Window Symptoms in the General Otologic Population

Lauren T. Brown, BA, New York, NY; Lauren Rouse, AuD, New York, NY; Jaclyn B. Spitzer, PhD, New York, NY; Anil K. Lalwani, MD, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the frequency of symptoms generally associated with pathologic third window of the inner ear in the general otologic population.

Objectives: Presentation of symptoms associated with pathologic third window often leads to diagnostic workup for superior canal dehiscence (SCD). The purpose of this study was to evaluate the frequency of these symptoms in a sample of the general otologic population. **Study Design:** Prospective questionnaire, audiometric evaluation, and chart review. **Methods:** 100 patients age > 17 English speaking, with same day audiometric evaluation were administered a ten item SCD symptoms survey in a soundproof room. Their otologic history and exam, audiometric data, and radiologic imaging were reviewed. **Results:** The mean age of the 100 patients was 57±17 years with slight preponderance of females (55%). Otologic diagnoses included otitis media, Meniere's disease, ETD, and SNHL. Two of 100 patients had SCD. The frequency of signs and symptoms associated with third window pathology in the patients without SCD (n=98) were: any autophony (voice, breathing, neck movement, eye movement, or pulse) (69%), air bone gap at 250Hz greater than 10dB (31%) and intact acoustic reflexes (12%), neck movement autophony (30%), aural fullness (21%), voice autophony (15%), pulsatile tinnitus (6%), sound induced dizziness or eye movement (5%), and eye movement autophony (4%). **Conclusions:** Symptoms typically associated with third window are common in the general otologic population. Radiologic imaging of all patients with these symptoms would lead to unnecessary radiation exposure. Our study highlights the need for diagnostic algorithm to identify patients most likely to harbor third window to minimize unnecessary diagnostic radiation exposure.

102. Myeloid Sarcoma of the Temporal Bone: Therapeutic Insights

Daniel R. Cox, MD, Salt Lake City, UT; Richard K. Gurgel, MD, Salt Lake City, UT

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the clinical presentation of myeloid sarcoma of the temporal bone and its management options.

Objectives: Myeloid sarcoma is a rare, extra-hematogenous manifestation of acute myeloid leukemia (AML). There are few cases of myeloid sarcoma of the temporal bone described in the literature. We report a case of myeloid sarcoma presenting as a mass in the external auditory canal (EAC) and discuss management options. **Study Design:** Case report and review of the literature. **Methods:** Presenting symptoms, physical exam findings, imaging, intraoperative findings, and pathologic examination of resected tumor specimen of a patient with myeloid sarcoma of the temporal bone are described in detail. **Results:** A 31 year old male with a history of AML in remission presented with left otalgia of 3 months' duration and acute left facial paralysis. MRI revealed a diffusely enhancing mass of the left EAC, middle ear and mastoid, with enhancement of all the facial nerve. Tympanomastoidectomy was performed. Intraoperatively, a fleshy subcutaneous mass was identified in the EAC, invading the posterior tympanic membrane and insinuating within the mastoid air cells. Frozen section showed nonspecific small blue cells. Care was taken to preserve the ossicular chain until definitive diagnosis was made with flow cytometry. Pathology revealed myeloid precursors positive for CD117, CD68, MPO, and lysozyme and negative for CD34, consistent with myeloid sarcoma. The patient was subsequently treated with chemotherapy. **Conclusions:** Myeloid sarcoma is a rare manifestation of AML which can present as a temporal bone mass. Until a definitive diagnosis is made, care should be taken in surgery to preserve normal ear architecture since these lesions are definitively treated with chemotherapy.

103. Unmasking Bilateral Superior Semicircular Canal Dehiscence—A Case of Bilateral Otosclerosis

Walid I. Dagher, MD, Boston, MA; Willim S. Kim, MD, Boston, MA; Jonathon S. Sillman, MD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the clinical presentation of superior semicircular canal dehiscence and explain the mechanism behind the "third window phenomenon".

Objectives: 1) To provide an overview of superior semicircular canal dehiscence (SSCD), and report a patient with bilateral superior canal dehiscence masked by conductive hearing loss and absent reflexes in the setting of bilateral otosclerosis; and 2) to review the audiometric findings in patients with SSCD and discuss the mechanism of conductive hearing loss in such pathology. **Study Design:** The clinical presentation, physical examination, audiometric analysis, imaging features and surgical findings were reviewed in a patient with bilateral conductive hearing loss, bilateral absent acoustic reflexes, and failed hearing improvement after stapedectomy in the setting of bilateral superior semicircular canal dehiscence. **Methods:** The clinical presentation, physical examination, audiometric analysis, imaging features and surgical findings were reviewed in a patient with bilateral conductive hearing loss, bilateral absent acoustic reflexes, and failed hearing improvement after stapedectomy in the setting of bilateral superior semicircular canal dehiscence. **Results:** A previously healthy 41 year old female patient presented with an isolated slowly progressive bilateral hearing loss. Audiometric evaluation revealed bilaterally symmetric moderate conductive hearing loss along with bilateral loss of acoustic reflexes compatible with otosclerosis. A right stapedectomy was performed, however the patient had persistent conductive hearing loss along with development of hyperacusis. Re-exploration revealed adequate prosthesis placement with an absent round window reflex. CT scan of the temporal bone showed bilateral SSCD. Review of the literature regarding SSCD was done with particular emphasis on the audiometric and radiologic findings. No such case of bilateral otosclerosis masking SSCD has been reported in the literature. **Conclusions:** We report a

patient with audiometric and clinical findings of bilateral otosclerosis masking bilateral SSCD. Additional testing in the form of vestibular evoked potentials and laser Doppler vibrometry may be helpful diagnostic tools to enable the proper management of such pathology.

104. Implant Access to the Cochlea: Facial Nerve, Incus and Pneumatization

Anita Satish Deshpande, BA, Atlanta, GA; Norman Wendell Todd, MD MPH, Atlanta, GA

Educational Objective: At the conclusion of this presentation, the participants should be able to know the location of the straight-into-cochlea line, and its anatomic relationship with the facial nerve and the posterior process of the incus.

Objectives: To describe the straight-into-cochlea line that affords the best access for an electrode array to enter via the round window, as the line relates to the facial nerve, the incus, and mastoid size. The straight-into-cochlea line is important to minimize cochlear trauma and maximize the likelihood of placement into the scala tympani. **Study Design:** Postmortem study of cadaveric crania. **Methods:** From a series of 41 crania with clinically ear normal temporal bones, high resolution CT scans were obtained for those with the extremes of large (N=5) and small (N=5) mastoid pneumatization. Using FIJI, a publicly available software program, the straight-into-cochlea insertion line was determined by defining the x,y,z coordinates of the midst of the round window and a point 6.0mm into the cochlea on its centrifugal wall. Then, from the extended straight-into-cochlea insertion line, we determined the shortest perpendicular distance to the midst of the lumen of the fallopian canal, and from that "fallopian point" to the apex of the posterior process of the incus. **Results:** Repeatability of assessments was good. The extended straight-into-cochlea insertion lines were routinely close to the midst of the fallopian canal (50% ≤ 1.0 mm), were 4.7 to 7.8 mm from the apex of the posterior process of the incus, but were not related to mastoid pneumatization. Bilateral symmetry was suggested for the distance "fallopian point" to incus. **Conclusions:** Straight-into-cochlea insertion via the round window puts the facial nerve at risk.

105. Chronic Suppurative Otitis Media in Nepal: National Prevalence and Risk Factors

Susan D. Emmett, MD, Baltimore, MD; Swetha Manohar, MSPH, Kathmandu, Nepal; Ramesh Adhikari, MBBS, Kathmandu, Nepal; Rolf Klemm, DrPH, Baltimore, MD; Lee Wu, MHS, Baltimore, MD; Keith P. West Jr., DrPH, Baltimore, MD

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the national prevalence of chronic suppurative otitis media in Nepal, geographic variations in prevalence, and risk factors.

Objectives: Recognized by the World Health Organization as a neglected tropical disease, chronic suppurative otitis media (CSOM) represents a major contributor to the burden of hearing loss in South Asia. This study estimates the national prevalence of CSOM in preschool aged children in Nepal and evaluates contributing risk factors. **Study Design:** Cross-sectional national survey was conducted in Nepal from April-July 2013 within 21 randomly sampled clusters/districts, equally distributed across the country's three agro-ecological zones: mountains, hills, and terai. **Methods:** A total of 5401 children under 5 years of age were included in the survey. The prevalence of CSOM was defined as the proportion of subjects reporting ear discharge within the past 30 days. Zone sampling weights reflecting population proportions were applied to estimate national prevalence. Multiple logistic regression was used to evaluate risk factors. **Results:** National prevalence of CSOM was 4.27% (95% CI, 3.59-5.07). Prevalence was higher in the terai (5.48%; 95% CI, 4.37-6.83) than mountains (3.91%; 95% CI, 2.56-5.92) or hills (2.82%; 95% CI, 2.10-3.79; p <0.001). Controlling for location and sociodemographic factors, moderate to severe food insecurity was associated with 1.64 fold (95% CI, 1.14-2.37; p=0.008) and 2.16 fold (95% CI, 1.38, 3.38; p=0.001) increased odds of CSOM, respectively. Chronic undernutrition, measured by severe stunting, (height for age Z score<-3) was associated with 3.38 fold increased odds of CSOM (95% CI, 1.38-3.38; p=0.001). Higher socioeconomic status was protective (0.81; 95% CI, 0.67-0.98; p=0.030). **Conclusions:** CSOM is common and varies by region in Nepal. Food insecurity and stunting are nutritional risk factors that merit attention in future studies.

106. Medicinal Honey as Treatment for Skin Reactions Associated with Bone Anchored Hearing Implant Surgery

Erynne A. Faucett, MD, Tucson, AZ; Abraham B. Jacob, MD, Tucson, AZ

Educational Objective: At the conclusion of this presentation, the participants should be able to explain the use of medicinal honey in wound care, more specifically as a treatment for skin reactions associated with bone anchored hearing implant surgery.

Objectives: Monofloral honey production relies on limiting bees' access to nectar from one particular plant. Medihoney®, a commercially available, medical grade product manufactured by Derma Sciences (Princeton, NJ) and derived from the leptospermum scoparium (manuka) plant, has verified anti-inflammatory and medicinal properties for the treatment of burns, multi-drug resistant bacteria, and bacterial biofilms. Its use in patients suffering skin reactions at bone anchored hearing implant (BAHI) sites has not been previously described. **Study Design:** We performed a retrospective chart review between November 2011 and May 2014 on patients from our institution who underwent BAHI and required postoperative wound care of the implant site. **Methods:** Patients who underwent BAHI and required postoperative wound care of the implant site between November 2011 and May 2014 were included in this retrospective chart review. Measured variables included type of device placed, side of device placement, presence and grade of skin reaction, treatment type, and time to resolution. **Results:** Out of 31 patients undergoing BAHI surgery, 7 had postoperative skin reactions. Four of the most

recent patients were treated with topical Medihoney® and resolved their skin reactions within 2 weeks. Those treated with other modalities including oral antibiotics, topical antibiotics, and/or hydrogen peroxide solution resolved their skin reactions an average of 5.25 weeks post-onset. No patients required surgical intervention. **Conclusions:** Medihoney® effectively resolved postoperative skin reactions at BAHI surgery sites at least as effectively as more traditional treatment modalities.

107. Isolated Cochlear Neuritis from Varicella Reactivation Mimicking a Vestibular Schwannoma

Adam D. Goodale, MD, Cincinnati, OH; Justin S. Golub, MD, Cincinnati, OH; Rebecca S. Cornelius, MD, Cincinnati, OH; Ravi N. Samy, MD, Cincinnati, OH

Educational Objective: At the conclusion of this presentation, the participants should understand the pathophysiology and presentation of isolated cochlear neuritis secondary to varicella reactivation as well as be able to discuss the limitations of traditional MRI to diagnose a vestibular schwannoma.

Objectives: The evaluation of asymmetric sensorineural hearing loss (SNHL) typically includes an audiogram and gadolinium enhanced MRI to inspect for retrocochlear pathology, most commonly a vestibular schwannoma. Previous reports have identified nonneoplastic lesions mimicking vestibular schwannoma. To our knowledge, this is the first case reported of an isolated cochlear neuritis secondary to varicella reactivation, which clinically and radiographically mimicked the presentation of a vestibular schwannoma. **Study Design:** Case report. **Methods:** A case is presented of a patient with progressive unilateral SNHL and tinnitus with internal auditory canal (IAC) enhancement on MRI secondary to isolated cochlear neuritis from varicella reactivation. MRI images are presented showing resolution of IAC enhancement following varicella treatment. **Results:** For an otolaryngologist, varicella reactivation is most commonly seen in the form of Ramsay Hunt syndrome or shingles of head and neck dermatomes. Ramsay Hunt syndrome is known to produce abnormal MRI enhancement within the IAC from the local facial and vestibulocochlear neuritis; however, its characteristic clinical signs aid the diagnosis. Our case is unique in that the patient's only manifestation of his varicella infection was unilateral SNHL manifesting as an MRI lesion indistinguishable from a vestibular schwannoma. **Conclusions:** This case outlines the importance of maintaining a broad differential diagnosis in the evaluation of unilateral SNHL. MRI remains an important tool in vestibular schwannoma diagnosis; however, its limited specificity must be recognized.

108. Glossopharyngeal Neuralgia Caused by a Subarachnoid Cyst of the Cerebellopontine Angle

Scott A. Hardison, MD, Richmond, VA; Shivani R. Pathak, BS, Richmond, VA; John F. Reavey-Cantwell, MD, Richmond, VA; Evan R. Reiter, MD, Richmond, VA

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) present an unusual case of glossopharyngeal neuralgia caused by an arachnoid cyst at the cerebellopontine angle; and 2) discuss diagnostic and treatment modalities for glossopharyngeal neuralgia.

Objectives: 1) Present an unusual case of glossopharyngeal neuralgia caused by an arachnoid cyst at the cerebellopontine angle; and 2) discuss diagnostic and treatment modalities for glossopharyngeal neuralgia. **Study Design:** Case report and literature review. **Methods:** A 48 year old healthy woman presented with intermittent stabbing pain in her right throat, ear and floor of mouth. Pain occurred in a seemingly random pattern, not associated with jaw or tongue movement or swallowing. Physical exam was unremarkable and demonstrated no masses nor cranial nerve deficits. Computerized tomographic scan of the neck revealed a 2-3 mm outpouching at the terminus of the right internal carotid artery (ICA), suggestive of aneurysm. She was referred to neurosurgery for management, although this was felt to be an unlikely source of her pain. Subsequent magnetic resonance imaging revealed a cystic mass of the right cerebellopontine angle (CPA), consistent with an arachnoid cyst. She underwent a retrosigmoid craniotomy approach for resection and fenestration of the cyst. **Results:** At the two week postoperative visit, the patient noted near complete resolution of her pain, which had resolved completely by the sixth week. **Conclusions:** Glossopharyngeal neuralgia is a rare cause of facial and throat pain. It is typically idiopathic, but may be caused by compression of the nerve as it exits the medulla or the jugular foramen by a number of different lesions. This report represents only the second known case of glossopharyngeal neuralgia caused by an arachnoid cyst of the CPA.

109. Cochlear Implantation in Elderly Patients—Long Term Results

Ohad Hilly, MD, Toronto, ON Canada; Euna Hwang, MD, Toronto, ON Canada; David BB Shipp, MA FAAA Reg CASLPO, Toronto, ON Canada; Julian M. Nedzelski, MD FRCSC, Toronto, ON Canada; Joseph M. Chen, MD FRCSC, Toronto, ON Canada; Vincent Y.W. Lin, MD FRCSC, Toronto, ON Canada

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss long term outcomes of elderly cochlear implantees.

Objectives: Cochlear implantation has been demonstrated to be beneficial in elderly patients with profound hearing loss. Data regarding long term outcomes in elderly cochlear implantees are scarce, and it is unclear whether outcomes are stable over time. The aim of this study was to evaluate long term outcomes in elderly cochlear implantees in comparison with younger patients. **Study Design:** Retrospective. **Methods:** Patients implanted at a adult tertiary cochlear implant center were divided into three age groups: ≤ 60, 61-70 and ≥ 71 years old. Hearing in Noise Test (HINT) scores were recorded at 1, 5 and 10 years after implantation. Outcome measures used

were: 1) absolute HINT scores; 2) HINT score changes during followup, and 3) quality of life using the SF-36. **Results:** HINT scores at 1 year were available in 206 patients, and averages were similar in patients ≤ 60, 61-70 and ≥ 71 years old (78, 84 and 73, respectively; p=NS). Followup of 5 years or more was available in 87 patients, with a mean followup period of 6.8 years. Average HINT scores at the most recent followup were 85, 85 and 77, respectively (p>0.05). In patients >70 years old, HINT scores were stable (<10% change) or improved during followup in 77% of the group, compared with 88% in the youngest group (≤ 60 years old). These differences were not significant. All groups demonstrated improvement in SF-36. **Conclusions:** Outcomes in elderly patients with cochlear implants are similar to those seen in the younger population. The hearing and quality of life benefit in all age groups is stable over a long term followup period.

110. Primary Meningioma of the Temporal Bone with Focal Rhabdoid Features

Glenn W. Knox, MD JD, Jacksonvillle, FL; Sania Shuja, MD PhD, Jacksonville, FL; Claudia Ormensian, MD, Jacksonville, FL; Raafat Makary, MD PhD, Jacksonville, FL

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) describe the importance of radiologic/histopathologic correlation of temporal bone meningiomas; 2) understand the impact on prognosis upon finding a rhabdoid component in a temporal bone meningioma; and 3) describe diagnosis and treatment options for temporal bone meningioma.

Objectives: The objectives of the present study are to present a case report of a primary temporal bone meningioma (rare lesion) and to review the literature for other instances of this lesion. In addition, discuss the prognostic significance of finding a rhabdoid component in a meningioma. **Study Design:** Case report and literature review. **Methods:** A 63 year old Caucasian male with a history of prostate cancer complained of headaches and dizziness. Workup revealed a 3.1 x 1.7 cm lesion of the left middle fossa on MRI. It was originally felt to be a metastasis from the prostatic carcinoma. The lesion was completely excised via a middle fossa approach. Pathology revealed a WHO grade 1 meningioma with focal rhabdoid features. A literature review revealed 28 previous cases of temporal bone meningiomas. **Results:** The literature review demonstrated that meningiomas of the temporal bone can be intrinsic, arising within the temporal bone itself, or extrinsic, invading the temporal bone secondarily. The treatment for these lesions is primarily surgical. Presence of rhabdoid component in a meningioma may increase the risk for tumor recurrence. **Conclusions:** Meningiomas of the temporal bone, although rare, should be considered in the differential diagnosis of any lesion involving the temporal bone. Temporal bone involvement can be primary or secondary. The treatment for these lesions is primarily surgical. Presence of rhabdoid component may increase the risk for recurrence.

111. Endoscopic Ear Surgery for Cholesteatoma Reduces Operating Time when Compared to Binocular Microscopy

Elliott D. Kozin, MD, Boston, MA; Parth Shah, BA, Boston, MA; Aaron K. Remenschneider, MD MPH, Boston, MA; Alyson Kaplan, BS, Boston, MA; Rosh K.V. Sethi, MD, Boston, MA; Daniel J. Lee, MD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss advantages and disadvantages of endoscopic ear surgery for cholesteatoma.

Objectives: Endoscopes are now being used for cholesteatoma surgery. One concern with endoscopic approaches is the inefficiency of one handed dissection. We hypothesize that endoscope only cholesteatoma procedures have equivalent total operating room (OR) and procedural times due to decreased need for post-auricular incision and mastoidectomy, while maintaining equivalent outcomes. **Study Design:** Retrospective review of patients undergoing endoscopic ear surgery for cholesteatoma. **Methods:** Consecutive adult cases of endoscopic ear surgery for cholesteatoma were reviewed. Cases were divided into endoscope only cases (group A) verses binocular microscopy cases (group B). Rates of conversion to binocular microscopy, complications, and recurrent disease were documented. **Results:** Forty-one patients, (group A = 23, group B = 18) were identified. Age (46.4 vs. 46.5 years, p=0.98) and gender (48% vs. 33% male, p=0.52) were not different between groups. Rate of conversion to microscope was 39.1% (9/23) in group A. Reason for conversion was extension of cholesteatoma into mastoid antrum (9/9). Mean total OR times (minutes): group A 188.6, group B 228.8, group A converted to binocular microscope 261.9, p<0.001. On average, conversion to binocular microscope resulted in an additional 80.5 minutes over endoscope only cases, and exceeded standard binocular microscopy cases by 39.2 minutes, p<0.001. There were no intraoperative complications. There was one recurrence in each group. **Conclusions:** Endoscopic only cases appear to be faster than microscope approaches, with similar rates of recurrence. Principal reason for conversion was cholesteatoma extension into the antrum. Further research is needed, such as a radiologic classification system, to preoperatively select ideal patients for endoscopic only approaches.

112. Joseph Ogura, MD Resident Research Award
Controlling the Blood Labyrinth Barrier

Trung N. Le, MD PhD, Winnipeg, MB Canada; Brian B. Blakley, MD PhD, Winnipeg, MB Canada

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) demonstrate a unique method of controlling the blood labyrinth barrier (BLB); and 2) establish the pharmacokinetics of gentamicin in perilymph, cerebrospinal fluid (CSF) and blood with and without mannitol.

Objectives: 1) To demonstrate a unique method of controlling the blood labyrinth barrier (BLB); and 2) to establish the pharmacokinetics of gentamicin in perilymph, cerebrospinal fluid (CSF) and blood with and without mannitol. **Study Design:** Controlled animal research project. **Methods:** Permeability of the BLB and the blood brain barrier (BBB) to gentamicin with and without mannitol was studied collecting 175 samples from 28 guinea pigs using concentrations relevant to human clinical situations. Gentamicin (4 mg/kg IV) with or without mannitol (250 mg/kg) was administered, followed by sampling of perilymph, CSF and blood at times ranging from 30 minutes to 17 hours after infusion. Enzyme linked immunoassay was employed to determine the concentration of gentamicin. The pharmacokinetics of gentamicin concentration over time was established to assess the effect of mannitol on the permeability of the BLB. **Results:** Mannitol increased the permeability of the BLB to gentamicin significantly (p=0.0044) but the effects on the blood brain barrier (BBB) did not reach statistical significance (p=0.581). Mannitol did not alter renal clearance of gentamicin from the blood (p=.471). The concentration of gentamicin in perilymph and CSF was always significantly lower than in blood. **Conclusions:** Mannitol administration transiently increases the permeability of the BLB. Potential clinical benefits may accrue from selected timing of administration of osmotic agents such as mannitol permitting a measure of control of the entry and egress of compounds such as gentamicin into and out of perilymph.

113. Acute Subdural Hematoma: A Potential Complication of Cochlear Implantation

Blake J. LeBlanc, MD, Shreveport, LA; Lawrence G. Gardner, MD, Shreveport, LA

Educational Objective: At the conclusion of this presentation, the participants should be able to have an increased awareness of intracranial bleeding as a potential complication of cochlear implantation.

Objectives: Cochlear implantation (CI) is a commonly performed surgical procedure for treatment of sensorineural hearing loss. Rates of intracranial bleeding after CI are reported to be <1%. We report a case of subdural hematoma recognized in the recovery room, which adds to the small number of existing literature reports. We intend to increase awareness of this potential complication. **Study Design:** Case report with literature review. **Methods:** Case report: A 65 year old female underwent a right sided cochlear implant, with no unusual bleeding or cerebrospinal fluid encountered. A bony well to house the implant and tie down holes were drilled, without known dural exposure. Postoperatively she was noted to have difficulty arousing in the recovery room. Imaging revealed a right sided subdural hematoma and emergency evacuation and decompression ensued. Her family reported that in the weeks prior to her surgical procedure she was involved in a motor vehicle collision during which she suffered head trauma and did not seek medical attention. **Results:** Multiple mechanisms have been postulated as etiologies for intracranial bleeding following CI. Direct injuries to dura/vessels as well as sheering of diploic veins have been described in the literature. With aging, diploic veins become increasing fragile. Perhaps our patient's undisclosed prior head trauma caused vessel weakness predisposing to bleeding. **Conclusions:** Acute subdural hematoma may complicate cochlear implant, even without obvious vascular or dural injury noted intraoperatively. Prior head trauma may increase this risk, especially in elderly patients.

114. Facial Nerve Stimulation following Cochlear Implantation for X-Linked Stapes Gusher Syndrome

Kevin A. Peng, MD, Los Angeles, CA; Edward C. Kuan, MD, Los Angeles, CA; Frederick Yoo, MD, Los Angeles, CA; Gail Ishiyama, MD, Los Angeles, CA; Ali R. Sepahdari, MD, Los Angeles, CA; Akira Ishiyama, MD, Los Angeles, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to recognize the presentation of X-linked stapes Gusher syndrome and describe the anatomical characteristics that predispose these patients to facial nerve stimulation and/or facial nerve injury following cochlear implantation.

Objectives: To present a case of facial nerve stimulation following cochlear implantation in a patient with X-linked deafness with stapes Gusher syndrome. **Study Design:** Retrospective case report. **Methods:** The medical records of a patient with X-linked stapes Gusher syndrome status post-cochlear implantation were reviewed. **Results:** A nine year old male presented to the otology clinic for continued care after cochlear implantation with a 21 electrode device in another country five years prior. Four years following implantation, and one year prior to presentation at our clinic, the patient began to experience intermittent ipsilateral facial nerve stimulation. At the time of consultation, facial nerve function was full and symmetric. Computed tomography (CT) was performed, revealing a dilated internal auditory meatus. The cochlear implant coursed normally through the basal turn of the cochlea, but at the level of the geniculate ganglion, the electrode protruded into the facial nerve canal, likely secondary to the observed absence of bony separation between the facial nerve and the cochlea. Taken together, radiological and clinical findings were diagnostic of X-linked stapes Gusher syndrome. Inactivation of electrodes 1 and 19-21 successfully abated facial nerve stimulation. **Conclusions:** X-linked stapes Gusher syndrome presents with a congenital hearing loss that is usually bilateral, mixed, and progressive. Cochlear implantation is almost always accompanied by a CSF fistula at the time of cochleostomy. Patients typically derive useful hearing from the cochlear implant, but owing to the anatomical anomalies associated with this condition, the facial nerve is at increased risk for intraoperative injury as well as excessive stimulation following implant activation.

115. Richard J. Bellucci, MD Resident Research Award
The Effect of High Flow Nasal Cannula Oxygen Therapy on Middle Ear Pressure
Kristina Piastro, MD, Albany, NY; Jay J. Agarwal, BS, Albany, NY; Steven M. Parnes, MD, Albany, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to explain how high flow nasal cannula oxygen therapy affects middle ear pressures.

Objectives: To investigate the effect of high flow nasal cannula oxygen therapy (HFOT) on middle ear pressure in patients with acute respiratory failure. **Study Design:** Prospective case series study. **Methods:** Ten patients (eight males and two females) with oxygen desaturations requiring HFOT were recruited with 19 ears available for our study. The study group was aged 29-90 years (mean 65.3 ±16.5). All patients underwent a review of medical history, questioned about subjective hearing loss and underwent a standard otologic exam, with middle ear pressures measured with a GSI TympStar tympanometer. **Results:** The middle ear peak pressures in our study group ranged from 25 to -200 daPa (mean -13.7±56.3 daPa). Volume of HFOT was delivered at 20-40 liters (mean 30.5 ± 9 L) and fraction of inspired oxygen required was 30-70% (mean 58±13%). There was a positive correlation between liters of oxygen delivery and middle ear pressure with a Pearson coefficient (R) of 0.436, although lacking statistical significance (p=0.06). **Conclusions:** Previous studies have shown that HFOT delivered in the range of 35-40 L/min produces pharyngeal pressures at or above 5 cm H20. Since pharyngeal pressures of 5 cm H20 produced via CPAP have shown to produce middle ear pressures above 40 daPa, we expected HFOT to result in similar middle ear pressures at 35-40 L/min. However, although our results show an increase in middle ear pressures with flow volume, HFOT did not produce significant increases in middle ear pressures. This may make HFOT an appropriate option for oxygen delivery for patients who require otologic procedures.

116. Francis E. LeJeune Sr., MD Resident Research Award
Magnetic Resonance Imaging in a Guinea Pig Model of Inner Ear Decompression Sickness and Barotrauma
Nathan E. Pierce, MD, Gainesville, FL; G. Joseph Parell, MD, Panama City, FL; Reordan O. De Jesus, MD, Gainesville, FL; Carolyn P. Ojano-Dirain, PhD, Gainesville, FL; Patrick J. Antonelli, MD, Gainesville, FL

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the use of MRI to differentiate inner ear barotrauma from inner ear decompression sickness.

Objectives: Scuba diving may cause severe hearing loss and vertigo due to inner ear barotrauma (IEBT) and inner ear decompression sickness (IEDS). These may be difficult to differentiate clinically. IEDS requires costly and potentially dangerous hyperbaric therapy, whereas such treatment may worsen IEBT. The objective of this study was to assess the potential utility of magnetic resonance imaging (MRI) to identify and distinguish blood from air in the inner ear, manifestations of IEBT and IEDS, using a guinea pig model. **Study Design:** Prospective animal trial. **Methods:** MRI with T1, FLAIR and SPACE sequences of the head were obtained at 3 Tesla pre- and post-injection of 2, 4, or 10 ul of air or blood through the round window into the perilymph. With this model, 2 ul has been shown to cause hearing loss. Images were reviewed by a neuroradiologist blinded to the treatment. **Results:** The radiologist correctly identified and differentiated injected air and blood, regardless of volume, in 14 of 14 ears. **Conclusions:** MRI reliably distinguishes small volumes of air and blood in the guinea pig inner ear. MRI should be evaluated for its utility in the diagnosis of IEBT and IEDS in scuba divers.

117. Hydroxyapatite Coated Titanium Bone Conduction Abutments Decrease Delayed Soft Tissue Complications Compared to Uncoated Titanium Bone Conduction Abutments
Jordan C. Schramm, MD MS, Omaha, NE; Duncan C. Watley, BS, Omaha, NE (Presenter); Jonathan L. Hatch, MD, Omaha, NE; Gary F. Moore, MD FACS, Omaha, NE

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the advantages of utilizing hydroxyapatite coated titanium bone conduction abutments over uncoated titanium bone conduction abutments.

Objectives: Hydroxyapatite (HA) is physiologically similar to bone, and has been shown to enhance soft tissue integration with transcutaneous implants in sheep. A titanium bone conduction abutment coated with HA was recently developed. We hypothesized that soft tissue integration with HA coated titanium bone conduction abutments would lead to fewer soft tissue complications compared to uncoated titanium bone conduction abutments. **Study Design:** Retrospective cohort study. **Methods:** A retrospective chart review was conducted on patients who underwent implantation of bone anchored hearing devices from 2012 to 2013 by a single surgeon in a private clinic. Patient records were examined for patient demographics, first instance of complication, complication type and treatment, and time until processor fitting. **Results:** 40 patients (21 female) received implants during the study period, including 16 HA coated abutments and 24 uncoated abutments. Average age of patients receiving HA coated abutments was similar to those receiving uncoated abutments (59.4 years [range: 29 - 81] versus 53.0 years [range: 9 - 75 years]). Complications, which included soft tissue infection, wound dehiscence, and skin overgrowth, were classified as either acute or delayed depending on whether they occurred prior to or after processor fitting. Acute complications trended toward higher frequency with HA coated than uncoated abutments (6/16 [37.5%] versus 4/24 [16.7%]; RR 2.25; p=0.121), while delayed complications trended toward lower frequency with HA coated than uncoated abutments (0/16 [0.0%] versus 5/24 [20.8%]; RR 0.134; p=0.055). Acute complications did not result in delayed processor fitting. **Conclusions:** HA coated titanium bone conduction abutments tend to decrease delayed soft tissue complications compared to uncoated titanium bone conduction abutments.

118. Cochlear Implant Outcomes in the Adult Population

Brian D. Schwab, MD, New York, NY; Erica Lai, MD, New York, NY; Lorie A. Singer, MBA, New York, NY; Ana H. Kim, MD, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to better understand and explain the audiologic benefit of cochlear implant surgery in patients age 21 to 64.

Objectives: To evaluate the hearing performance of patients with cochlear implants who were 21 to 64 years of age at the time of implantation (adult, non-geriatric patients). **Study Design:** Retrospective chart review in an academic specialty center. **Methods:** Preoperative audiometric data included word recognition via Consonant Nucleus Consonant (CNC) scores at 50 dB. Postoperative testing was performed at 3, 6, 12, and 24 months and included both CNC at 50 dB and AZ Bio Sentences. **Results:** Of the 155 patients, 81 (52.3%) were female and 74 (47.7%) were male. The average age of the patients was 45 (range of 21-64 years at age of implantation). Patients in this study experienced a significant improvement in word recognition scores ($p < 0.00001$). The mean post-implant score was 47% (at 6 months) and 53% (at 24 months) on CNC score at 50dB compared to average pre-implantation aided score of 5%. The AZ Bio data corroborated this finding. The surgery was well tolerated in this population with no noted infections and five patients requiring re-implantation due to failure. **Conclusions:** Our study found patients receiving a cochlear implant who were ages 21-64 showed a significant audiologic benefit as early as 3 months postop. The surgery appears to be well tolerated in this population with relatively low risk. Further research is needed to better quantify subjective metrics such as quality of life measures.

119. Using Transtympanic Gadolinium and MRI in Distinguishing between Meniere's and Migraine

Warren C. Swegal, MD, Detroit, MI; Syed F. Ahsan, MD, Detroit, MI

Educational Objective: At the conclusion of this presentation, the participants should be able to understand that transtympanic gadolinium injection and MRI can potentially be used to differentiate between Meniere's disease and migraine in patients with vertigo.

Objectives: To describe the use of MRI imaging using transtympanic gadolinium (TT Gad) in distinguishing between migraine and Meniere's disease (MD) in a patient with dizziness. **Study Design:** Case report. **Methods:** Patient's chart was reviewed for subjective and objective reports of vertigo, vestibular function tests and imaging. The patient underwent TT Gad injection followed by MRI 3D FLAIR to assess for endolymphatic hydrops (EH). Audiogram before and after was assessed. **Results:** A 43 year old man presented with recurrent vertigo attacks lasting more than one hour with right side aural fullness, tinnitus, sensitivity to sound and temperature as well as left side headaches. Vestibular testing demonstrated reduced vestibular response on the left, possible EH on the right, cervical vestibular evoked myogenic potential suggesting possible right side superior semicircular canal dehiscence. Patient was counseled about performing an MRI after TT Gad injection to rule in Meniere's disease. It was explained that this was an off label use of the contrast. MRI 3D FLAIR sequence ruled out endolymphatic hydrops and he was started on a migraine diet. He was treated for migraines and his vertigo and headaches improved by over 90%. **Conclusions:** This is an interesting case because, while conventional vestibular testing revealed an inconclusive and complex picture, TT Gad and MRI were able to distinguish between MD and migraine in a patient who presented with symptoms suggestive of both. This has the potential to save the patient from unnecessary treatment for MD and side effects as well as reduced the time to a firm diagnosis.

120. Utility of Preoperative CT and MRI in Adult and Pediatric Cochlear Implant Candidates

Matthew L. Tamplen, MD, San Francisco, CA; Adam Schwalje, BS, San Francisco, CA; Lawrence Lustig, MD, San Francisco, CA; Mia E. Miller, MD, San Francisco, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) evaluate the utility of preoperative cochlear implant imaging in both pediatric and adult patients; 2) determine the frequency of retrocochlear pathology identified on preoperative MRI; and 3) determine how frequently CT and MRI demonstrate anomalies that affect operative planning in pediatric and adult patients.

Objectives: Determine the utility of preoperative imaging in both adult and pediatric cochlear implant candidates. **Study Design:** Retrospective chart review. **Methods:** Medical records of 122 consecutive patients who underwent 137 cochlear implantation (CI) procedures between 5/14/11 and 7/30/14 at a single institution were reviewed. **Results:** CT was obtained preoperatively in 119 (97.5%) patients, preoperative MRI was obtained in 106 (86.8%) patients and both were obtained in 85 (69.7%) patients. Of those scans, MRI revealed 1 acoustic neuroma and 2 meningiomas, which affected surgical planning for 3 (2.2%) procedures. MRI identified enlarged vestibular aqueduct (EVA) in 2.0% of adult patients. CT demonstrated middle ear disease in 4 (3.3%) patients, all of which were noted on preoperative clinical examination. CT was useful in indicating round window and cochlear patency in 3 (2.2%) patients with cochlear otosclerosis. 20 pediatric patients underwent 27 CI procedures. Preoperative CT in the pediatric cohort demonstrated 5 (25%) dysplastic cochleae, 3 (15%) dysplastic vestibules and/or semicircular canals, and 3 (15%) EVA. In one patient, CT demonstrated a duplicated right internal auditory canal (IAC) and hypoplastic left IAC; MRI confirmed hypoplastic cochlear nerves in this patient. **Conclusions:** Preoperative MRI can demonstrate retrocochlear pathology, cochlear patency and EVA in adults being evaluated for cochlear implantation. CT may provide additional information in patients with chronic otitis media or otosclerosis. Both CT and MRI can identify inner ear anomalies in pediatric patients. Routine MRI scanning in children does not offer substantial diagnostic benefit over CT for routine CI screening.

Pediatric Otolaryngology

121. Nasal Gliomas and Encephaloceles: An Update on Current Evaluation and Management

Eelam A. Adil, MD, Boston, MA; Colleen H. Heffernan, MD, Boston, MA; Ethan R. Moritz, BS, Boston, MA; Reza R. Rahbar, MD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the current evaluation and management of congenital nasal gliomas and encephaloceles.

Objectives: To describe our experience and current management approach for congenital nasal gliomas and encephaloceles. **Study Design:** Retrospective chart review at a tertiary pediatric hospital from 1970-2013. **Methods:** A total of 30 pediatric patients were identified. Twenty-one had a nasal glioma and nine had pathology confirmed encephaloceles. Data including demographics, pathology, imaging modality, surgical approach, reconstruction, extent of resection, outcomes, and complications were analyzed. **Results:** Fourteen nasal glioma patients (67%) presented with an internal nasal mass and presented with nasal obstruction. Three patients (14%) presented with an external nasal mass and 4 (19%) had a mixed lesion. The median age at surgery was 0.51 years (interquartile range 1.32 years). Thirteen (62%) had an intranasal endoscopic approach, 5 (24%) patients had an external approach, 2 (10%) patients had an intranasal excision and 1 (5%) had a transoral resection. Median operative time was 1.6 hours (interquartile range 1.2 hours) and there were no major complications. Nine patients with congenital nasal encephalocele were identified: 6 patients (67%) presented with transethmoidal encephaloceles, 2 patients (22%) presented with nasoethmoidal encephaloceles, and 1 (11%) presented with a nasofrontal lesion. The median age at surgery was 1.25 years (interquartile range 1.4 years). All patients required a craniotomy for intracranial extension. Median operative time was 5 hours (interquartile range 1.9 hours) and 8 patients (88%) had a total resection. **Conclusions:** Nasal gliomas and encephaloceles are very rare lesions that require multidisciplinary evaluation and management. There has been shift to magnetic resonance imaging (MRI) alone for the evaluation of these lesions when there is no intracranial extension. In addition, endoscopic extracranial resection is feasible for most intranasal and mixed gliomas without an increase in operative time, residual disease, or complications.

122. A Comparison of Pediatric Tracheostomies Performed for Anatomic and Respiratory Pathologies

Christopher H. Azbell, MD, Louisville, KY; Samantha B. Allen, BS, Louisville, KY; Elizabeth D. Cash, PhD, Louisville, KY; Swapna K. Chandran, MD, Louisville, KY

Educational Objective: At the conclusion of this presentation, the participants should be able to identify the most common indications, comorbidities, and complications of tracheostomy placement in the pediatric population and identify factors which may lead to increased morbidity and mortality postoperatively.

Objectives: The goals were to identify indications for tracheostomies in pediatric patients, describe complications, comorbidities, and dispositions of patients after receiving tracheostomies, and identify factors that predict clinical outcomes of patients with tracheostomies. **Study Design:** Retrospective chart review. **Methods:** Children under 18 (N=137) who underwent primary tracheostomy (CPT codes 31600, 31601) within a 6 year period at our institution were included. Data points were extracted from inpatient and outpatient charts. Chi-square, Spearman correlations, and Cox regression survival analyses were used to test hypotheses. **Results:** Of the patients reviewed, 32.8% were performed for anatomic pathology of the upper airway, such as laryngomalacia, subglottic stenosis, and craniofacial deformities. The remaining 67.2% were performed for respiratory pathologies, including chronic lung disease and bronchopulmonary dysplasia. The most common comorbidities were neurological (61.8%) and cardiac (53.3%). The number of comorbidities was associated with younger age at tracheostomy and longer hospital stay. Decannulation rate was similar for the anatomic (62.9%) and respiratory (63.8%) groups (n.s.). The overall mortality rate was 14.8%. **Conclusions:** Pediatric patients who have tracheostomies performed for anatomic and respiratory pathologies have similar outcomes in hospital stays, decannulation rate and mortality. Both groups had similar numbers of comorbidities. Children with more comorbidities had tracheostomies performed at an earlier age, possibly because of earlier consultation for a tracheostomy. Unsurprisingly, these children had longer length of hospital stays and were more likely to require long term acute care or rehabilitation after discharge.

123. Pediatric Sublingual Hematoma from a Mandibular Fracture: Airway Management and Treatment Considerations

Fred M. Baik, MD, Seattle, WA; Andrew F. Inglis, MD, Seattle, WA; Greg E. Davis, MD MPH, Seattle, WA

Educational Objective: At the conclusion of this presentation, the participants should be able to appropriately manage airway distress in sublingual hematomas, and consider conservative versus surgical treatment in stable airways.

Objectives: Assess proper airway management and treatment of pediatric sublingual hematomas. **Study Design:** Case report. **Methods:** Case review and literature search. **Results:** A 2 year old boy sustained a two story fall; subsequent imaging demonstrated a mandibular fracture. On examination, he had no increased work of breathing, but was struggling with his secretions. A large sublingual hematoma was evident, and the tongue was elevated nearly to the hard palate. The patient was admitted to the pediatric ICU for airway monitoring and received dexamethasone. Serial examinations demonstrated diminishment of the hematoma. The patient was orally intubated and underwent extraction of loose teeth and assessment of his mandible. The hematoma was not drained due to its reduced

size, and the patient was later discharged home. Pediatric sublingual hematoma is rare entity, described in case reports as a complication of hemophilia or as a sign of child abuse. We present the first report of a pediatric sublingual hematoma due to a mandibular fracture. Management of sublingual hematomas requires assessment of the airway. In cases of respiratory distress, establishment of a surgical airway is preferred. Fiberoptic nasal intubation or laryngeal mask anesthesia intubation are also options in non-emergent respiratory distress. The decision to drain hematomas remains controversial. While drainage appears necessary for hematomas resulting from operative procedures, several authors argue against drainage due infectious risk and/or eventual resolution of the hematoma. **Conclusions:** Adequate airway evaluation, preparation and monitoring are paramount in the management of pediatric sublingual hematomas. Conservative treatment can be a viable option for those with stable airways.

124. Effects of a Novel Antimicrobial Agent on the Viability and Sustainability of Bacterial Biofilms on Tympanostomy Tubes

Debdeep Banerjee, AB, Lubbock, TX; Phat L. Tran, PhD, Lubbock, TX; James C. Wang, PhD, Lubbock, TX; Matthew Myntti, PhD, Jacksonville, FL; Joehassin Cordero, MD, Lubbock, TX; Abdul N. Hamood, PhD, Lubbock, TX

Educational Objective: At the conclusion of this presentation, the participants should be able to demonstrate the results of the utilization of novel Next Science antimicrobial agent on both the inhibition and elimination of bacterial biofilms on tympanostomy tubes.

Objectives: To evaluate a novel antimicrobial agent in preventing bacterial biofilms on tympanostomy tubes (TTs). **Study Design:** Bacterial pathogens form a protective structure termed biofilm, which shelters them from the effect of antibiotics and host immunity. Pseudomonas aeruginosa (Pa) and staphylococcus aureus (Sa) contribute to middle ear infections and form biofilms on TTs in children. Due to the resistance of Pa and Sa to numerous antibiotics, identifying alternative therapies is essential. Next Science R (NS) has the potential to destroy the biofilm and kill the bacteria within the biofilm. We assessed the effectiveness of NS in inhibiting biofilm formation and eliminating established biofilms by Pa and Sa. **Methods:** In the biofilm inhibition model, we inoculated the bacteria together with the NS on TTs. After 24 and 48 hours of incubation, the biofilms were quantified using the colony forming unit assay and visualized by confocal laser scanning microscopy. The biofilm elimination model was similar to the inhibition model except that we added NS 8 hours after the TTs were inoculated with the bacteria. **Results:** 1) At 325 and 20 ug/mL, NS inhibited the planktonic growth of Pa and Sa, respectively; 2) both Pa and Sa formed mature biofilms on the outer and inner surfaces of the TTs in the absence but not the presence of NS; 3) NS eliminated Pa partial biofilm on both surfaces of the TTs; 4) analysis of Sa biofilm elimination by NS is underway. **Conclusions:** NS is a potential agent to treat middle ear infection and inhibit biofilm development on TTs in pediatric patients.

125. Oral Cavity Foreign Body Masquerading as a Hard Palate Lesion in an Infant

Jay M. Bhatt, MD, Irvine, CA; Kevin C. Huoh, MD, Irvine, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to develop a differential diagnosis of hard palate lesions in infants and children.

Objectives: To perform a systematic review of benign and malignant hard palate lesions in children. In addition, participants will also recognize the subtle presentation of sticker foreign body ingestion, which can prompt a persistent inflammatory response in the surrounding tissue. **Study Design:** Case report and review of literature. **Methods:** PubMed query of English literature to collect publications, including case reports and review articles, published over the last 25 years, pertaining to hard palate lesions in the <18 year old population. **Results:** We report an unusual case of a sticker foreign body lodged in the hard palate of a 12 month old, masquerading as a hard palate mass lesion. Our review revealed that there is a paucity of literally describing palatal masses in the pediatric population. Case reports indicate that lesions include Epstein ‘s pearls and Bohn ‘s nodules in newborns, palatal abscess, mucoceles, tori palatine, and less commonly, salivary gland tumors, congenital hairy polyps, rhabdomyosarcoma and other sarcomas, teratoma, and reactive conditions such as necrotizing sialometaplasia. **Conclusions:** To our knowledge, this is the first report of a sticker stuck to the hard palate, inciting a foreign body response that resembles a palate lesion. Review of literature also indicates that hard palate masses are rare in the pediatric population, which should thus prompt a thorough workup and management.

126. Isolated Congenital Maxillomandibular Synechiae

Eric W. Cerrati, MD, New York, NY; Omar H. Ahmed, MD, New York, NY; Scott M. Rickert, MD, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to identify the presentation of maxillomandibular syngnathia, understand the involved workup and be able to discuss treatment options.

Objectives: Congenital maxillomandibular syngnathia, or fusion of the jaws, is a rare condition that has a broad spectrum of presentations. The restricted mouth opening can lead to issues with feeding, swallowing, and respiration resulting in failure to thrive and temporomandibular joint ankylosis. Early recognition and treatment is necessary for proper growth and development. **Study Design:** Case report with review of the literature. **Methods:** We report a 1 day old male with isolated bilateral soft tissue alveolar fibrous bands. He presented with difficulty feeding secondary to trismus. No bony or muscular involvement in the synechiae was noted and the remainder of the physical exam was unremarkable. **Results:** The bilateral alveolar synechiae were divided under local anesthesia using surgical scissors. The patient immediately showed improvement in mouth opening and had resolution of his feeding problems. He is now

gaining weight and developing appropriately. **Conclusions:** The accompanying review of the literature demonstrates only 11 cases worldwide of isolated maxillomandibular fusion. Depending upon the composition of the synechiae, simple surgical division under local anesthesia can be curative.

127. Respiratory Distress Caused by Bilateral Nasolacrimal Duct Mucoceles in a Neonate

Scott A. Hardison, MD, Richmond, VA; Christopher T. Leffler, MD, Richmond, VA; Kelley M. Dodson, MD, Richmond, VA

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) present a case of nasal obstruction and respiratory distress secondary to bilateral nasolacrimal duct mucoceles; and 2) discuss diagnostic and treatment modalities for bilateral nasolacrimal duct mucoceles in the neonatal period.

Objectives: 1) Present a case of nasal obstruction and respiratory distress secondary to bilateral nasolacrimal duct mucoceles; and 2) discuss diagnostic and treatment modalities for bilateral nasolacrimal duct mucoceles in the neonatal period. **Study Design:** Case report and literature review. **Methods:** A two day old female born at 38 weeks gestation who developed respiratory distress soon after birth, more pronounced with sleeping and feeding. After choanal atresia was ruled out by insertion of a nasogastric tube, fiberoptic nasal endoscopy revealed pale cystic lesions emanating from the inferior meatus bilaterally. The airway was secured with nasopharyngeal airway adjuncts. A computed tomography (CT) scan revealed bilateral cystic lesions extending from the medial canthi through the nasolacrimal duct and down into the inferior meatus bilaterally, consistent with nasolacrimal duct mucoceles. The patient was taken to the operating room on the fourth day of life for endoscopic marsupialization of the cysts and probing of the nasolacrimal ducts. **Results:** The patient's respiratory distress resolved immediately with surgery. She was discharged home after three days. At her two week followup visit, her parents reported that her respiratory symptoms had not returned. Review of literature reveals only a small number of such cases. **Conclusions:** Bilateral nasolacrimal duct mucoceles are a rare cause of respiratory distress in neonates, but should be considered as part of an otolaryngologist's differential diagnosis. Early surgical intervention with marsupialization of the cysts is favored.

128. Incidence of Visualization of the Glossopharyngeal Nerve after Pediatric Tonsillectomy

Courtney A. Hill, MD, Lebanon, NH; Vikrum A. Thimmappa, MD, Memphis, TN; Mark C. Smith, MD, Lebanon, NH; Eunice Y. Chen, MD PhD, Lebanon, NH

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the anatomy of the pediatric glossopharyngeal nerve relative to the tonsillar capsule and the possible implications regarding tonsillectomy and dysgeusia.

Objectives: To determine the incidence of exposure of the lingual branch of the glossopharyngeal nerve during tonsillectomy. **Study Design:** Retrospective review of surgical findings in children who underwent total tonsillectomy at a tertiary medical center. **Methods:** Medical records of children who underwent tonsillectomy between November 2013 and May 2014 were reviewed for age, sex, surgical indication, tonsil size, congenital abnormalities, operative time and surgical findings indicating the presence or absence of the glossopharyngeal nerve in the tonsillar fossa. Statistical analysis was performed with t-test and Fisher's exact test. **Results:** Of 138 patients, the glossopharyngeal nerve was observed in 28 patients (20.3%) with 9 patients having bilateral nerve exposure. Of 276 tonsillar fossae examined, the lingual branch of the glossopharyngeal nerve was identified in 37 (13.4%), with 24 (8.7%) on the left and 13 (4.7%) on the right. Comparing children with and without exposed nerves, there was no difference in mean age (6.89 vs 7.08 [p=0.84]), proportion of males (14/28 vs 54/110 [p=1]), or proportion of 3-4+ tonsils (20/28 vs 73/110 [p=0.66]). Average operative time was similar with 27.6 minutes in both groups (p= 0.99). **Conclusions:** In approximately 20% of children undergoing tonsillectomy, the lateral pharyngeal musculature incompletely protected the lingual branch of the glossopharyngeal nerve from the tonsil capsule. This anatomical variant presented greater risk of nerve injury during total tonsillectomy and could be a mechanism for postoperative dysgeusia. These findings inspire future prospective studies of taste after tonsillectomy and whether tonsillotomy might carry less risk.

129. Otolaryngology Complications in Pediatric Small Bowel Transplant Patients: A 23 Year Experience

Matthew S. Johnson, MD, Omaha, NE; John F. Guynan, MD, Omaha, NE; Wendy J. Grant, MD, Omaha, NE; Jiantao Luo, PhD, Omaha, NE; Dwight T. Jones, MD, Omaha, NE

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the common otolaryngologic complications in small bowel and multi-visceral transplant recipients. Participants will also understand the relationships between these complications and otolaryngologic operations and patient survival.

Objectives: To evaluate the otolaryngology complications of pediatric small bowel organ transplant patients at a high volume transplant center. **Study Design:** Retrospective chart review. **Methods:** A retrospective chart review was performed on 288 patients age 18 and under who received a small bowel transplant either alone or as part of a multi-visceral transplantation from 1990-2013. All post-transplantation otolaryngology diagnoses, complications and operations were recorded. The number of intubations, cumulative intubation length, and survival rates were also recorded. **Results:** Three hundred and twenty-two transplants were performed in 288 patients with 285 first time transplantations. The cohort was 54.3% male and 59.0% white from 39 states and 3 countries. Age at first transplant ranged 15 weeks to 18 years (mean 3 years). Overall mortality was 41.3%. Nearly 65% of patients required intubation beyond the first

postoperative day with cumulative intubation lengths ranging 1-251 days (mean 36.8). Thirty-seven patients (13.3%) required tracheostomy. Otolaryngologic diseases included adenotonsillar hypertrophy (22.3%), sinusitis (21.0%), otitis media (14.7%), adenotonsillar post-transplantation lymphoproliferative disorder (5.4%), epistaxis (4.7%) and tracheal stenosis (2.5%). Ten intubated patients (5.5%) developed subglottic stenosis. Operations included tonsillectomy (22.3%), laryngoscopy and bronchoscopy (13.3%), tracheostomy (13.3%), myringotomy and tube placement (11.9%), adenoidectomy (2.2%), and endoscopic sinus surgery (2.2%). Length of intubation was associated with tracheostomy placement ($p < 0.0001$) and airway complications (p 0.036) including subglottic stenosis ($p = 0.0032$). Subglottic stenosis was associated with decreased survival ($p = 0.039$). **Conclusions:** Pediatric small bowel transplant recipients frequently encounter otolaryngologic complications. Long term intubation was associated with increased likelihood of subglottic stenosis and subsequent decrease in survival.

130. A Report of Congenital High Airway Obstruction Syndrome with Complete Laryngeal Atresia Requiring a Multistage Approach

Andrew Larson, BS, San Francisco, CA; Molly Elmer-Dewitt, BA, San Francisco, CA; Matthew L. Tamplen, MD, San Francisco, CA; Anna Meyer, MD, San Francisco, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the intraoperative findings and the surgical technique used to repair a case of grade IV laryngeal atresia with a solid cricoid cartilage and single arytenoid cartilage.

Objectives: Describe the clinical decision making and surgical findings and techniques used to treat a case of grade IV congenital laryngeal atresia. **Study Design:** Case report. **Methods:** Medical records were reviewed for a 4 year old patient with CHAOS syndrome who was born successfully at 35 5/7 weeks via ex utero intrapartum treatment (EXIT) procedure and immediate tracheotomy. **Results:** Initial direct laryngoscopy demonstrated fusion of the arytenoid cartilages and true vocal cords in the midline with an inability to pass a telescope through the larynx. At 3 years of age the patient underwent direct laryngoscopy with EMG confirmation of true vocal cord innervation followed by division of the fused arytenoid cartilages and lateralization with an inset mucosal advancement flap. One year later the patient underwent a combined endoscopic and open approach for laryngeal reconstruction. Midline fused vocal cord tissue was divided endoscopically down to a solid cricoid cartilage. Needle localization from an open neck incision allowed the direct visualization of midline positioning. The solid cricoid cartilage was divided down to an intact posterior capsule and anterior and posterior costal cartilage grafts were placed to construct a neo laryngeal lumen. A 6 mm Aboulker stent was sutured in place to maintain patency. **Conclusions:** CHAOS is a rare condition that, until the advent of the EXIT procedure, had been universally fatal. We report of rare form associated with grade IV laryngeal atresia with a solid cricoid cartilage and a multistage combined endoscopic and open technique for laryngeal reconstruction.

131. Congenital Giant Cervicofacial Teratoma: A Case Report from Diagnosis in Utero to Surgical Excision

Heather E. Lee, MD, Louisville, KY; Matthew B. Hirsch, MD, New York, NY; Swapna Chandran, MD, Louisville, KY; Jeffrey Bumpous, MD, Louisville, KY

Educational Objective: At the conclusion of this presentation, the participants should be able to identify appropriate means to diagnose cervicofacial masses, formulate delivery and airway planning strategies, and develop plans for definitive surgical resection.

Objectives: We report a case of a healthy 31 year old G1P0 pregnant woman undergoing routine maternal ultrasound who was found to be carrying a fetus with a right cervicofacial mass. We discuss in utero diagnosis and subsequent multidisciplinary management of delivery and airway planning which involved extrauterine intrapartum treatment, or EXIT procedure. Strategy for definitive treatment by surgical excision and followup is also presented. **Study Design:** Observational case report. **Methods:** Observational case report. **Results:** EXIT procedure was performed with the airway secured after direct laryngoscopy. Tracheostomy was then performed with delayed surgical resection of the right neck mass that extended from the area of foramen ovale to the C4 level, occupying the masticator space, oral cavity, oropharynx, floor of mouth, right maxillary sinus and nasal cavity. A right mandibular swing with parapharyngeal and infratemporal fossa and parotidectomy approach was used for removal of this extensive cervicofacial mass. Pathology returned as mature teratoma. **Conclusions:** Fetal giant cervicofacial masses are typically diagnosed with fetal ultrasound and MRI. MRI can give valuable information about the characteristics of a mass and its effect on the airway. If there is clinical or radiologic suspicion of airway compression, an EXIT procedure should be performed in order to secure the newborn's airway while still on maternal support. Surgical excision of these extensive masses can be performed, and may require multidisciplinary approach to postoperative rehabilitation for appropriate craniofacial development and speech and swallowing therapy.

132. Pediatric Balloon Catheter Sinuplasty: Initial Experience in a Pediatric Otolaryngology Group Practice

Laura I. Peck, BA, Ft. Lauderdale-Davie, FL; David L. Mandell, MD, Boynton Beach, FL; Zorik Spektor, MD, Boynton Beach, FL; David J. Kay, MD, Boynton Beach, FL; Alfredo Archilla, MD, Boynton Beach, FL

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the use of balloon catheter sinuplasty as a technique in the armamentarium of surgical options for pediatric recurrent acute and chronic sinusitis, regarding its safety profile, its potential benefits, and its shortcomings.

Objectives: To describe the initial results of pediatric balloon catheter sinuplasty (BCS) as a diagnostic and therapeutic tool in pediatric recurrent acute and chronic rhinosinusitis. **Study Design:** Retrospective medical record review from a private practice consisting of three fellowship trained pediatric otolaryngologists. **Methods:** Consecutive pediatric patients with either recurrent acute or chronic rhinosinusitis underwent maxillary sinus BCS. Demographic, surgical, and followup data were collected. **Results:** Maxillary sinus BCS was performed 136 times in 134 pediatric patients (two patients underwent the procedure twice). Adenoidectomy was also performed in all subjects either prior to (n=11) or concurrently with (n=125) sinuplasty. Mean age at time of sinuplasty was 5.8 years. All but 5 procedures were bilateral. Positive cultures were obtained in 47% of cases. There were no intraoperative complications, and 2 minor postoperative complications (rash, epistaxis). Followup was obtained in 100 patients (mean followup duration was 5.8 months). Clinical resolution of sinusitis was obtained in 78% of subjects (95% CI: 70%-86%). Another 10% of subjects had only one documented episode of acute sinusitis during followup, and 12% had no improvement (95% CI: 5.6%-18.4%). **Conclusions:** Pediatric maxillary sinus BCS was found to be a safe procedure. BCS provided a diagnostic sinus culture which helped with management of almost half of the patients. The outcomes with relatively short followup periods have been favorable thus far, although the true therapeutic benefit of the procedure is difficult to isolate due to the ubiquity of adenoidectomy as a concurrent treatment option in this setting.

133. Pediatric Inflammatory Myofibroblastic Tumor of the Maxilla

Kevin A. Peng, MD, Los Angeles, CA; Edward C. Kuan, MD, Los Angeles, CA; Frederick Yoo, MD, Los Angeles, CA; Sunita M. Bhuta, MD, Los Angeles, CA; Alisha N. West, MD, Los Angeles, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the basic clinical presentation of an inflammatory myofibroblastic tumor and to understand that treatment is primarily surgical.

Objectives: To report a case of inflammatory myofibroblastic tumor (IMT) of the maxilla occurring in a child and to summarize literature recommendations for management. **Study Design:** Retrospective case report. **Methods:** The medical records of a pediatric patient diagnosed with IMT of the oral cavity were reviewed. **Results:** A five year old male presented to the head and neck Surgery clinic with an ulcerated mass involving the entire left superior alveolar ridge. Imaging revealed an expansile lesion involving the left hard palate and alveolar ridge with extension into the maxillary sinus. En bloc resection was accomplished by performing an infrastructure maxillectomy, and primary closure was achieved using a contralateral palatal flap. Final pathological diagnosis was consistent with inflammatory myofibroblastic tumor (IMT). Postoperative imaging showed no evidence of residual or recurrent disease. **Conclusions:** IMT is a benign spindle cell proliferation with an inflammatory infiltrate that may mimic sarcoma. While IMT was previously classified as a subtype of inflammatory pseudotumor, it is now recognized as a distinct entity. The upper aerodigestive and gastrointestinal tracts are affected less commonly than the lungs. To our knowledge, this is the first report of IMT presenting in the oral cavity in a pediatric patient. The mainstay of treatment is complete surgical excision. In the pediatric population, it is particularly important to limit morbidity and to preserve function; therefore, primary reconstruction, as performed in the current presentation, is ideal. Otolaryngologists must remain cognizant of this entity, and complete resection remains the primary therapeutic modality.

134. Ethnic Disparities in Post-Tonsillectomy Bleeding

Sharon D. Ramos, MD, Galveston, TX; Nikunj A. Rana, MD, Galveston, TX (Presenter); Gwen M. Baillargeon, MS, Galveston, TX; Shradda S. Mukerji, MD, Galveston, TX

Educational Objective: At the conclusion of this presentation, the participants should be able to recognize and discuss risk factors that affect post-tonsillectomy bleeding including: ethnicity, sex, and age.

Objectives: To determine a rate difference of postoperative bleeding between white and non-white children undergoing adenotonsillectomy (T&A). The results may provide parents with more information regarding the possibility of postoperative bleeding based on patient's ethnicity. **Study Design:** A retrospective chart review of patients between the ages of 2-18 years undergoing T&A was performed at a single tertiary care center between March 2009 and September 2013. **Methods:** A total of 1054 patients who underwent tonsillectomy (T), T&A, or T&A and myringotomy with tube insertion were selected. Known coagulopathic patients were excluded. Cohorts were either whites or non-whites. Amongst the non-white cohort information was collected for Hispanic, African American and Asian American ethnicities. Indications and techniques of surgery were also noted. **Results:** As a cohort, white children did not bleed more compared to non-whites (chi-square p=0.2500). Amongst the non-white cohort, when each ethnic group was compared separately to white children, only Asian children bled more (OR=6.54, 95% C.I 1.55-27.69, p=0.0166). Age (> 6 years) and sex (males>females) was associated with a higher rate of bleeding; (OR=2.109, 95% C.I. 1.17-3.81, p=0.0133) and (OR=1.997, 95% C.I. 1.12-3.56, p=0.0187) respectively. Surgical technique (p=0.3091) or indication of surgery (p=0.2911) did not significantly impact bleed rates. **Conclusions:** Asian children, males, and children older than 6 years are more likely to bleed after T&A surgery. The results of our study may help guide parental expectations after T&A surgery especially in children of Asian descent and possibly warrant preoperative lab work given their higher incidence of factor XII deficiency.

135. Cochlear Abnormalities Associated with Dursun Syndrome

Dylan F. Roden, MD MPH, New York, NY; Eric W. Cerrti, MD, New York, NY; John T. Roland, MD, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to understand that there can be cochlear abnormalities associated with Dursun syndrome and G6PC3 deficiency.

Objectives: G6PC3 deficiency causes severe congenital neutropenia type 4 and is associated with a wide phenotypic spectrum. Dursun syndrome represents a subset of these patients who have the triad of leukopenia, atrial septal defect, and primary pulmonary hypertension. To date approximately 57 patients with G6PC3 deficiency have been reported and only 3 with Dursun syndrome. **Study Design:** Case report. **Methods:** We report a 3 year old male with Dursun syndrome who failed his newborn hearing screening test and was found to have bilateral profound sensorineural hearing loss (SNHL). MRI and CT imaging demonstrated bilateral cochlear malformations consistent with incomplete partition type 1. **Results:** This patient underwent successful placement of bilateral cochlear implants and is progressing well in his development. **Conclusions:** To our knowledge, this is the first report of cochlear abnormalities associated with G6PC3 deficiency and Dursun syndrome. If eligible, cochlear implantation is a viable option for this subset of patients.

136. Palate Tongue Fusion in Neonate with Pierre Robin Sequence and Cleft Palate

Tara L. Rosenberg, MD, Little Rock, AR; James D. Phillips, MD, Little Rock, AR; Lisa M. Buckmiller, MD, San Antonio, TX; Larry D. Hartzell, MD, Little Rock, AR

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss neonatal palate tongue fusion and how this may be managed in a patient with Pierre Robin sequence.

Objectives: 1) To review an interesting case of palate tongue fusion in a neonate with Pierre Robin sequence and cleft palate and how this patient was managed; and 2) to discuss palatogenesis and how this may lead palate tongue fusion. **Study Design:** Case report and literature review. **Methods:** A full term newborn male presented to the neonatal intensive care unit for evaluation of palate tongue fusion as well as an inter-alveolar adhesion and cleft palate was reviewed. On exam, he demonstrated nearly circumferential fusion between the ventral tongue and cleft palate edges, as well as a thin adhesion between the maxillary and mandibular alveolar ridges on the left side, which resulted in the absence of an oropharyngeal airway. Moderate micrognathia was also present. A comprehensive literature review of similar cases was performed and compared to the current patient. **Results:** The patient underwent successful surgical lysis of the adhesions at 2 days of age to establish an oropharyngeal airway and allow for feeding efforts to commence. He subsequently demonstrated glossoptosis related to his micrognathia and intermittent, positional airway obstruction, thus diagnosing Pierre Robin sequence. He later required mandibular distraction osteogenesis to assist with alleviation of his obstructive symptoms as well as feeding difficulties related to the obstruction. **Conclusions:** Palate tongue fusion is a rare phenomenon. Surgical intervention is indicated for lysis of the adhesions to establish airway patency and allow for oral feeding. In patients with Pierre Robin sequence, these adhesions seem to function as natural tongue adhesions, which help to prevent glossoptosis and associated oropharyngeal obstruction. When lysed, glossoptosis and airway obstruction may develop, thus requiring further intervention.

137. Avoiding Surgical Pitfalls during Resection of a "Hybrid" First and Second Branchial Cleft Cyst

George A. Scangas, MD, Boston, MA; Matthew R. Naunheim, MD, Boston, MA; Angela Castellanos, BA, Boston, MA; Nikhila Raol, MD, Boston, MA; Michael S. Cohen, MD, Boston, MA

Educational Objective: At the conclusion of this presentation, participants will understand the presentation, radiologic features, and surgical pitfalls of a hybrid first and second branchial cleft cyst (BCC).

Objectives: BCCs are a consequence of abnormal development of the branchial apparatus. We describe an anomaly with anatomic and pathologic features of both a first and second BCC and present the salient features of the evaluation, diagnosis, and management. **Study Design:** Retrospective case review. **Methods:** Retrospective case review. **Results:** A fourteen year old female presented with a draining pit inferior to the angle of the left mandible. MRI with contrast revealed a tract from the skin inferolateral to the left parotid gland extending across the parapharyngeal space to the left tonsil. Intraoperatively, the main trunk of the facial nerve was encountered looping around the inferior aspect of the tract from posterior to anterior. The tract was excised with preservation of the facial nerve. Pathology revealed features of both first (fistula lined by dermal tissue) and second (cyst lined by squamous and respiratory epithelium with associated lymphoid tissue) BCCs. The patient remains free of recurrence with normal facial nerve function. **Conclusions:** By understanding the ontogeny of the branchial apparatus, surgeons can anticipate intraoperative anatomic relationships. While type II first BCCs often course in close proximity to the facial nerve, second BCCs classically course near the ninth and eleventh cranial nerves. This case illustrates a novel branchial cleft anomaly and highlights the importance of awareness of the facial nerve during resection of second BCCs in close proximity to the parotid gland.

138. Office Based Long Range Optical Coherence Tomography of the Pediatric Airway: First Report of Objective Analysis of Upper Airway Obstruction Using Computational Fluid Dynamics

Giriraj K. Sharma, MD MS, Irvine, CA; Gurpreet S. Ahuja, MD, Irvine, CA; Frances Lazarow, MD, Irvine, CA; Erica Su, BS, Irvine, CA; Zhongping Chen, PhD, Irvine, CA; Brian J. Wong, MD PhD, Irvine, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to explain and discuss a novel, noninvasive and efficient means of obtaining office based topographical imaging of the pediatric upper airway using optical coherence tomography (OCT). This technology can be used to obtain objective data on the location and degree of upper airway obstruction in patients with symptoms of obstructive sleep apnea. We believe OCT may ultimately provide otolaryngologists with an adjunct diagnostic tool to evaluate OSA patients, formulate individualized treatment plans and guide surgical therapy.

Objectives: Management of patients with symptoms of obstructive sleep apnea (OSA) is often based upon clinical judgment without data to objectively identify regions of airway obstruction. Long range optical coherence tomography (LR-OCT) is a minimally invasive, high resolution diagnostic modality that acquires three dimensional (3-D) cross sectional images of tissue. This is the first report of office based LR-OCT for topographical mapping of the pediatric upper airway. LROCT based 3-D airway models were rendered for computational fluid dynamics (CFD) analysis to objectively identify regions of airway stenosis. **Study Design:** Nonrandomized controlled clinical trial. **Methods:** A LR-OCT system and flexible scanning endoscopic probes were constructed. Office-based LR-OCT was performed in tandem with flexible nasopharyngoscopy in children with symptoms of upper airway obstruction. LR-OCT data was rendered into virtual 3-D airway models (3D slicer). CFD analysis (lattice Boltzmann method) was conducted to determine velocity magnitudes for flow fields at multiple anatomic levels of the airway. **Results:** LR-OCT was conducted in 33 patients (ages 5-17 years). Twenty (61%) cases with adequate signal to noise ratio permitted volumetric airway rendering. Five airway models (mean patient weight 27.2 kg, mean flow rate 10.68 L/min) underwent preliminary CFD analysis to yield mean space averaged velocity magnitudes: adenoids (2.52 m/sec), tonsils (3.19 m/sec), epiglottis (3.78 m/sec). **Conclusions:** This is the first report of LR-OCT of the upper airway in awake pediatric patients. CFD data may be correlated with clinical findings and polysomnography for an additional, quantitative criteria to localize and grade airflow obstruction. This may ultimately help guide interventions such as adenotonsillectomy, palatoplasty and orthognathic procedures, and improve individualized management of OSA.

139. An Unusual IV Cap Complication: Iatrogenic Esophageal Foreign Body

Kareem O. Tawfik, MD, Cincinnati, OH; Charles M. Myer IV, MD, Cincinnati, OH; Tasneem A. Shikary, MD, Cincinnati, OH; Kenneth R. Goldschneider, MD FAAP, Cincinnati, OH

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the potential of IV caps to become esophageal foreign bodies in pediatric patients and to weigh this risk against the perceived benefits of these devices.

Objectives: Intravenous line disinfection caps (IV caps) are increasingly used to prevent line associated bloodstream infections. These objects, typically small and brightly colored, have the potential to become pediatric airway and esophageal foreign bodies. The objective of this case report is to describe two patients with esophageal foreign bodies following ingestion of IV caps and to increase awareness of this potential iatrogenic problem. **Study Design:** Case series. **Methods:** We report the cases of 2 patients who presented with IV caps as esophageal foreign bodies during hospital admission for unrelated reasons. **Results:** A 13 year old, developmentally delayed female was admitted after an operative procedure. Soon after being witnessed chewing on an object, she developed drooling, dietary refusal, and recurrent emesis. Flexible laryngoscopy showed a possible IV cap at the cricopharyngeus. Esophagoscopy was performed and the IV cap was found in the distal esophagus with an associated partial thickness laceration. The cap was safely removed and the patient recovered uneventfully. A 3 year old child was witnessed to ingest an IV cap during emergence from general anesthesia, when the cap was inadvertently dropped into the patient's oropharynx by medical personnel. As a result, the patient was admitted for overnight observation. During admission, the patient had emesis, which ejected the IV cap. **Conclusions:** IV caps, which are often small and brightly colored, may present as airway and esophageal foreign bodies. Given their potential for being aspirated, IV caps for peripheral lines may not be appropriate in pediatric institutions.

Rhinology/Allergy

140. Preoperative Planning and Tri-portal Neuroendoscopic Approach for Resection of Juvenile Nasopharyngeal Angiofibroma of the Lateral Cavernous Sinus, Infratemporal Fossa, and Middle Cranial Fossa

Angelique Marie Berens, MD, Seattle, WA; Kris S. Moe, MD FACS, Seattle, WA; Randall A. Bly, MD, Seattle, WA; Manuel J. Ferreira, MD PhD, Seattle, WA

Educational Objective: At the conclusion of this presentation, the participants should be able to demonstrate how virtual endoscopy and 3D CT imaging help plan optimal surgical pathways for removal of skull base tumors.

Objectives: To describe a technique of preoperative, computer aided surgical planning and to illustrate the use of such planning during neuroendoscopic removal of two JNA tumors involving the lateral cavernous sinus, infratemporal and middle cranial fossae. **Study Design:** Retrospective case series with computer modeling and analysis. **Methods:** Two adolescent males presented with JNA that extended into the lateral cavernous sinus, infratemporal and middle cranial fossae. Computer modeling, including virtual endoscopy, was performed to determine optimal surgical approach based on individual anatomy and tumor location. After preoperative embolization, ipsilateral transmaxillary and nasal portals were used to remove the tumor. Intraoperative navigation and CT scans were used as needed. **Results:** The results from the computer analysis showed that a multiportal endoscopic approach of transnasal and transmaxillary portals would permit adequate visualization, instrument access and working space. Both patients underwent complete resection of the JNA involving the lateral cavernous sinus, infratemporal and middle cranial fossae. Bimanual resection of the intracranial component was performed through the ipsilateral maxillary and nasal portal with endoscopy through the contralateral nasal portal. Open craniotomy was not needed. There were no intraoperative or postoperative complications. **Conclusions:** A multiportal approach for complex lesions of the lateral cavernous sinus, infratemporal and middle cranial fossae is technically feasible and efficacious, and, in our experience, avoids the need for open craniotomy. Preoperative computer analysis and virtual endoscopy can greatly assist the surgeon in surgical planning and can help determine which combination of approaches will permit endoscopic resection of skull base tumors.

141. Socioeconomic Determinants of Night and Weekend Emergency Department Use for Uncomplicated Acute Rhinosinusitis

Regan W. Bergmark, MD, Boston, MA; Stacey L. Ishman, MD MPH, Cinncinati, OH; Michael J. Cunningham, MD, Boston, MA; Ahmad R. Sedaghat, MD PhD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the association of specific types of insurance status with afterhours presentation to the emergency room for uncomplicated acute rhinosinusitis.

Objectives: Prior work has shown Medicaid and self-pay insurance status is associated with emergency department, rather than an outpatient clinic, presentation for uncomplicated acute rhinosinusitis (ARS). We investigate whether the disparate use of emergency department resources by patients with Medicaid and self-pay insurance statuses for this nonemergent condition can be attributed to presentation outside of standard business hours. **Study Design:** Cross-sectional survey of 990,849 patients from the 2009 and 2010 National Hospital Ambulatory Medical Care Survey presenting to emergency departments with uncomplicated ARS. Patients with ARS complications were excluded. **Methods:** Univariate and multivariate associations identified demographic and socioeconomic characteristics, including insurance status, of ARS patients independently associated with after hours (any day between 5 pm and 7 am) or weekend presentation. **Results:** After hours emergency department presentation was associated with either Medicaid or self-pay insurance status (odds ratio [OR]=1.88, P=0.018) in comparison to either private or Medicare insurance. However, weekend emergency department presentation was associated with patients living in zip codes with the highest national quartile of median income (OR=2.42, P=0.021) and with an education level above the lowest national quartile (OR=1.85, P=0.058). **Conclusions:** ARS patients with Medicaid or self-pay status, previously shown to preferentially use emergency departments for uncomplicated ARS, were more likely to present for emergency department care after hours compared to patients with private insurance or Medicare. In contrast, weekend presentation was associated with markers of higher socioeconomic status. Potential explanations for these findings include lack of access to non-emergency department after hours outpatient care, childcare needs or work inflexibility.

142. Unifying the Upper Airway: The Effect of Allergic Sensitization on Sinus Inflammation

Christopher D. Brook, MD, Boston, MA; Jacob E. Kuperstock, MD, Boston, MA; Matthew Ryan, MD, Dallas, TX; Michael Platt, MD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to better explain the role of atopic disease in chronic sinonasal inflammation.

Objectives: To determine the effect of allergen sensitization on paranasal sinus inflammation. **Study Design:** Case control analysis of patients undergoing both CT scan of the sinuses and allergy testing at a tertiary care hospital. **Methods:** Patients with chronic sinonasal symptoms were included if they had undergone both allergy testing and CT imaging of the paranasal sinuses. There were 482 patients who met inclusion criteria, of which 267 had positive specific allergen tests and 216 had negative testing. Mean Lund-Mackay scores were calculated for atopic versus non-atopic patients, and patients with seasonal allergies, perennial allergies or a combination of seasonal and perennial allergies. Patients were also identified as having had their CT scan taken during the season of their allergy or outside of their allergic season, and the mean Lund-Mackay scores were calculated and compared for each of these as well. **Results:** Mean Lund-Mackay scores did not differ between atopic patients and non-atopic patients (5.54 vs 4.86, p=0.19). Patients with perennial allergies had higher mean Lund-Mackay scores than patients with only seasonal allergies (5.91 vs 3.66, p=0.02). For patients with seasonal allergies, the timing of CT scan did not impact overall Lund-Mackay score. **Conclusions:** Patients with perennial allergies have increased sinus inflammation on CT scan compared to patients with seasonal allergies, suggesting that persistent allergen sensitization may impact on severity of sinusitis. The timing of CT scan in relation to allergy season for patients with intermittent allergic rhinitis does not seem to influence overall sinus inflammation.

143. Influx of Large Volume Sinonasal Irrigation Fluid into the Middle Ear

Rachel B. Cain, MD, Phoenix, AZ; David M. Barrs, MD, Phoenix, AZ; Devyani Lal, MD, Phoenix, AZ

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss whether sinonasal irrigation fluid can penetrate into the middle ear space during gentle, large volume intranasal irrigation in the head down position. Participants should also be able to consider possible implications of this.

Objectives: Large volume sinonasal irrigation is a commonly employed maintenance therapy for chronic rhinosinusitis. We have previously reported a case of infected cochlear implant due to suspected influx of sinonasal irrigation fluid into the middle ear space via the eustachian tube. This study investigates whether large volume sinonasal irrigation fluid can penetrate into the middle ear space via the eustachian tube. **Study Design:** Human cadaver study. **Methods:** Fourteen thawed fresh frozen cadaver heads underwent large volume sinonasal irrigation with a methylene blue stained solution. A 240 mL commercially available squeeze bottle was used for the sinonasal irrigations. The cadavers were placed in a head down position, and each nasal cavity was then flushed with a gentle digital pressure on the delivery bottle. Bilateral rigid otoscopy was performed before and after irrigation. Images were recorded. A myringotomy was then performed on each ear, and additional images were obtained of the middle ear space. Three blinded reviewers independently viewed the images to determine the presence or absence of methylene blue in the middle ear space following nasal irrigation. **Results:** One of 14 cadaver heads (1 of 28 ears) demonstrated methylene blue influx into the middle ear space following large volume, low pres-

sure sinonasal irrigation. There was 100% agreement between blinded reviewers. **Conclusions:** Large volume nasal irrigation fluid, even when delivered by low pressure methods according to manufacturer instructions, has the potential to penetrate into the middle ear via the eustachian tube. This must be a consideration when employing sinonasal irrigation, especially in high risk populations such as cochlear implant recipients.

144. Sinonasal and Ventral Skull Base Inflammatory Pseudotumor: A Systematic Review

Stuti V. Desai, BA, Newark, NJ; Eleonora F. Spinazzi, BA, Newark, NJ; Christina H. Fang, BS, Newark, NJ; Grace Huang, BS, Newark, NJ; Soly Baredes, MD FACS, Newark, NJ; Jean Anderson Eloy, MD FACS, Newark, NJ

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the presentation, radiographic and histologic findings, treatment and outcomes of patients with sinonasal and ventral skull base inflammatory pseudotumor.

Objectives: Inflammatory pseudotumor (IPT) of the ventral skull base is a benign idiopathic inflammatory process often misdiagnosed as an infection or neoplasm. This review analyzes all cases of skull base IPT to date and provides a framework for evaluation and management of this uncommon condition. **Study Design:** Systematic review of studies using the Medline/PubMed database. **Methods:** A search for articles related to IPT of the ventral skull base, along with bibliographies of those articles, was performed. Demographics, presentation, radiographic findings, treatment, followup, and outcome were analyzed. **Results:** Thirty articles were reviewed, including a total of 84 patients. The most common presenting symptom was vision change (60.7%). IPT was found in the cavernous sinus in 46.4% of cases. The mass appeared isointense (in 67.4% of cases) and homogeneously enhancing on T1 weighted magnetic resonance imaging (MRI), while hypointense on T2 weighted MRI in 92.7% of cases. IPT appeared hyperdense on computed tomography in 77.8% of cases. Histopathological analysis of biopsied specimens revealed fibrosis (79.7%) and presence of inflammatory cells (94.2%). Administration of corticosteroids alone was the most common treatment modality (57.1%), resulting in disease free patients in 47.8% of cases over a median followup period of 17.6 months. Surgical management alone was uncommon (7.1%), but showed high success rate (66.7%). **Conclusions:** This review is the most comprehensive analysis of ventral skull base IPT to date. Radiologic findings and histopathological analysis are essential for diagnosis. Corticosteroids alone is the most common treatment modality. Surgery, although uncommon, appears to be an efficacious treatment modality.

145. Malignant Solitary Fibrous Tumor of the Frontal Sinus: Case Report and Literature Review

Jonathan W. Fowlkes, MD, Iowa City, IA; Eugene H. Chang, MD, Iowa City, IA

Educational Objective: At the conclusion of this presentation, the participants should be able to recognize the presentation, radiographic findings and histology of malignant solitary fibrous tumors as well as understand treatment options and the disease course.

Objectives: At the conclusion of this presentation, participants should be able to discuss diagnosis and management of solitary fibrous tumors and malignant solitary fibrous tumors in the paranasal sinuses. **Study Design:** Case report. **Methods:** We report a case of malignant solitary fibrous tumor in the naso-orbital-ethmoid complex with intracranial extension in an 89 year old woman. Literature review was performed using the key words hemangiopericytoma, solitary fibrous tumor. **Results:** Only one prior case of malignant SFT in the sinonasal tract has been reported. Imaging demonstrated an expansile lesion in the right frontal sinus with erosion of the anterior table, posterior table and lamina papyracea. MRI findings of a T1 and T2 isointense lesion with avid contrast uptake were suggestive of a cellular lesion. Initial biopsy showed a low grade solitary fibrous tumor. We performed a near total resection through a gull wing approach, leaving a small cuff of tumor adherent to dura to mitigate the risk of postoperative cerebrospinal fluid leak. Pathology demonstrated an intermediate grade (FNCLCC 2/3) SFT with high mitotic index and loss of CD 34 in the cellular areas. At followup her diplopia and headache symptoms had resolved with no gross disease on MRI. She deferred recommended adjuvant treatment given her age and morbidity to local structures. **Conclusions:** Malignant SFT is a rare tumor and to our knowledge this is the second report in the paranasal sinuses.

146. Online Teaching Tool for Sinus Surgery: Trends towards Mobile and Global Education

Stacey T. Gray, MD, Boston, MA; Rosh K.V. Sethi, MD MPH, Boston, MA; Elliott D. Kozin, MD, Boston, MA; Ralph B. Metson, MD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss an online forum for sinus education, as well as explain new areas of growth for surgical education.

Objectives: There is a growing need for surgical education in sinus and skull base surgery beyond the operating room. Online resources may provide an ideal forum for expert presentation of surgical techniques. The purpose of this study was to investigate utilization patterns of a sinus surgery website to gain insight into the contemporary educational needs of surgical trainees. **Study Design:** Retrospective review of an online teach tool for sinus surgery. **Methods:** SinusVideos.com publishes educational surgical videos curated by expert sinus surgeons. The website's anonymized analytical database was queried from 2009 to 2013. Quantified data included user demographics, location, viewing device, page visits, and duration spent on the website. **Results:** A total of 371,484 website pages were viewed during the study period. Significant growth in viewership was observed with each successive year since the site was launched ($p<0.05$). Users were predominately male (54.15%) with an age range of 18 to 34 (60.0%). The average time spent on the website was

5.1 minutes. The percent of mobile devices used to view the site increased significantly between 2009 and 2013 (2.9% vs. 27.2%, respectively, p<.0.0001). The website's viewership expanded globally with a significant increase in site views from outside North America over this same time period (18.21% vs. 41.1%, p<0.0001). **Conclusions:** Demographics for the majority of viewers of this educational website for sinus surgery appear to match that for surgical trainees. The observed increase in global participation and mobile device usage may reflect new areas of growth for surgical education.

147. Revision Orbital Decompression Surgery for Thyroid Eye Disease

Nicholas J. Potter, MBBS, Iowa City, IA; Scott M. Graham, MD, Iowa City, IA (Presenter); Nan Hu, MS, Iowa City, IA; Keith D. Carter, MD, Iowa City, IA

Educational Objective: At the conclusion of this presentation, the participants should be able to review the indications for and the outcomes of revision orbital decompression surgery for thyroid eye disease.

Objectives: To review the indications for and the outcomes of revision orbital decompression surgery for thyroid eye disease. **Study Design:** Retrospective consecutive case series. **Methods:** A retrospective case series of all revision orbital decompression procedures for thyroid eye disease, over the ten year period 01/01/2004-01/01/2014 was reviewed. Cases were examined for previously described outcome measures, including changes in proptosis, intraocular pressure, visual acuity and diplopia. **Results:** 26 surgeries were performed for 19 patients. There were 6 bilateral procedures and 2 patients underwent further revision surgery. 21 cases were performed as "open" procedures with 5 endoscopic or combined cases. Combined ophthalmology/otolaryngology surgery via combined transcaruncular and endoscopic approaches was favored for persistent orbital apex disease, including the presence of sphenoethmoidal (Onodi) cells. Median age was 57 with median 36 weeks between primary and revision surgery. Median followup was 36 months. Overall median reduction in proptosis was 2mm, reduction in intraocular pressure was 2mmHg. 17 patients had diplopia preoperatively. The rate of new onset diplopia was 20% but the rate of diplopia persistence was 94% within this subset. There were no significant differences between the open and the endoscopic/combined arms. Other than new onset diplopia there were no surgical complications. **Conclusions:** Revision orbital decompression is an uncommon procedure indicated for those patients with progressive or persisting symptoms despite previous surgery and prior intensive medical management. Both endoscopic and non-endoscopic techniques offer favorable outcomes with comparable complication rates.

148. The Evolution of Craniofacial Actinomyces Osteomyelitis: A Case that Implies its Natural History

Joseph Y. Shen, BSc, Seattle, WA; Neal D. Futran, MD DMD, Seattle, WA; Robert C. Rostomily, MD, Seattle, WA; Maya G. Sardesai, MD MEd, Seattle, WA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss craniofacial actinomyces osteomyelitis and describe an example of one of the most extensive cases ever reported.

Objectives: Though craniofacial actinomyces osteomyelitis has been reported, progression over time is rarely described, as patients are typically soon brought to treatment. We describe the case of a patient initially presenting with sinusitis, whose disease, due to failure of timely followup, demonstrated extensive progression over time. **Study Design:** Case report and review of the literature. **Methods:** The clinical records of a patient who initially presented with sinusitis and re-presented one year later with actinomyces osteomyelitis was reviewed. Risk factors, clinical and radiographic findings over time, treatment strategies and outcomes are described. A thorough review of the associated literature was performed. **Results:** A 56 year old male with history of smoking presented with sinusitis and was managed medically with plans for followup. He failed to followup and ultimately re-presented one year later with erosive bony disease. He was managed with a combination of medical and surgical treatment; however his disease evolved to include the rest of his midfacial skeleton, skull base, and cranium. He ultimately underwent staged debridement and free flap reconstruction in multidisciplinary procedures involving otolaryngology-head and neck surgery and neurosurgery. His disease continues to be managed though cure is not anticipated. The reported literature includes primarily case reports and small series describing limited disease that was treated successfully with a combination of surgical and medical management. **Conclusions:** Though craniofacial actinomyces osteomyelitis uncommon, it can become debilitating. This case demonstrates how the disease can progress, and highlights the need for a multidisciplinary approach to care of these patients.

149. Fairbank's Solution: The Solution for Chronic Nasal Crusting

Mausumi N. Syamal, MD, Detroit, MI; Vanessa G. Schweitzer, MD, West Bloomfield, MI; Vigan Darian, MD, Detroit, MI; Grant R. Fairbanks, MD, Salt Lake City, UT; David N. Fairbanks, MD, Bethesda, MD

Educational Objective: At the conclusion of this presentation, the participants should be able to see the utility of using Fairbank's solution for patients with chronic nasal crusting.

Objectives: To introduce a safe, affordable, non-prescription solution for chronic nasal crusting. **Study Design:** Case series of patients with severe and chronic nasal crusting, dryness and/or epistaxis. **Methods:** A nasal irrigation mixture consisting of saline, boric acid, glycerin and Caro syrup was offered to several patients suffering from chronic nasal crusting not relieved by existing commercial rinses. **Results:** Regular irrigation with Fairbank's solution has resulted in significant improvement of nasal crusting and dryness for all patients

in our study. **Conclusions:** Fairbank's solution may be the solution for patients suffering from chronic nasal crusting, dryness and epistaxis that is safe, affordable and available without a prescription.

150. Dacryocystorhinostomy with a Thulium Laser: A Case Series

Christopher G. Tang, MD, New York, NY; Niv Mor, MD, New York, NY; Munir Patel, MD, New York, NY; Scott M. Rickert, MD, New York, NY; Martin L. Lieb, MD, New York, NY; Andrew Blitzer, MD DDS, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to understand how to perform a thulium laser dacryocystorhinostomy and understand the literature supporting its usage.

Objectives: To demonstrate the efficacy of thulium laser dacryocystorhinostomy (DCR) for symptomatic epiphora as well as review the current literature on such technique. **Study Design:** Retrospective review of 19 patients. **Methods:** 19 patients with symptomatic epiphora were found to have 24 eyes documented with epiphora by dacryocystograms. Under general anesthesia, a thulium laser fiber was placed in the lacrimal canaliculi to the stenotic segment. With endoscopic visualization, a laser DCR was performed anterior and inferior to the middle turbinate creating a 5x5 mm opening. Silicone stents were placed and oral and ophthalmic antibiotics were given postoperatively. **Results:** 19 patients with an average age of 73 years (range 47 to 92) were included in this study. 24 laser DCRs were performed with average followup of 13 months (range 22 days to 3 years and 2 months). All patients noted initial improvement and 13 out of 15 continued to have improvement in epiphora postoperatively. Two patients required revision surgery: one patient developed mucopurulent drainage 1 year after surgery and required an open DCR, and one patient required a conjunctivo-thinostomy with insertion of jones tube 3 years after surgery. These results are in line with the current literature. **Conclusions:** To our knowledge, there have only been two articles published on thulium laser DCR over 20 years ago by the same author. Our case series would be the largest in the English literature. Thulium laser DCR is an effective, affordable, and efficient solution for patients with symptomatic epiphora.

151. The Endoscopic Endonasal Approach to the Basilar Artery: An Anatomic Study and Clinical Case Series

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Educational Objective: At the conclusion of this presentation, the participants should be able to appreciate and understand the important neurovascular landmarks found during the transclival approach.

Objectives: Endoscopic endonasal approaches have revolutionized skull base surgery. The transclival approach requires thorough understanding of the vertebrobasilar system. This study describes neurovascular features in the transclival approach, with a complementary retrospective review of patients with pathologies involving the basilar artery. **Study Design:** Anatomical study. **Methods:** Endoscopic approaches were performed in 12 latex injected, human cadaveric specimens. Measurements were collected describing the basilar artery and surrounding neurovascular structures. Chart review was performed on patients who had pathology requiring direct microsurgical dissection of the basilar artery. **Results:** Basilar artery visualization from the vertebrobasilar junction to basilar apex, an average distance of 26.6mm, was achieved in all specimens. Variable numbers of basilar perforators without predominant laterality were appreciated. The abducens nerves originated 1.9mm and 3.4mm on average above the vertebrobasilar junction on the right and left, respectively. Lower cranial nerves were visualized in the parasagittal plane with location described in relation to the basilar and clival zones. Retrospective review yielded 13 patients undergoing 14 procedures for pathologies involving the basilar artery. Craniopharyngioma was the most commonly identified pathology. Gross total resection was achieved in 11 patients with total resection limited by basilar perforators in the remaining cohort. Postoperative CSF leak was noted in 3 patients who required repair. The nasoseptal flap without routine lumbar drain was used for reconstruction. No intraoperative arterial injuries or long term neurovascular sequelae were appreciated. **Conclusions:** Knowledge of the basilar system is critical during transclival surgery. Key anatomic landmarks with complementary clinical review are illustrated. Large, intradural clival defects remain a reconstructive challenge.

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