

**THE TRIOLOGICAL SOCIETY**  
**107TH ANNUAL MEETING PROGRAM**  
**PHOENIX, ARIZONA**  
**APRIL 30 - MAY 3, 2004**  
**FRIDAY, APRIL 30, 2004**

- 7:00 New Fellows Reception - Grand Sonoran E**
- 7:30 Business Meeting/New Fellows Ceremony - Grand Sonoran E**
- 8:00 Welcome and Presidential Remarks - Grand Sonoran E**  
Robert A. Jahrsdoerfer, MD\*, Charlottesville, VA
- 8:05 Introduction of Guest of Honor**  
Byron J. Bailey, MD\*, Galveston, TX
- 8:10 Presidential Citations**  
Ugo Fisch, MD, Zurich, Switzerland  
Robert Miller, MD\*, New Orleans, LA  
Julius Hicks, MD\*, Birmingham, AL  
Charles Gross, MD\*, Charlottesville, VA  
William Saunders, MD\*, Columbus, OH
- 8:20 OGURA LECTURE**  
Ernest Weymuller, Jr., MD\*, Seattle, WA
- 8:40 Invited Presidential Speaker**  
Total Reconstruction of the Ossicular Chain: Are Titanium Prostheses Better?  
Ugo Fisch, MD, Zurich, Switzerland
- 9:00 MOSHER AWARD PRESENTATION**  
**Vestibular Effects of Cochlear Implantation**  
Craig A. Buchman, MD, Chapel Hill, NC

**EDUCATIONAL OBJECTIVE:** At the conclusion of the presentation, the participants should be able to discuss the vestibular effects of unilateral cochlear implantation.

**OBJECTIVES:** Cochlear implantation (CI) carries with it the potential for vestibular system insult or stimulation with resultant dysfunction. **STUDY DESIGN:** A prospective study was carried out to assess the vestibular effects of unilateral CI. **METHODS:** Assessment included Dizziness Handicap Inventory, bithermal caloric irrigations (ENG), rotary chair testing (SHA), and platform posturography (CDP) at preoperative, 1-month, 4-month, 1-year and 2-years. **RESULTS:** For the group as a whole, there were few significant differences between pre- and postoperative values for VOR and DHI testing except for significant improvements in emotional subcategory DHI scores at 4-months and 1-year. CDP demonstrated improvements in vestibular conditions (5 and 6) and composite scores with the device "off" and "on" at 1-month, 4-month, 1-year, and 2-years. Device activation improved postural stability in some conditions. Reductions in caloric response in the implanted ear were observed for 29% of "at-risk" patients. No significant changes were detected in the DHI or CDP of these patients. **CONCLUSIONS:** Unilateral CI rarely results in significant adverse effects on the vestibular system. On the contrary, CI patients experienced significant improvements in postural stability that appeared to be augmented by device activation in music. These findings should be considered in counseling patients about CI.

- 9:12 FOWLER AWARD PRESENTATION**  
**Relationship of Static and Dynamic Mechanisms in Vestibular Compensation**  
Shawn D. Newlands, MD, Galveston, TX

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to discuss differences between static and dynamic vestibular compensation.

**OBJECTIVES:** Our objective was to investigate the interaction between recovery of dynamic symptoms (symptoms elicited by head movement such as vestibular reflexes) and of static symptoms (symptoms present at rest such as nystagmus). The hypothesis tested is that after unilateral labyrinthectomy (UL) recovery from the static deficit (spontaneous nystagmus) is independent of recovery of vestibular reflexes (vestibulo-ocular reflex - VOR). This hypothesis predicts that recovery from vestibular lesions that do not cause static symptoms (such as unilateral canal plugging) would have a similar time course and magnitude of recovery as from a lesion that creates both a static and dynamic imbalance, such as UL. Further, animals compensated after unilateral plugging of all three semicircular canals (UCP) would be expected to retain their compensated state (in terms of the VOR) after UL. **STUDY DESIGN:** An experimental study in the Mongolian gerbil animal model. **METHODS:** The horizontal VOR was measured from both eyes using infrared video-oculography in gerbils before and after UCP, UL, or ipsilateral labyrinthectomy after previous UCP. Eye movements were recorded during yaw rotation in the dark. **RESULTS:** Compensation from UL and UCP are similar the first few days after injury. Over several weeks, the UCP animals compensate their horizontal vestibulo-ocular reflex, particularly for rotation towards the intact side, more completely than the UL animals. Animals that underwent ipsilateral labyrinthectomy 4 to 8 weeks after UCP demonstrated preservation of the improved gain particularly on rotation toward the intact labyrinth. This retained plasticity was erased after 72 hours. **CONCLUSIONS:**

Plasticity in dynamic vestibular reflexes induced by UCP is preserved after subsequent UL. However, events during the first and second day after UL limit or suppress the long-term dynamic compensation of the VOR, regardless of whether the animals have had a previous UCP. These findings are included in a schematic model of compensation.

**9:29 - 12:00 GRAND SONORAN E**  
**FRIDAY SIMULTANEOUS SESSION I - BRONCHOSOPHAGOGY/OTHER**

**MODERATOR: SIGSBEE DUCK, MD\*, GILLETTE, WY**

**9:29 Incidence, Classification and Consequence of Errors in Otolaryngology**

Rahul K. Shah, MD, Boston, MA  
Gerald B. Healy, MD\*, Boston, MA  
David W. Roberson, MD, Boston, MA

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to discuss the types of errors that occur in medicine, specifically in otolaryngology. Understanding the spectrum and gravity of errors in otolaryngology will enable the participant to directly improve his/her practice.

**OBJECTIVES:** To define and categorize errors in otolaryngology. **STUDY DESIGN:** Retrospective, randomly distributed, anonymous survey. **METHODS:** Five hundred otolaryngologists were mailed surveys inquiring about the incidence and type of errors in the last six months in their realm of practice. Results were analyzed qualitatively and a preliminary error classification scheme was developed. **RESULTS:** One hundred otolaryngologists returned the questionnaire; ninety-seven responses (19.4%) meet inclusion criteria. Of the respondents, forty-five physicians (46%) reported 52 errors. Thirty of the reported errors (66%) resulted in harm. Potentially fatal dosing of anesthetic agents was seen in one patient. No gender predilection for errors was found. The average age of affected patients was 42 (range 1-87 years). The most common error categorizations were: surgical—knowledge/skill deficits (11), administrative—filing, billing, etc. (10), medication related (7), misdiagnosis (6), malfunction of surgical equipment (5), operating on wrong patient/surgery not needed (3). Errors related to the realm of the operating room constituted over half of all errors. **CONCLUSIONS:** This study is the first to examine the spectrum and gravity of errors in a surgical specialty. The types of errors reported in this study differ from those reported in medical specialties, with a greater emphasis being placed on the realm of the operating room (over half seen in this study). Understanding the types of errors in otolaryngology should enable targeted approaches towards increasing patient safety.

**9:37 An Otolaryngology Standardized Patient**

Eric C. Andrist, MD, Louisville, KY  
Gina C. Wesley, PhD, Louisville, KY  
Alan J. Nissen, MD, Louisville, KY  
Jeffrey M. Bumpous, MD, Louisville, KY

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to discuss the utility of a standardized patient scenario in otolaryngology resident education.

**OBJECTIVES:** To develop an otolaryngology standardized patient program, in order to enhance resident education and to fulfill the ACGME core competencies for resident education. **STUDY DESIGN:** Standardized patient scenario. **METHODS:** A standardized patient scenario was developed based on a patient with Meniere's disease. Three standardized patients were trained on the history and the specifics of a complete head and neck physical examination. The standardized patients were also furnished with checklists for the history, physical exam, and the SEGUE Framework checklist for evaluation of interpersonal skills. Seven otolaryngology residents were tested sequentially. Each resident was given a numerical based on their performance on the history, exam, and interpersonal skills checklists completed by the standardized patients. Subsequently, an attending faculty member gave each resident a score using the SEGUE checklist to evaluate interpersonal skills. **RESULTS:** The mean score on the history checklist was 21/30 (range 18-24). The mean score on the exam checklist was 19/35 (range 12-32). The mean score on the SEGUE checklist for interpersonal skills was 17/23 for both the reviews done by the standardized patients and those done by the attending faculty member. **CONCLUSIONS:** The development of an otolaryngology standardized patient program will help to satisfy several of the ACGME core competencies for resident education. Such a program can also be a valuable tool for resident evaluation and self-assessment, ultimately enhancing the resident educational experience.

**9:45 Break with Exhibitors - Grand Canyon 6, 7 & 8**

**10:15 The Resident 80-Hour Work Week: How Has It Affected Surgical Specialties?**

Rakesh K. Chandra, MD, Memphis, TN

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to describe trends regarding the resident 80-hour work week regulations.

**OBJECTIVES:** 1) To identify strategies that academic surgical specialty departments have employed to address the resident 80-hour work week regulations; and 2) to characterize perceived attitudes of faculty and residents to these changes. **STUDY DESIGN:** Analysis of survey data. **METHODS:** Attendees to the 2003 Residency Program Coordinator/Administrator Workshop for subspecialties (Denver, CO) were surveyed regarding recently instituted 80-hour workweek regulations. **RESULTS:** The study population included 44 respondents spanning 9 surgical subspecialties. Forty seven percent of programs instituted at least one administrative change specifically to comply with duty hour regulations. The most commonly employed strategies were the hiring of nurse practitioners or physician assistants (32%) and the use of internet-based software to tract resident duty hours (30%). Other changes included giving call responsibilities to residents on research rotations (15%), institution of home call (14%) and assignment of a night float resident (11%). Perceptions of program coordinators indicated that junior residents and junior faculty accepted changes better than did senior residents and senior faculty (p=.019) **CONCLUSIONS:** The resident 80-hour work week is a major health care policy change that has required academic subspecialty departments to make significant alterations in their administrative structure. Further study is necessary

to determine how these changes affect both quality of training and patient care in the short and long term.

**10:23 Union Army Veterans with Hearing Loss and the Evolution of Disability in America During 1862-1920**

Peter D. Blanck, PhD JD, Iowa City, IA  
Ryan K. Sewell, BA, Iowa City, IA (*Presenter*)  
Chen Song, PhD, Los Angeles, CA  
Richard J. Smith, MD\*, Iowa City, IA  
Nancy M. Bauman, MD, Iowa City, IA

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to demonstrate an understanding of the prevalence and potential etiologies of hearing loss in Civil War veterans. Participants should also be able to discuss the implications of the findings to modern day compensation and disability policy schemes.

**OBJECTIVES:** To examine the characteristics and compensation for hearing loss in Union Army (UA) veterans following the Civil War and compare disability policy with modern day. **STUDY DESIGN:** A retrospective review of medical records for 17,722 UA veteran pension applicants, and who were a subset of some 35,000 soldiers retrieved randomly from the Military Archives. **METHODS:** The diagnosis of hearing loss was based on gross measurements due to the unavailability of modern audiometric testing. Any pension received for hearing loss was considered as a diagnosis of hearing loss. **RESULTS:** Musculoskeletal conditions and gunshot wounds were the most common disability complaints, with hearing loss representing 3.63% of all presenting complaints. Slightly more than one-quarter (5,078 or 28.78%) of all pensioners received compensation for hearing loss. The veterans with hearing loss suffered predominantly from left sided hearing loss, which is consistent with noise-induced hearing loss from a right handed individual firing a rifle. Those with unilateral hearing loss received an average pension of \$11.17 per month, or \$134.04 per year, representing nearly one-third of the average annual income in 1890. Today, Social Security disability benefits are granted only for bilateral hearing loss with an average 60 year old individual receiving less than \$1200 a month. Comparison of UA veterans' occupations reveals minimal variation in prevalence of hearing loss among the occupational groups, however, associated pension compensation did show significant variation. **CONCLUSIONS:** Hearing loss received higher compensation following the Civil War than it does today. The impact of the UA pension scheme and implications for contemporary disability policy are discussed.

**10:31 Diagnosis of Pneumonia Using an Electronic Nose: A Prospective Study**

Neil G. Hockstein, MD, Philadelphia, PA  
Erica R. Thaler, MD\*, Philadelphia, PA  
Wallace T. Miller Jr., MD, Philadelphia, PA  
Drew A. Torigian, MD, Philadelphia, PA  
Daniel D. Lee, PhD, Philadelphia, PA  
C. William Hanson III, MD, Philadelphia, PA

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to discuss the use of electronic nose technology in the diagnosis of infection.

**OBJECTIVES:** The electronic nose is a sensor of volatile molecules which can be used in the analysis of expired gases. This device is well suited to the testing of the breath of mechanically ventilated patients. We will demonstrate the ability of the electronic nose to discriminate between patients with pneumonia and those without pneumonia. **STUDY DESIGN:** A prospective study of mechanically ventilated patients in a surgical intensive care unit who underwent chest computed tomography (CT) scanning. **METHODS:** Chest CT scans were independently reviewed by two attending radiologists and imaging features were recorded on a standardized form. Within 48 hours of undergoing chest CT scan, five aliquots of exhaled gas were sampled from the expiratory limb of the ventilator circuit. The gases were assayed with a commercially available electronic nose. Both linear and nonlinear parametric analyses were performed to identify correlations between imaging features and the assayed gas signatures. **RESULTS:** Twenty-five patients were identified, 13 of whom were diagnosed with pneumonia by CT scan. Based on nonlinear parametric analysis, the electronic nose was able to predict pneumonia with between 91% and 100% accuracy. **CONCLUSIONS:** The electronic nose is a new technology that shows promise as a rapid, noninvasive, univariate screening tool in the diagnosis of pneumonia in mechanically ventilated patients.

**10:39 National Assessment of Business of Medicine Training in Otolaryngology Residency Programs and Its Implication on the Development of a Business of Medicine Curriculum**

Anit T. Patel, MD MBA, Bronx, NY  
Richard M. J. Bohmer, MD MPH, Boston, MA  
J. Robert Barbour, JD MPS, Bronx, NY  
Michael J. Reichgot, MD PhD, Bronx, NY  
Jeff P. Gold, MD, Bronx, NY  
Marvin P. Fried, MD\*, Bronx, NY

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to determine if there is a significant deficiency of business training of graduating otolaryngology residents. If so, they should be able to demonstrate what aspects of business training they are found in. They will also be able to compare what otolaryngology chairmen/program directors feel are the most important business topics for residents to learn vs. what recent otolaryngology graduates out in practice feel are the most important business topics. The participants will be able to see how this data was then used to determine the most effective approaches and topics for management training and how they were subsequently incorporated into developing a business of medicine curriculum on interactive CD. This curriculum will also be geared towards meeting ACGME competencies.

**OBJECTIVES:** First, to determine the current state of business training in otolaryngology programs in the U.S. Second, to develop a business of medicine (BOM) curriculum based on the results of the first objective. **STUDY DESIGN:** Cross-sectional survey. **METHODS:** A survey concerning management training for residents was sent to chairmen of the 102 otolaryngology residency programs. A similar survey was sent to 576 otolaryngology graduates (classes of 2000, 2001, and 2002). An interactive BOM curriculum on CD was developed based on the results. **RESULTS:** 75% of graduates rated their BOM training as poor or fair. Only 8% rated their BOM training as excellent. 20% of the graduates responded to

having a BOM course during residency. Recent graduates report a BOM course can best be taught via lectures and apprenticeship/mentoring while program directors report via lectures and outside consultants. Graduates report coding compliance was the topic most neglected in residency while program directors report coding compliance was the main topic covered in the business training. Both groups agree that attendings have the most impact on business training. Program directors report correct coding, planning entry into medical practice, risk management, and reimbursement issues are the most important topics for residents to learn while recent graduates stated it should be correct coding, office management, risk management, and reimbursement issues. **CONCLUSIONS:** This study shows that there is a deficiency of business training in otolaryngology residency programs. Based on this finding and the outcome measures from the survey, a BOM curriculum was developed that is general enough to target residents of all specialties and to provide business skills that result in improved utilization of resources and higher quality of care.

#### 10:47 Discussion

### MODERATOR: GADY HAR-EL, MD\*, BROOKLYN, NY

#### 10:55 Beyond Otolaryngology/Head and Neck Surgery

James B. Powell, II, MD\*, Asheville, NC

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to explain a medical delivery and methodology for indigent care.

**OBJECTIVES:** When success is not enough, how do we get from success to significance as individuals and as an association? This is the story of one community's physician led effort to build a significant system for its indigents' health care needs, that could overcome traditional barriers, would be embraced by the physician and lay community, and that would provide a full continuum of care for all the low income and eligible uninsured. **PROJECT ACCESS**, supported initially by competitive grants from the Robert Wood Johnson Foundation "Reach Out" initiative in 1994, was sponsored and run by an all-volunteer effort of a local medical society. Project Access won the Innovations in American Government award in 1998. Innovations in American Government is a national program of the Ford Foundation and the JFK School of Government at Harvard University in partnership with the Council for Excellence in Government. Project Access is in various states of emulation and replication in 81 towns and cities in 43 states. It is not the ultimate or final solution to all that is wrong with our system of health care and health care delivery, but it is a work in progress of how our community, physician led and sponsored, coped with the issue of indigent health needs. **STUDY DESIGN:** Non-study no design. **METHODS:** Universal HC. **RESULTS:** Outstanding. **CONCLUSIONS:** Methodology is reproducible.

#### 11:03 Is an Overnight Hospital Stay Necessary After Uncomplicated Uvulopalatopharyngoplasty for Obstructive Sleep Apnea?

Jeffrey H. Spiegel, MD, Boston, MA  
Tejas X. Raval, BA, Providence, RI

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to understand the incidence of complications of uvulopalatopharyngoplasty (UPPP) for obstructive sleep apnea, their incidence and time to onset, and controversies regarding the length of post-operative stay necessary after.

**OBJECTIVES:** To examine the early post-operative complications of UPPP to determine the necessity of postoperative overnight hospital stay. **STUDY DESIGN:** Literature review; retrospective chart review. **METHODS:** We conducted a Medline search for literature pertaining to complications of UPPP and related surgical procedures for obstructive sleep apnea. The charts of 148 patients undergoing UPPP at a university-based medical center during a 5 year period were also reviewed. **RESULTS:** The early post-operative complications of UPPP include airway obstruction, hemorrhage, oxygen desaturation, cardiac arrhythmia, and post-obstructive pulmonary edema (POPE). Airway obstruction has an average incidence of 10%, and most often occurs in the intra-operative or immediate post-operative setting. Post-operative hemorrhage has an incidence of 2-15% and tends to occur in a biphasic pattern, either 5-8 hours post-operatively or more than 24 hours post-operatively. Oxygen desaturation is most often noted immediately post-operatively, and continued desaturation despite use of nasal CPAP is cause for prolonged observation. Post-operative arrhythmia has an incidence of less than 1%, and is usually associated with oxygen desaturation. POPE has a less than 1% incidence, and overwhelmingly occurs within 1 hour after relief of obstruction. **CONCLUSIONS:** Many surgeons currently insist that all of their patients who receive UPPP stay overnight in the hospital, often in an intensive care setting. In cases of UPPP, the vast majority of early post-operative complications occur within 5 to 8 hours after surgery. If no complications arise within an observation period of this length, overnight hospital stay should not be necessary for further monitoring.

#### 11:11 The Role of Combined Transoral and Transgastric Endoscopic Esophagoscopy in the Management of Complex Esophageal Obstruction

Magalie Nelson, MD, New York, NY  
Charles Saha, MD, New York, NY  
Mark L. Urken, MD, New York, NY

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to demonstrate knowledge and skills in the technique of combined oral and transgastric endoscopic esophagoscopy and be able to apply this knowledge in clinical practice.

**OBJECTIVES:** To present a technique used to evaluate near complete or total esophageal obstruction when the standard endoscopic esophagoscopy and radiographic imaging fail to delineate the nature of the obstruction. **STUDY DESIGN:** Simultaneous antegrade and retrograde esophagoscopy was performed on two patients who presented with complete esophageal obstruction in whom transoral rigid esophagoscopy failed to identify the proximal esophageal lumen. **METHODS:** The technique of combined oral and transgastric endoscopic esophagoscopy allows for simultaneous examination of the esophageal lumen above and below the obstruction and enables safe cannulation of the strictured lumen. A flexible scope is introduced into the distal esophagus in a retrograde fashion via a gastrostomy. The site of obstruction is identified, and a guidewire is advanced through the stricture into the proximal esophagus. A rigid esophagoscope is then introduced transorally into the esophagus and directed to the stricture with the guidance of the wire or the flexible scope itself. Complete visualization of the extent of the obstruction is achieved so that an appropriate therapeutic approach can be designed. **RESULTS:** Combined oral and transgastric endoscopic esophagoscopy was attempted in two patients who presented with complete esophageal obstruction that seemingly required esophageal resection with reconstruction. It successfully

demonstrated that esophageal continuity still existed and altered the surgical plan. One patient had a high grade hypopharyngeal stricture and a radial forearm free flap onlay patch was used to widen the hypopharyngeal diameter. The other patient had a Zenker's diverticulum with redundant mucosa obstructing the esophageal lumen and endoscopic staple assisted diverticulostomy was performed. This method obviated the need for a major operative resection and provided findings that were invaluable in planning a less invasive procedure to reestablish esophageal patency. **CONCLUSIONS:** Combined oral and transgastric endoscopic esophagoscopy provides an effective and safe method for evaluation of complex esophageal obstruction and should be part of the head and neck surgeon's armamentarium.

#### **11:19 Zenker's Diverticulum and Cricopharyngeal Dysfunction: 25 Year's Experience and Current Management**

Harvey M. Tucker, MD\*, Cleveland, OH

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should understand the anatomical and physiological issues involved in Zenker's diverticulum and cricopharyngeal muscle dysfunction, as well as the evolution of surgical management over 25 years experience.

**OBJECTIVES:** 1) To report the evolution of the author's approach to surgical management of Zenker's diverticulum; and 2) to compare and contrast the outcomes of the author's current open surgical techniques against those of recently reported endoscopic and open approaches. **STUDY DESIGN:** A retrospective review of the author's experience with over 150 cases of Zenker's diverticulum. Analysis of outcomes, complications, morbidity, mortality, and of operating room times and necessary length of stay in hospital are compared with recent literature reports using traditional and endoscopic approaches to management. **METHODS:** Retrospective chart review of over 150 cases of Zenker's diverticulum managed by the author between 1970 and 2000. Comparison of outcomes, complications, morbidity, mortality, operating room times, and length of hospital stay between these cases and published recent literature using open and endoscopic techniques. **RESULTS:** Using the author's current approach since 1995 in 47 consecutive cases: 1) complete correction of symptoms = 94%; 2) recurrence of symptoms = 2%; 3) complications of any kind = 2%; 4) recurrent laryngeal nerve palsy = 0%; 5) mortality = 0%; 6) average OR time 46 minutes; 7) average hospital stay = 1.8 days. **CONCLUSIONS:** Using the author's approach to open surgical correction of Zenker's diverticulum/cricopharyngeal dysfunction outcomes, complications, morbidity, mortality, operating room times, and hospital stays compare favorably to recently reported results of endoscopic approaches and improve significantly on reported results of other open surgical techniques.

#### **11:27 Discussion**

#### **11:35 Tonsillectomy and Adenoidectomy in Children with Bleeding Disorders**

Alessandro de Alarcon, MD, Charlottesville, VA  
Margaret M. Sennett, CPNP, Charlottesville, VA  
Charles W. Gross, MD\*, Charlottesville, VA  
Pedro A. de Alarcon, MD, Charlottesville, VA

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to understand the risks of tonsillectomy and adenoidectomy in children with bleeding disorders and the medical regimens that prevent bleeding in these children.

**OBJECTIVES:** Identify children with bleeding disorders treated with tonsillectomy and adenoidectomy and ensuing complications, post-op bleeds, medical regimens. **STUDY DESIGN:** Retrospective review of patients undergoing tonsillectomy and/or adenoidectomy with bleeding disorders in an academic university hospital setting between 1998-2003. **METHODS:** Patients with bleeding disorders and who had tonsillectomy + adenoidectomy were identified. Patient charts, records, and operative notes were reviewed. Blood loss at time of surgery, complications, surgical methods, and medical protocol were recorded. **RESULTS:** 10 patients. Surgeries performed: 8 adenotonsillectomies, 1 tonsillectomy, 2 PET, 1 tympanoplasty. Technique: 5 cold, 4 electrocautery. Bleeding disorders: 3 Factor VIII deficiency, 1 platelet dysfunction, 6 VonWillebrand disease (VWD). Blood loss: avg. 25 cc (10-50 range) admission length: VWD and platelet dysfunction, 23 hrs. Factor VIII deficiency, 3-6 days, avg. 4.3 days. Medical protocol: VWD and platelet dysfunction: DDAVP pre-op, POD 1, POD 5. Amicar 50-100mg/kg QID x 5 days. Factor VIII deficiency: Factor VIII 100% bolus pre-op, 4u/k/hr intra-op and POD 1-4 followed by 3u/k/hr for 2 days followed by Factor VIII TID for 4-6 days. Complications: None. **CONCLUSIONS:** Tonsillectomy and adenoidectomy in patients with bleeding disorders is a safe procedure when using appropriate medical regimens to prevent bleeding. Coordination of care between the otolaryngologist and the pediatric hematologist is crucial in management of these patients.

#### **11:43 The First Class of Prevnar Vaccinated Children and Otitis Media: How Did They Do?**

Emily E. Epstein, MD, Saint Louis, MO  
Mark C. Eddy, MD, Saint Louis, MO  
John C. Freeman, BS, Saint Louis, MO  
Thomas J. Donovan, MD, Saint Louis, MO

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to explain the history of the pneumococcal vaccine, Prevnar, and its recommended dosing schedule, discuss the implications of Prevnar on otitis media and compare infection rates of vaccinated and unvaccinated children.

**OBJECTIVES:** Prevnar is a pneumococcal conjugate vaccine that was introduced in 2000 for children less than 2 years of age. The goal of this study is to evaluate the effects of Prevnar on otitis media (OM) in a university clinic population. **STUDY DESIGN:** Retrospective chart review. **METHODS:** A review of the medical records of 350 randomly selected children born between January 1, 1995, and January 1, 2002, who received all of their care at a university pediatric clinic was performed. Data on patient demographics, vaccination status and OM history were recorded. Children with major systemic disease, immunocompromised states and craniofacial anomalies were excluded. Children receiving no doses of Prevnar were placed in the control group (n=140) and patients receiving at least 2 doses of Prevnar with the first dose before 6 months of age were placed in the study group (n=133). Children receiving late doses of Prevnar or an incomplete vaccination series were excluded. The number of episodes of OM, the number of doctor visits for OM and the number of complications from OM were compared between the vaccinated group and the control group. **RESULTS:** Prevnar vaccinated children were more likely to never have had an episode of OM by age 2. Children who went on to develop OM showed a trend to fewer episodes of OM and fewer doctor visits. Complication profiles between the 2 groups were similar.

Breast-feeding appeared to augment the benefits of Pevnar. **CONCLUSIONS:** Pevnar appears to have a beneficial effect on OM prevention in children.

**11:51 Regeneration of the Mastoid Air Cells in Clinical Applications by in Situ Tissue Engineering**

Shin-ichi Kanemaru, MD, Kyoto, Japan  
Koichi Omori, MD, Fukushima, Japan  
Akhmar Magrufov, MD, Kyoto, Japan  
Masaru Yamashita, MD, Kyoto, Japan  
Kiyohiro Fujino, MD, Kyoto, Japan  
Juichi Ito, MD, Kyoto, Japan

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to demonstrate that mastoid air cells and mucosa can be regenerated by in situ tissue engineering technique.

**OBJECTIVES:** Poor development of the mastoid air cells in the temporal bone is a common anatomical feature of chronic otitis media. Mastoid air cells have a gas exchange function. Once this function failed, intractable otitis media would be prolonged. Therefore, the aim of this study is to regenerate functionally the mastoid air cells by in situ tissue engineering. **STUDY DESIGN:** Hydroxyapatite (HA) of honeycomb-like structure was used as artificial pneumatic bones. It has a high ratio (90%) of micro pore and is coated with collagen. Ten patients with cholesteatoma, adhesive otitis media, and purulent chronic otitis media undertook this new operation. **METHODS:** At the first stage of tympanoplasty, HA was implanted into the newly opened mastoid cavity. CT scan was then performed to determine whether the mastoid air cells were regenerated or not. At the second stage of operation, histopathological examinations of specimen of HA taken from reopened mastoid cavity were done. **RESULTS:** Aeration in the mastoid cavity were observed in nine out of the ten patients within 6 months after the second operation. Moreover, the pneumatic structure in mastoid cavity was regenerated in 5 patients. In these successful cases, the surface of the implanted HA was covered by mucosa with newly formed capillaries. **CONCLUSIONS:** We succeeded in regenerating the mastoid air cells through the implantation of collagen coated HA in patients with intractable otitis media. This in situ tissue engineering method is a possible treatment for intractable otitis media.

**12:00 Adjourn**

**9:29 - 12:00 GRAND SONORAN F  
FRIDAY SIMULTANEOUS SESSION II - HEAD & NECK**

**MODERATOR: JESUS E. MEDINA, MD\*, OKLAHOMA CITY, OK**

**9:29 Single Cell Microinjection of Cytochrome C Can Result in Gap Junction-Mediated Apoptotic Cell Death of Bystander Cells in Human Squamous Cell Carcinoma of the Head and Neck**

Douglas K. Frank, MD, New York, NY  
Bozena Szymkowiak, MD, New York, NY  
Olgica Josifovska-Chopra, PhD, New York, NY  
Tora Nakashima, MD PhD, Fukuoka, Japan  
Kathleen W. Kinnally, PhD, New York, NY

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to understand the role that gap junctional intercellular communication can play in conducting cell death signals from squamous cell carcinoma of the head and neck (SCCHN) cells targeted to undergo apoptosis to adjacent, non-targeted bystander cells (bystander effect).

**OBJECTIVES:** Gap junction intercellular channels are required for metabolic cooperation between cells and regulate normal tissue homeostasis via the transfer of small molecules between contacting cells. Not surprisingly, the gap junction phenotype is frequently lost during carcinogenesis in human tissues, freeing individual cancer cells from the growth control signals of normal surrounding tissues and less aggressive adjacent cancer cells. We hypothesized that gap junctional intercellular communication (GJIC) could mediate a bystander effect (apoptotic cell death) in SCCHN cells adjacent to individually targeted SCCHN cells. **STUDY DESIGN:** Basic science research. **METHODS:** Single cell microinjection of cytochrome c was used to induce apoptosis in target SCCHN cells with endogenous GJIC activity and in a SCCHN cell line with exogenously introduced GJIC activity. Apoptosis was followed in target and surrounding bystander cells through light and time course microscopic characterization, as well as through nuclear DNA staining techniques. All of the above experiments were carried out in the absence and presence of 18-beta-glycerretinic acid (betaGA), a reversible inhibitor of GJIC. **RESULTS:** When cytochrome c was introduced into SCCHN cells with endogenous GJIC activity through single cell microinjection, bystander effects (apoptosis of nontarget cells) were observed. When GJIC was blocked with betaGA, a bystander effect was never seen in GJIC active SCCHN cell lines. **CONCLUSIONS:** Gap junction intercellular channels can mediate a bystander effect in SCCHN. Inconsistencies in our data, however, will be discussed in the context of recent advances in this field as well as our future research directions.

**9:37 Differentiation of Parathyroid Hyperplasia from Adenoma Using Molecular Genetics and Immunohistochemical Staining**

Robert L. Dean, MD PhD, St. Louis, MO  
Leonard E. Grosso, MD PhD, St. Louis, MO  
Karen T. Pitman, MD\*, Jackson, MS  
Laura J. Gardner, MD, St. Louis, MO

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to understand possible molecular genetic techniques utilized to differentiate between parathyroid hyperplasia and adenoma.

**OBJECTIVES:** Parathyroid adenomas are the most common etiology of primary hyperparathyroidism followed by hyperplasia. Questions have arisen in the literature regarding the ability to differentiate hyperplastic parathyroid glands from adenomatous glands. Utilizing molecular genetics and immunohistochemical techniques, differentiation between the two states was attempted. **STUDY DESIGN:** Parathyroid tissue stored in paraffin

embedded blocks was retrospectively evaluated for clonality and proliferative activity using molecular genetic techniques and immunohistochemical markers. This was compared with the pathological diagnosis made utilizing light microscopy and sestamibi scanning. **METHODS:** This study included 24 patients with parathyroid disease, 10 with secondary hyperparathyroidism, 14 with primary hyperparathyroidism. Clonal analysis of these specimens were performed utilizing a polymerase chain reaction (PCR) method based on the phosphoglycerokinase (PGK) gene and the human androgen receptor gene (HUMARA). Pathologic specimens not informative by PGK analysis were subjected to HUMARA analysis. The immunohistochemical marker Ki-67 was utilized to assess proliferative activity. **RESULTS:** Eleven patients were “informative” in the PGK analysis. Two patients diagnosed pathologically as having an adenoma were monoclonal for the gene while in 8 patients considered to have hyperplasia microscopically, 1 was monoclonal and 7 were polyclonal. One patient read as indeterminate by light microscopy was polyclonal. Two specimen read as normal were found to be polyclonal. Of 38 specimen stained for Ki-67, 10 that were polyclonal were positive while 2 polyclonal samples were negative. Three monoclonal specimen were positive. Four normal specimen were negative for Ki-67. On sestamibi scan, 2 patients were read as having an adenoma that were monoclonal while 3 patients read as adenoma were polyclonal. Data for the HUMARA gene are pending. **CONCLUSIONS:** In the PGK analysis, 100% of those diagnosed as having an adenoma were monoclonal while 88% of those diagnosed as having hyperplasia were polyclonal. Genetic and pathologic results were consistent with sestamibi scan results in only 40% of cases. This technology could be used to perform echo guided FNA’s of hyperplastic tissue to determine the need for multiple gland exploration.

#### 9:45 Break with Exhibitors - Grand Canyon 6, 7 & 8

#### 10:15 Intraoperative iPTH Monitoring as a Guide to Parathyroid Reimplantation After Thyroidectomy

Michael Friedman, MD\*, Chicago, IL  
Ramakrishnan Vidyasagar, MBBS MS, Chicago, IL  
Darius Bliznikas, MD, Chicago, IL

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to discern the value of intraoperative iPTH (IOiPTH) in predicting when a parathyroid gland needs to be reimplanted. In addition, the participants should understand the limitations of IOiPTH monitoring when dealing with multiglandular hyperparathyroidism.

**OBJECTIVES:** Although intraoperative iPTH (IOiPTH) monitoring can predict early hypocalcemia following thyroid and parathyroid surgery, its usefulness in predicting parathyroid gland viability following total thyroidectomy or to confirm complete removal of diseased parathyroid glands in hyperparathyroidism is unclear. We assess the sensitivity and specificity of IOiPTH measurement in thyroid and parathyroid surgery with respect to definitive evaluation of the parathyroid glands. **STUDY DESIGN:** Prospective study performed at a tertiary level referral hospital in 25 consecutive patients undergoing thyroidectomy or parathyroidectomy assessed with IOiPTH. **METHODS:** After each parathyroid gland was identified, manipulated, or removed, IOiPTH levels were drawn. iPTH levels were subsequently drawn on postoperative days 1, 7, 14, 21, 28, and 56. Also, preserved parathyroid glands were incised to determine vascularity. Normal sized vascular glands were preserved, whereas avascular glands were microdissected and reimplanted in the sternocleidomastoid muscle. **RESULTS:** Thyroidectomy—despite abrupt decrease in IOiPTH, parathyroid glands that appeared to be normal were left intact. Although transient hypocalcemia developed, both calcium and iPTH levels normalized by day 7 in patients with intact vascularity. Parathyroid surgery—patients with multiglandular disease had > 80% decrease IOiPTH after removal of one or two enlarged glands, even when the contralateral glands were hyperplastic. **CONCLUSIONS:** IOiPTH is not useful in determining whether parathyroid glands should be reimplanted. Glands with non-detectable IOiPTH levels but with normal clinical appearance return to normal function. In patients treated for hyperparathyroidism, decreased IOiPTH is an unreliable indicator of diseased tissue removal in multiglandular disease. Although valuable under certain conditions, the test lacks sensitivity and specificity in the studied situations.

#### 10:23 Hypothyroidism Following Hemithyroidectomy for Benign Nontoxic Thyroid Disease

Kristin A. Seiberling, MD, Chicago, IL  
Jose C. Dutra, MD, Chicago, IL  
Sandra Bajramovic, MD, Chicago, IL

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to identify certain characteristics that increase a patient’s risk for developing postoperative hypothyroidism after a hemithyroidectomy.

**OBJECTIVES:** The incidence of hypothyroidism following hemithyroidectomy for benign thyroid disease is an underappreciated complication. This partially stems from the fact that until recently it was common practice to routinely place patients on prophylactic thyroid suppressant therapy after surgery. This trend has fallen out of favor due to more recent data questioning the efficacy of levothyroxine therapy in preventing recurrent disease combined with a heightened awareness of its associated morbidity. With fewer patients being placed on postoperative levothyroxine it is imperative to determine who is at risk for developing hypothyroidism postoperatively and to follow those patients more closely. **STUDY DESIGN:** This is a retrospective chart review study looking at all patients who underwent a hemithyroidectomy from the years 1994-2003 at one institution. **METHODS:** Patients were selected from a surgical pathology database using the search terms “hemithyroidectomy” and “thyroid lobectomy”. The indications for surgery were limited to benign nontoxic thyroid disease. Charts were then reviewed for information regarding the patient’s age, gender, disease presentation, final surgical pathology, weight of resected gland, preoperative and postoperative TSH levels and postoperative course. Patients were excluded if they had a diagnosis of hypo/hyperthyroidism prior to surgery, malignancy, subsequently underwent a completion thyroidectomy, on any medications known to alter thyroid hormone levels, lack of follow-up labs or placed on prophylactic thyroid suppressant therapy postoperatively. **RESULTS:** Over 200 charts were reviewed, but only 58 subjects met our study’s requirements. Of the 58 patients 14 (24.1%) became hypothyroid postoperatively. Most patients were diagnosed at 1 (n=7) and 2 (n=6) months postoperatively with a mean rise in TSH to 14.8µIU/L. The mean preoperative TSH in the hypothyroid group was 2.28 and 1.07 in the euthyroid group (p<.0001). Of the 14 hypothyroid patients 7 (50%) had a tissue diagnosis consistent with chronic inflammation (hashimotos or lymphocytic thyroiditis) which was diagnosed in only 3 (6.8%) of the euthyroid group. There was no statistical significance between the two groups in regards to age, gender, or weight of resected gland. **CONCLUSIONS:** In conclusion, hypothyroidism following hemithyroidectomy is not an uncommon occurrence with an incidence as high as 24.1%. Apparent risk factors include a higher mean preoperative TSH level and tissue pathology consistent with chronic inflammation. In patients with those identifiable risk factors it may be wise to following them more closely postoperatively with thyroid function tests drawn at scheduled office visits.

#### 10:31 Sentinel Lymphadenectomy in Cases of Midline Squamous Cell Cancer

Jochen A. Werner, MD, Marburg, Hessen Germany  
Anja A. Dunne, MD, Marburg, Hessen Germany  
R. Kim Davis, MD\*, Salt Lake City, UT

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to 1) understand the technique of sentinel node biopsy in midline cancers; and 2) understand the potential for sentinel node biopsies to direct or even reduce the need for selective neck dissection in N0 necks.

**OBJECTIVES:** This investigation critically analyzes the value of sentinel lymphadenectomy in cases of midline primary squamous cell carcinoma of the upper aerodigestive tract with N0 necks. **STUDY DESIGN:** Prospective, nonrandomized clinical study. **METHODS:** Seventeen patients with HNSCC of the epiglottis (n=15; 3- T1, 8- T2, 4- T3) and uvula (n=2; 1- T1, 1- T2), all staged with N0 neck status underwent intraoperative peritumoral 99mTc-nanocolloid injection (4 sites, 1.2mCi) and radiolabeled detection and analysis of up to three hot nodes (SN1-3) during bilateral elective ND. SN analysis was done after primary site resection. **RESULTS:** Gamma-probe detection revealed bilateral intranodal tracer uptake in 8/17 patients and unilateral in 9. In 3 of the 8 bilateral patients a radiolabeled sentinel node with an isolated metastasis was found in one neck site. The other five patients were tumor free in the sentinel nodes; five unilateral patients had radiolabeled sentinel nodes containing isolated metastases, whereas 4 patients had no cancer detected. No cancer was found in non-labeled nodes. **CONCLUSIONS:** Sentinel lymphadenectomy correctly identified the stage of metastatic disease in all 17 investigated patients with primary carcinomas of the midline. Unilateral tracer uptake represented the pathway of occult metastatic spread in 5/9 cases and the disease-free neck status of both neck sites in 4/9 cases. Future investigations should be done to determine whether intraoperative lymphoscintigraphy can reduce the extent of neck dissection in midline cases (e.g., unilateral neck dissection based on the site of intranodal tracer uptake) versus the common practice of bilateral dissection for N0 necks in these patients.

#### 10:39 Sentinel Node Biopsy in N0 Oral Cavity and Oropharyngeal Squamous Cell Carcinoma

Robert D. Hart, MD, Halifax, NS Canada  
Joseph G. Nasser, MD, Halifax, NS Canada  
Jonathan R. Trites, MD, Halifax, NS Canada  
Mark S. Taylor, MD, Halifax, NS Canada  
David C. Barnes, MD, Halifax, NS Canada  
Martin J. Bullock, MD, Halifax, NS Canada

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to discuss the predictive value and potential utility of sentinel node biopsy in oral cavity and oropharyngeal squamous cell carcinoma.

**OBJECTIVES:** To ascertain if sentinel node biopsy accurately predicts micrometastatic disease in N0 oral cavity and oropharyngeal squamous cell carcinoma. **STUDY DESIGN:** 20 T1-T4 N0 patients with biopsy proven squamous cell carcinoma were enrolled in the study. **METHODS:** All patients underwent lymphoscintigraphy after peritumoral intramuscular injection of tc99m-labeled sulfur colloid. Focal areas of uptake were marked on the skin with indelible ink. Intraoperatively the sentinel node(s) was identified using a hand-held gamma probe and removed separately. Complete neck dissection was then performed and the histological findings of the neck contents were compared to the sentinel node(s). **RESULTS:** One or more sentinel nodes were identified and successfully removed in all twenty patients (100%). In five patients (25%) two sentinel nodes were identified. In four patients (20%) the sentinel node(s) contained micrometastatic disease. In two of the four patients with micrometastatic disease the sentinel lymph node(s) was the only positive node. No false negatives were found when negative sentinel nodes were compared to the pathological status of the neck dissections. **CONCLUSIONS:** In this study sentinel node biopsy accurately predicted the presence or absence of micrometastatic disease in the neck. Although more study is needed, these results indicate that sentinel node biopsy is reliable and could potentially prevent unnecessary neck dissection and its sequelae in a select population.

#### 10:47 Discussion

### MODERATOR: K. THOMAS ROBBINS, MD\*, SPRINGFIELD, IL

#### 10:55 The Effects of HHV-8 on an HPV Transformed Cell Line

Michael P. Underbrink, MD, Galveston, TX  
Stephen L. Hoskins, PhD, Galveston, TX  
Thomas A. Albrecht, PhD, Galveston, TX  
Anna M. Pou, MD, Galveston, TX

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to discuss the potential role of oncogenic viruses, specifically human papilloma virus and human herpes virus-8, in head and neck cancer.

**OBJECTIVES:** High-risk human papilloma virus (HPV) type 16 is known for its association with development of head and neck carcinoma, leading to considerable morbidity and mortality worldwide. HPV produces two early proteins, E6 and E7 that can disrupt the cell cycle and transform cells. Other viruses may potentiate dysregulation of the cell cycle by HPV. Herpes viruses are known to produce replication transcription activators (Rta), which may contribute to the malignant transformation of normal cells. This project studied the effect of human herpes virus-8 (HHV-8) on HPV infected cells. **STUDY DESIGN:** The study was designed to determine if the ORF50/Rta protein of HHV-8 binds to genomic regions within HPV-16 and if this protein alters the transcription and/or translation of E6 and E7 in HPV infected cells. **METHODS:** Protein shift assays were used to study the binding potential of ORF50 to various HPV-16 genomic regions. SiHa cells were transfected with an HHV-8/ORF50 expression plasmid. A real-time polymerase chain reaction assay quantified the effect of ORF50 on the transcription of E6 and E7 within these cells. Finally, immunofluorescent confocal microscopy was used to quantitate E6 and E7 protein levels within transfected cells and study their localization patterns. **RESULTS:** These results reveal potential ORF50/rta binding sites within HPV-16. Initial results show upregulation of at least E7 transcription in transfected cells. A difference in corresponding protein quantities within those cells was not appreciated. **CONCLUSIONS:** HHV-8 may potentiate the effects of HPV-16 on cell cycle dysregulation, which can lead to malignant transformation of normal epithelial cells.

#### 11:03 The Role of PET/CT in the Management of Recurrent Papillary Thyroid Carcinoma

Zayna S. Nahas, BS, Baltimore, MD  
Ralph P. Tufano, MD, Baltimore, MD (*Presenter*)  
David Goldenberg, MD, Baltimore, MD  
Carole Fakhry, MD, Baltimore, MD  
Richard L. Wahl, MD, Baltimore, MD

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to discuss the role of PET/CT in the evaluation of recurrent papillary thyroid carcinoma patients.

**OBJECTIVES:** To evaluate the role of combined PET/CT fusion imaging in the detection and management of recurrent papillary thyroid cancer. **STUDY DESIGN:** A retrospective analysis of 30 patients with recurrent papillary thyroid carcinoma followed and evaluated using PET/CT. PET-CT was compared to standard imaging techniques in each patient to determine if it contributed to the therapeutic management plan. Histopathology was then correlated to PET-CT in those patients that underwent surgery. **METHODS:** The senior author reviewed the charts of 30 patients with recurrent papillary thyroid carcinoma to determine what impact PET/CT had on surgical decision making. In surgical patients, PET/CT was compared to histopathology to determine its sensitivity, specificity, accuracy, positive predictive value and negative predictive value. **RESULTS:** In 43% of the cases (13/30) PET/CT supplied information that altered the management plan. Nineteen of 30 patients underwent surgery with 23 lesions identified on histopathology. PET/CT correlated with histopathology in 21/23 lesions, with an accuracy of 91.3% (21/23). The sensitivity and positive predictive value of PET/CT in detecting recurrence was found to be 95%, with specificity and negative predictive value of 67%. **CONCLUSIONS:** Combined PET/CT fusion scanning was most useful in the detection and management of recurrent papillary thyroid cancer in those patients that on average have had more than one previous surgery and where the tumor no longer concentrates radioactive iodine. Ninety-five percent (sensitivity) of the time PET/CT localized a region as malignant, histopathology confirmed the results. PET/CT is a powerful tool for predicting exact locations of recurrent papillary thyroid cancer making it a reliable guide for surgical planning.

#### **11:11 Effect of FDG-Positron Emission Tomography on the Management of Patients with Head and Neck Squamous Cell Cancer**

Parul Goyal, MD, Syracuse, NY  
Jack M. Hsu, MD, Syracuse, NY  
Robert M. Kellman, MD, Syracuse, NY

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to discuss the role of positron emission tomography in the evaluation of head and neck cancer patients, and discuss the accuracy and reliability of the information obtained from PET.

**OBJECTIVES:** Positron emission tomography (PET) has become a commonly used imaging modality for initial staging and for surveillance of patients with head and neck cancer. It is reported to be more sensitive and specific than CT and MRI in the detection of primary and metastatic tumors. The goal was to determine whether the information provided by PET has an impact on the management of patients with head and neck squamous cell cancer. **STUDY DESIGN:** Retrospective chart review. **METHODS:** Records of patients who underwent PET as a part of the initial staging evaluation or for post-treatment surveillance were reviewed. **RESULTS:** PET was obtained in a total of 36 patients. PET was obtained in 18 patients as a part of the initial staging evaluation and in 18 patients for post-treatment surveillance. PET provided information beyond the information obtained from the routine workup and evaluation. This additional information altered the management in a total of 8 patients (22%). One of these patients was in the initial staging group and 7 patients were in the surveillance group. PET results prompted further diagnostic workup in 4 patients (11%) and altered the treatment plan in 4 patients (11%). The management changes prompted by these results were unnecessary or erroneous in 3 of these 8 patients. **CONCLUSIONS:** FDG-PET allows assessment of primary tumors, regional metastases, and distant metastases for the purpose of initial staging and for surveillance in previously treated patients. The information provided by the FDG-PET prompted further workup or altered the treatment plan of 22% of the patients.

#### **11:19 Radiofrequency Thermal Ablation—An Alternative Palliative Treatment in Head and Neck Cancer**

Leif J. J. Back, MD, Helsinki, Finland  
Tommi V. Liukko, MD, Helsinki, Finland  
Antti J. Markkola, MD, Helsinki, Finland  
Antti A. Makitie, MD PhD, Helsinki, Finland  
Jukka S. Ylikoski, MD PhD, Helsinki, Finland

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to discuss other treatment modalities in head and neck cancer and compare them with this modality, called radiofrequency thermal ablation.

**OBJECTIVES:** Radiofrequency thermal ablation (RFTA) is a minimally invasive electrosurgical technique characterized by a precise controllable effect in the tissue. It has demonstrable efficacy, safety and reproducibility in the management of unresectable solid malignancies. Our aim was to assess the morbidity and efficacy of RFTA in palliative treatment of head and neck cancer. **STUDY DESIGN:** Eight patients with head and neck cancer without curative treatment possibilities were enrolled in the study. RFTA was performed with a CelonPrecision (490kHz) generator using a CelonProSurge hand piece. The treatment was administered under local anesthesia and appropriate sedation at four weekly intervals (1-3 treatments). **METHODS:** The response to the treatment was assessed with CT or MRI before and after the treatment. Morbidity of the treatment was evaluated with a questionnaire. **RESULTS:** There were four pharyngeal carcinomas (T4N2c, rT3rN2b, T4N2cM1 and rT4), one unknown primary (T0N3) growing through the skin on the neck, two recurrent malignant melanomas originating from the maxillary sinuses and one carcinoma of the tongue (T2N0). All patients had only a partial response to the ablation, which induced radiologically detectable changes, which will be discussed. There has been no treatment related complications, and the patients have tolerated the treatment well. **CONCLUSIONS:** RFTA in head and neck cancer patients is easy to perform, well tolerated, and induces radiologically detectable changes in the tumour mass. Continuous evaluation of RFTA treatment modality is warranted in selected patients.

#### **11:27 Discussion**

#### **11:35 Malignancies of the Paranasal Sinus: A 20 Year Experience at a Multi-Institutional Health System**

Diana D. Chuong, MD, Washington, DC

Kenneth A. Newkirk, MD, Washington, DC  
Ziad E. Deeb, MD\*, Washington, DC  
Renee Grunsten, MD, Washington, DC

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to discuss the diagnosis, management and prognostic factors influencing patients with malignancies of the paranasal sinuses. The participants should be able to remark on factors that place patients at risk for treatment failure and factors that improve survival.

**OBJECTIVES:** To evaluate the experience at two tertiary care medical centers with management of paranasal sinus malignant tumors during a 20 year period, report long-term survival rates and discuss prognostic factors. **STUDY DESIGN:** Retrospective chart review. **METHODS:** Since 1982, 74 patients were treated for a paranasal sinus malignancy at the two tertiary care hospitals with a minimum 6 month follow-up. Demographic data including gender, age, TNM stage, anatomic site, pathology and treatment were reviewed. Multivariate analysis was performed to determine factors affecting survival. **RESULTS:** Male to female ratio was 1.1:1. The median patient age was 60 years. In order of frequency, the maxillary sinus was the most frequent location of tumor in 53 patients (72%) and the ethmoid sinus was the second most common in 26% of cases, followed by the sphenoid and frontal sinus. Histological analysis revealed 40 patients with squamous cell cancer, 8 patients with adenoid cystic cancer, 8 patients with lymphoma, 5 with neuroendocrine tumors and other cancers. Most patients presented with T3/T4 disease (75%) and No status (59%). Cox analysis revealed 5 year survival to be 62% with surgery as part of the multimodality treatment, versus 27% without surgery (P=0.0002). Advanced T-stage also negatively impacted survival (p=0.05). No nodal disease is a good prognostic indicator, 29% alive without surgery. **CONCLUSIONS:** Advanced T-stage and lack of surgery as part of the multimodality treatment negatively impact survival.

#### **11:43 Obliteration of the Frontal Sinus Using Fibrin Tissue Adhesive and Demineralized Bone Matrix in a Feline Model**

John F. Damrose, MD, Chicago, IL  
Karl Siedentop, MD, Chicago, IL  
Kevin O'Grady, BS, Chicago, IL

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to describe the indications for frontal sinus obliteration, to compare the current methods used in frontal sinus obliteration and to describe their limitations, and to discuss a novel approach to obliterate the frontal sinus that overcomes these limitations.

**OBJECTIVES:** To examine the efficacy of fibrin tissue adhesive (FTA) alone, or FTA mixed with demineralized bone matrix (DBM), to obliterate the frontal sinus in domestic felines compared to a control (spontaneous osteoneogenesis). **STUDY DESIGN:** In-vivo animal study using the domestic feline. **METHODS:** 12 domestic felines were randomly assigned to one of two experimental groups or to a control group. Under general anesthesia, the frontal sinus was entered via an external approach and the mucosa was removed. Depending on group assignment, the frontal sinus was filled with fibrin glue alone (Group 1) or fibrin glue mixed with demineralized bone matrix (Group 2), or it was allowed to spontaneously obliterate without filler (Control). The animals were sacrificed at 3 months and the frontal sinus cavities were examined histologically. **RESULTS:** Opacification of the frontal sinus was seen in all three groups. The greatest degree of obliteration was seen in the group treated with FTA and DBM. There was no evidence of mucosal remnants or mucocele formation in any group. **CONCLUSIONS:** FTA, FTA with DBM, and spontaneous osteoneogenesis are all effective in achieving obliteration of the frontal sinus. Immediate and complete obliteration was obtained with FTA mixed with DBM.

#### **11:51 Analysis of Recurrence and Survival After Hypopharyngeal Ablative Surgery With Radial Forearm Free Flap Reconstruction**

Joseph Scharpf, MD, Cleveland, OH  
Ramon Esclamado, MD, Cleveland, OH

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to appreciate the rationale for a total laryngopharyngectomy and partial esophagectomy with radial forearm free flap reconstruction in selected patients with hypopharyngeal cancer.

**OBJECTIVES:** To address the controversial ideal margin of distal resection for the surgical management of patients with hypopharyngeal cancer. **STUDY DESIGN:** Retrospective review of the records of 28 patients who underwent pharyngoesophagectomy reconstruction with radial forearm free flaps between 1996-2001 after total laryngopharyngectomy for hypopharyngeal cancer. Pathology, margins, and patterns of recurrence were charted. **METHODS:** The Kaplan-Meier method was used to estimate survival and recurrence-free time. **RESULTS:** The median follow-up time was twenty months. There were fourteen (50%) patients who had recurrences. Analysis revealed that only one (3%) patient experienced a recurrence at the inferior resection margin, the junction of the free flap reconstruction and the cervical esophagus. Estimated four year survival was 51%. **CONCLUSIONS:** Total laryngopharyngectomy and partial esophagectomy with radial forearm free flap reconstructions in selected patients with hypopharyngeal cancer has become the preferred strategy at our institution

#### **12:00 Adjourn**

**SATURDAY, MAY 1, 2004**

**6:30 Reception - Ballroom Lawn\***

**7:15 Banquet/Party - Grand Sonoran A-D\***

\*If you did not pre-order tickets, tickets may be purchased at the registration counter

## SUNDAY, MAY 2, 2004

### 7:45 - 8:45 COURSES

- S1. Identification and Management of Parotid Lesions *Desert Conference Suite II*  
Jonas T. Johnson, MD\*, Pittsburgh, PA
- S2. Management of Vocal Fold Paresis and Paralysis *Desert Conference Suite V*  
Charles Cummings, MD\*, Baltimore, MD
- S3. The Pediatric Airway *Desert Conference Suite VII*  
Robin Cotton, MD\*, Cincinnati OH
- S4. Diagnosis and Management of Hearing Impairment in Young Children *Grand Sonoran H*  
Kenneth Grundfast, MD\*, Boston, MA
- S5. Case Studies in Pediatric Otolaryngology *Grand Sonoran I*  
Gerald B. Healy, M\*D, Boston, MA
- S6. Anatomy and Surgical Management of Frontal Sinus Disease *Grand Sonoran J*  
Stilianos Kountakis, MD, Augusta, GA
- S7. Management of Allergic Fungal Sinusitis *Grand Sonoran K*  
Frederick Kuhn, MD\*, Savannah, GA
- S8. Extending Transnasal Endoscopic Surgery Beyond the Sinuses *Grand Sonoran E*  
Aldo Stamm, MD, PhD, Sao Paulo, Brazil

### 8:50 - 9:50 COURSES

- S9. Modern Management of Recurrent Laryngeal Nerve Injury *Grand Sonoran H*  
Roger L. Crumley, MD\*, Irvine, CA
- S10. Microflap Surgery for Benign Laryngeal Disease *Grand Sonoran I*  
Robert H. Ossoff, MD\*, Nashville, TN
- S11. Diagnosis and Treatment of Allergic Middle Ear Disease *Desert Conference Suite II*  
Jennifer Derebery, MD\*, Los Angeles, CA
- S12. How Advances in Genetics Have Changed the Evaluation of the Deaf Person  
Richard Smith, MD\*, Iowa City, IA *Desert Conference Suite V*
- S13. The Otolaryngologist's Role in Newborn Hearing Screening *Desert Conference Suite VII*  
Patrick E. Brookhouser, MD\*, Omaha, NE
- S14. Inverted Papilloma and Other Sinonasal Tumors: Management in the Endoscopic Era  
David Kennedy, MD\*, Philadelphia, PA *Grand Sonoran E*
- S15. The Frontal Sinus - Overview and Update *Grand Sonoran J*  
Charles H. Gross, MD\*, Charlottesville, VA
- S16. The Surgeon's Perspective on Managing Patients on Organ Preservation Protocols  
George Adams, MD\*, Minneapolis, MN *Grand Sonoran K*

### 9:50 Break with Exhibitors - Grand Canyon 6, 7 & 8

### 10:30 PANEL: HEAD AND NECK-STUMP/STOMP THE EXPERTS Grand Sonoran E

Moderator: Jack L. Gluckman, MD\*, Cincinnati, OH

Panelists: Paul Donald, MD\*, Sacramento, CA; Jonas T. Johnson, MD\*, Pittsburgh, PA; Paul Levine, MD\*, Charlottesville, VA; Ernest Weymuller, Jr., MD\*, Seattle, WA

### 12:00 Adjourn

## MONDAY, MAY 3, 2004

**7:00 Business Meeting - Members Only - Grand Sonoran E**

**7:40 Introduction of President-Elect, Patrick E. Brookhouser, MD\***  
**Robert A. Jahrsdoerfer, MD\***

### **7:50 - 8:50 A.M. COURSES**

- M1. Meatoplasty in Closed and Open Cavities: How & Why *Grand Sonoran E*  
Ugo Fisch, MD, Zurich, Switzerland
- M2. Pediatric Otology *Desert Conference Suite II*  
Antonio De La Cruz, MD\*, Los Angeles, CA
- M3. The Future of Otology *Desert Conference Suite III*  
Robert Jackler, MD, San Jose, CA
- M4. Ossicular Reconstruction *Desert Conference Suite IV*  
Klaus Jahnke, MD, Essen, Germany
- M5. Cochlear Implants *Desert Conference Suite V*  
Harold C. Pillsbury, MD\*, Chapel Hill, NC
- M6. Functional and Aesthetic Rhinoplastic Surgery *Grand Sonoran H*  
Ted Cook, MD, Portland, OR
- M7. Techniques in Functional Rhinoplasty *Grand Sonoran I*  
Stephen Park, MD\*, Charlottesville, VA
- M8. Rhinoplasty: Successful Techniques for Nasal Grafts and Implants *Grand Sonoran J*  
J. Regan Thomas, MD, Chicago, IL
- M9. Improving Long Term Outcomes in Rhinoplasty *Grand Sonoran K*  
Dean Toriumi, MD\*, Chicago, IL
- 9:00 PANEL: THE FACIAL NERVE Grand Sonoran E**  
Moderator: Ugo Fisch, MD, Zurich, Switzerland  
Panelists: Newton Coker, MD\*, Houston, TX; Bruce Gantz, MD\*, Iowa City, IA; John House, MD\*, Los Angeles, CA; John K. Niparko, MD\*, Baltimore, MD

**10:15 Break with Exhibitors - Grand Canyon 6, 7 & 8**

**10:45 - NOON GRAND SONORAN E**  
**MONDAY SIMULTANEOUS SESSION I - EAR**

**MODERATOR: ANIL K. LALWANI, MD\*, NEW YORK, NY**

**10:45 Acoustic Neuromas After Failed Radiation Therapy: Challenges of Surgical Salvage**  
Charles J. Limb, MD, Baltimore, MD  
Donlin M. Long, MD, Baltimore, MD  
John K. Niparko, MD\*, Baltimore, MD

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to discuss the technical aspects of surgical resection of acoustic neuroma after unsuccessful treatment with stereotactic radiotherapy.

**OBJECTIVES:** As stereotactic radiation has emerged as a treatment option for acoustic neuromas, cases requiring surgical salvage after failed irradiation have also emerged. We present here a comparison of the technical challenges faced by surgeons in the treatment of irradiated vs. non-irradiated acoustic neuromas. **STUDY DESIGN:** Matched case control series. **METHODS:** We identified seven patients with acoustic neuromas that required surgical resection following radiation therapy. Seven non-irradiated case control subjects matched for age, gender, and tumor size were identified for comparison. Growth rates, operative findings and outcomes were compared for the two groups. **RESULTS:** Surgical removal following irradiation was found to be significantly more difficult due to increased fibrosis and adhesion to adjacent nervous structures, particularly at the porus acusticus. Excessive scarring hindered identification of the facial nerve and added uncertainty as to the completeness of tumor removal. Decompression of the internal auditory canal dura and intracanalicular resection of neoplasm prior to cerebellopontine angle dissection was often required for facial nerve identification. Operative time was longer for irradiated cases, and facial nerve outcomes tended to be poorer, particularly when facial nerve dysfunction prompted the salvage procedure. **CONCLUSIONS:** Surgical salvage of acoustic neuromas following radiation therapy is feasible, but presents technical challenges beyond those associated with primary surgical therapy. Poorer outcomes relate to anatomic changes at the nerve/tumor interface and preoperative cranial nerve status. As surgical experience with the irradiated acoustic neuroma grows, observations should be incorporated into the counsel provided to patients as they consider treatment options.

**10:53 Unilateral Acoustic Neuroma: Long-Term Hearing Results in Patients Managed with Hyperfractionated Stereotactic Radiotherapy, Hearing Preservation Surgery and Expectantly**

Vincent Y. W. Lin, MD, Toronto, ON Canada  
Craig Stewart, MSc, Toronto, ON Canada  
May Tsao, MD, Toronto, ON Canada  
David W. Rowed, MD, Toronto, ON Canada  
Joseph M. Chen, MD, Toronto, ON Canada  
Julian M. Nedzelski, MD\*, Toronto, ON Canada

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to understand and compare the various treatment modalities used to manage unilateral acoustic neuromas (hyperfractionated stereotactic radiotherapy, hearing preservation tumour excision and expectant). They should be able to understand the hearing acuity deterioration associated with the natural history of this disease which is unfortunately not circumvented with treatment.

**OBJECTIVES:** Most current studies in which irradiation treatment is used for acoustic neuromas claim hearing preservation rates between 57.7% and 100%. We reviewed the long-term hearing results of patients managed with: 1) hyperfractionated stereotactic radiotherapy (HSR); 2) hearing preservation tumour excision (HPTE); and 3) expectantly. **STUDY DESIGN:** Retrospective chart review. **METHODS:** Single institution retrospective chart review of 20 patients managed with HSR (1993-2003), 126 patients in whom HPTE was carried out and 101 patients left untreated (1974-2003). Only patients with tumors < 25 mm (including intracanalicular component) were included. **RESULTS:** Mean pure tone averages (PTA) in the HSR group increased 37.7 dB from 41.4 dB pre-treatment. The HPTE group demonstrated a mean PTA rise of 21.7 dB from 24.9 dB. Mean speech recognition thresholds (SRT) in the HSR group also increased 32.6 dB from 57.5 dB compared to an increase of 23.5 dB from 22 dB in the HPTE and an increase of 22.7 dB from 41.2 dB in the expectant group. Mean speech discrimination scores (SD) fell 37.7% from 90.1% in the HSR group compared to a decrease of 15.9% from 86.7% in the HPTE and a decrease of 22.0% from 67.2% in the expectant group. All results are statistically significant (p<0.05). Mean follow up periods were 3.5, 4.1 and 4.0 years in the HSR, HPTE and expectant groups respectively. **CONCLUSIONS:** Long-term hearing acuity significantly worsened in all three treatment modalities. There were no statistically significant differences in the rate of hearing acuity changes between the three treatment modalities examined.

**11:01 Perceptual Outcomes of ABI in Tumor vs. Non-Tumor Patients**

Vittorio Colletti, MD, Verona, Italy  
Francesco Fiorino, MD, Verona, Italy  
Veronica Miorelli, MD, Verona, Italy  
Liliana Colletti, MD, Verona, Italy  
Marco Carner, MD, Verona, Italy

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to demonstrate that ABI represents a valid rehabilitative option in deaf patients with contraindications to cochlear implantation.

**OBJECTIVES:** To compare the rehabilitative results achieved with auditory brainstem implant (ABI) patients with without acoustic tumors. **STUDY DESIGN:** Over the period from April 1997 to October 2003, 48 patients (38 adults, 10 children) were fitted with ABI in our department. Two categories of patients were treated. The first one included subjects with acoustic tumor (T). The second group comprised patients suffering from a variety of non-tumor (NT) cochlear or cochlear nerve pathologies. **METHODS:** The T group comprised 10 adults and 1 child suffering from neurofibromatosis type 2 (NF2) and 3 adults with solitary vestibular schwannoma in the only hearing ear. The NT group included 5 children with bilateral cochlear nerve aplasia, 2 children and 16 adults with complete cochlear ossification, 6 adults with eighth cranial nerve disruption following head injury and 2 children and 3 adults with auditory neuropathy. The retrosigmoid-transmeatal approach was used in all T patients and a retrosigmoid approach in the NT subjects. The electrode array was inserted into the lateral recess and correct electrode positioning was monitored with the aid of electrically evoked auditory brainstem responses (EABRs) and neural response telemetry (NRT). **RESULTS:** No complications were observed due to implantation surgery or related to ABI activation and stimulation of the cochlear nuclei. A variable number of electrodes (5 to 18) were activated postoperatively. Auditory sensations with different pitches were experienced by all patients using different electrode stimulations. Closed set word recognition, open set sentence recognition and speech tracking furnished higher scores in NT compared to T patients at every follow-up. In particular, sentence recognition in the auditory only mode, evaluated at the latest follow-up (2 months to 6 years) was on average 60% in the NT group and 16% in the T group. **CONCLUSIONS:** Based on the intraoperative electrophysiological findings, pathophysiological reasons underlying the different outcomes in the two groups are discussed. ABI represents a valid rehabilitative option in NT patients in whom cochlear implantation is contraindicated or is not suitable to give satisfactory hearing improvement.

**11:09 Surgical Outcomes in Patients with Endolymphatic Sac Tumors**

Marlan R. Hansen, MD, Iowa City, IA  
William M. Luxford, MD, Los Angeles, CA

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to discuss the clinical presentation, imaging characteristics, treatment options, and outcomes for endolymphatic sac tumors.

**OBJECTIVES:** To determine the surgical outcomes in patients with endolymphatic sac tumors (ELSTs). **STUDY DESIGN:** Retrospective review of patients at a referral-based otology-neurotology practice. **METHODS:** A review of the records from a single tertiary referral center revealed 16 patients treated for ELSTs from 1971-2002. This paper reports the treatment outcomes for the 14 patients for whom clinical data were available. **RESULTS:** Sensorineural hearing loss, tinnitus, and dizziness were the most common presenting signs and symptoms. Six patients presented with facial weakness and three patients had symptoms characteristic of Meniere's syndrome. One patient suffered from Von Hippel-Lindau disease. Patients underwent microsurgical removal and were followed for an average of 59.6 months. Patients that presented with normal facial function maintained excellent postoperative function and hearing was preserved in two patients with small tumors. Three patients developed recurrent tumors. Two of these patients suffered persistent disease despite multiple attempts at microsurgical removal and radiotherapy. Both had incomplete resections of their initial tumors. The third patient was successfully managed by a second attempt at microsurgical removal. **CONCLUSIONS:** Taken together with other reports, these results suggest that ELST are best managed by complete surgical resection. This can generally be accom-

plished with minimal additional morbidity.

#### 11:17 Discussion

### MODERATOR: KAREN J. DOYLE, MD\*, SACRAMENTO, CA

#### 11:22 Cytomegalovirus in Perilymphatic Fluid

Paul W. Bauer, MD, Dallas, TX  
Mojgan Pariszi-Robinson, PhD, Dallas, TX  
Peter S. Roland, MD\*, Dallas, TX

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to describe the technique used to analyze perilymphatic fluid for CMV and know the impact of congenital CMV infection on hearing.

**OBJECTIVES:** The incidence of congenital cytomegalovirus (CMV) infection is approximately 1% of neonates. Ninety percent of congenitally infected infants are "asymptomatic"; they have no signs or symptoms at birth. The prevalence of congenital CMV in the profoundly deaf population and the pathogenesis of deafness from CMV are unknown. It has been shown that the nature of CMV mediated endothelial cell interaction is both qualitative and quantitative. The objective of this study is to determine CMV can be demonstrated and quantified in perilymphatic fluid of patients with congenital CMV infection and sensorineural hearing loss (SNHL) using a quantitative real-time polymerase chain reaction (QRT-PCR). **STUDY DESIGN:** Prospective case series. **METHODS:** Perilymphatic fluid was collected at the time of cochlear implantation from children with known or radiologic evidence of congenital CMV infection and analyzed for the CMV using QRT-PCR. Blood was collected and analyzed for CMV using QRT-PCR, serology, and culture. The primary outcome measure was the presence of CMV in perilymphatic fluid. The quantitative concentration of PCR product made was compared to that present in the patient's blood. **RESULTS:** Perilymphatic fluid and blood was collected from six children. The concentration of CMV in perilymphatic fluid was significantly greater than the typical concentration of CMV found in blood. **CONCLUSIONS:** CMV can be demonstrated in perilymphatic fluid using QRT-PCR. It is found there at concentration levels significantly higher than are typically found in blood. The high concentration of CMV supports previous observations that the mechanism of endothelial cell injury involves a quantitative component providing insight into the pathophysiologic mechanism by which CMV mediates SNHL.

#### 11:30 Surgical Management of Meniere's Disease in the Era of Gentamicin

David M. Kaylie, MD, Nashville, TN  
C. Gary Jackson, MD\*, Nashville, TN  
Edward K. Gardner, MD, Nashville, TN

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to discuss the benefits and reasonable expectations for the various surgical management options for Meniere's disease.

**OBJECTIVES:** For many years surgery was the mainstay of therapy for medically refractory patients, but recently, transtympanic gentamicin perfusion has become a popular and frequently used method for treating Meniere's disease. Many otologists question the relevance of surgical treatments, and traditional options are rarely discussed or offered to patients. The purpose of this study is to describe results of labyrinthectomy, vestibular nerve section and endolymphatic mastoid shunt surgery for patients with Meniere's disease, and compare them to published results for gentamicin perfusion. **STUDY DESIGN:** Retrospective chart review. **METHODS:** Two hundred forty-eight patients underwent surgery for management of Meniere's disease between 1/1/1995 to 12/31/2001. Forty-six patients had translabyrinthine labyrinthectomies, ninety-five underwent suboccipital vestibular nerve sections and one hundred and seven elected for an endolymphatic mastoid shunt. Hearing results, dizziness classification and functional level score were determined from patient charts and telephone conversations. All results were in accordance with the AAOHNS Committee on Hearing and Equilibrium guidelines for evaluation of Meniere's disease therapy. **RESULTS:** Audiologic results, functional level score and dizziness classification is reported for the pre-operative period and the 18-24 month post-operative period for all surgical patients. These data are also reported individually for each of the three surgical procedures. Early post-operative data and most recent follow-up data are presented if available. Post-operative improvement of tinnitus, aural fullness and unsteadiness is reported. Those who developed bilateral disease and/or the number of patients who had subsequent procedures are indicated. **CONCLUSIONS:** Surgical management of Meniere's disease is a safe and viable option for patients with medically refractory disease.

#### 11:38 Ossiculoplasty Using Incus Interposition: Hearing Results and Analysis of the Middle Ear Risk Index

Robert C. O'Reilly, MD, Wilmington, DE  
Richard A. Bernat, MD, Philadelphia, PA (Presenter)  
Stephen P. Cass, MD MPH, Denver, CO  
Barry E. Hirsch, MD, Pittsburgh, PA  
Donald B. Kameron, MD\*, Pittsburgh, PA  
Sheri P. Poznanovic, MD, Denver, CO

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to understand the utility of incus interposition for ossicular chain reconstruction and discuss the long-term success rate of this type of reconstruction.

**OBJECTIVES:** To determine the immediate hearing result and the long-term stability of sculpted incus interposition for the treatment of conductive hearing loss. **STUDY DESIGN:** This study is an extensive retrospective review of 137 patients who underwent type III ossiculoplasty using autologous or homologous sculpted incus interposition. **METHODS:** Retrospective chart review, using the guidelines delineated by the Committee on Hearing and Equilibrium of the AAO-HNS for the evaluation of results for the treatment of conductive hearing loss. **RESULTS:** The mean preoperative air bone gap was 26.8 dB and the mean postoperative gap was 18.6 dB, accounting for a 20.1% air bone gap closure. 25.5% of patients were closed to within 10 dB, and 66.4% brought to within 20 dB of the postoperative bone conduction line. Average time to the last postoperative audiometric testing was 15.8 months, with a range of 2 to 62 months. A mean air bone gap change of -0.2 dB was noted. Four patients had more than a 10 dB deterioration in conductive hearing loss. Each operated ear in our series was fully scored using the MER Index proposed by Kartush et al. and an index total was calculated. No statistical associations could be demonstrated in any group between the postoperative air bone

gap and the MER Index subcategories or total. **CONCLUSIONS:** While many innovative designs and materials have been employed to bridge the gap between the malleus and stapes for the treatment of conductive hearing loss, sculpted autologous incus interposition provides hearing success comparable to current allograft prosthesis studies, has a very low extrusion rate, and remains stable over time.

**11:46 Direct Facial to Hypoglossal Neuroorrhaphy Using the Parotid Release Maneuver: Long-Term Outcomes**

Karen Lin, MD, New York, NY  
Lee M. Klausner, MD, New York, NY  
Philip J. Miller, MD, New York, NY  
J. Thomas Roland, MD, New York, NY

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should understand a modification of a facial to hypoglossal neuroorrhaphy and its indications and expected outcomes.

**OBJECTIVES:** Surgeries involving the temporal bone, cerebellopontine angle, and facial nerve tumors inherently risk facial nerve integrity. When the facial nerve is transected or severely compromised, hypoglossal-facial nerve anastomosis remains the most favorable method for accomplishing three main goals: restoring facial tone, restoring facial symmetry, and facilitating return of voluntary facial expression. Our objective is to evaluate the surgical feasibility and the long-term outcomes of our facial to hypoglossal neuroorrhaphy with a parotid release maneuver. **STUDY DESIGN:** Prospective cohort. **METHODS:** Eight patients with iatrogenic facial paralysis due to proximal facial nerve injury who underwent the facial-hypoglossal neuroorrhaphy with a parotid release maneuver were subjects for this study. Outcome measures included the Gidley and Gantz Repaired Facial Nerve Recovery Scale, questionnaires, and photographs. **RESULTS:** Facial-hypoglossal neuroorrhaphy with a single anastomosis and parotid release was technically feasible in all cases, and anastomosis was achieved distal to the ansa hypoglossi take-off. Most patients had good return of facial nerve function despite prolonged facial paralysis. Five patients had ratings of C or better, indicating strong eyelid and oral sphincter closure, and mass motion. There was minimal to no hemilingular atrophy and no subjective tongue dysfunction. **CONCLUSIONS:** The parotid release maneuver mobilizes additional length to the distal facial nerve, therefore creating a tension-free communication distal to the ansa hypoglossi. Our study demonstrates that this is a viable option for facial reanimation, and patients achieve good clinical outcomes with continual improvement.

**11:54 Discussion**

**12:00 Adjourn**

**10:45 - NOON GRAND SONORAN A-D  
MONDAY SIMULTANEOUS SESSION II - PLASTIC/RECONSTRUCTIVE & LARYNGOLOGY**

**MODERATOR: TED A. COOK, MD, PORTLAND, OR**

**10:45 Total Nasal Reconstruction Using Microvascular and Pedicle Tissue Transfer—A Three Year Experience**

Adam T. Ross, MD, Portland, OR  
Mark K. Wax, MD, Portland, OR  
Rajendra Bhayani, MD, Portland, OR  
Tom D. Wang, MD\*, Portland, OR  
Ted A. Cook, MD, Portland, OR

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to discuss the various options used for the reconstruction of large nasal defects as well as discuss lessons learned from our series of patients who have undergone total nasal reconstruction with microvascular and pedicle tissue transfer.

**OBJECTIVES:** Total nasal defects may be a result of cancer resection or trauma and can be challenging to manage from the perspective of both the patient and the surgeon. While prosthetic reconstruction is an acceptable option for such defects, advances in microvascular surgery and other techniques have provided us with a surgical alternative. In this report, we discuss the lessons we have learned through a series of patients who underwent total nasal reconstruction with microvascular free flap transfer in combination with local flap techniques usually reserved for lesser defects. **STUDY DESIGN:** Retrospective study of eight patients who underwent microvascular free flap reconstruction for total nasal defects. **METHODS:** Chart review of patients treated at our tertiary care center over the past three years. **RESULTS:** We have found microvascular free flap tissue transfer to be a useful adjunct for total nasal reconstruction when used in combination with local techniques. Over three years, eight patients were identified who have undergone this type of reconstruction. We have modified our techniques to improve both our aesthetic and functional results, and found that aggressive reconstruction of the nasal dorsum as well as lateral nasal wall augmentation is a technique crucial to assure aesthetic and functional longevity. **CONCLUSIONS:** Modern surgical advances and technical improvements now offer patients a viable alternative to a prosthesis for total nasal reconstruction. Excellent aesthetic and functional results are now feasible using microvascular free tissue transfer with other surgical modifications to further support the reconstructed nasal complex.

**10:53 Pre-Caruncular Medial Canthopexy**

Kris S. Moe, MD, San Diego, CA  
Chuan-Hsiang Kao, MD, Taipei, Taiwan ROC (*Presenter*)

**EDUCATIONAL OBJECTIVE:** To demonstrate a new procedure that can be used by facial plastic and head and neck surgeons to correct malposition of the medial canthal tendon.

**OBJECTIVES:** While numerous surgical procedures have been developed to correct malposition of the medial lower eyelid, most are ineffective in that they reposition the medial canthus in only two dimensions. We describe a new three-dimensional technique for medial canthal repositioning, pre-caruncular medial canthopexy (PMC) and present an outcome study demonstrating its efficacy. **STUDY DESIGN:** Retrospective analysis. **METHODS:** Thirty procedures were performed on 27 consecutive patients (3 patients had bilateral pathology). There were 19 males and 8 females,

the mean age was 63 (range, 28-85 years), and the mean follow-up was 19 months (range 1-48 months). Standardized pre- and post-operative photographs were taken of all patients. The Ectropion Grading Scale (EGS) was used to grade the degree of ectropion before and after each procedure. Ancillary procedures, most commonly lateral transorbital canthopexy (for correction of lateral canthal malposition), were performed on 60% of the lids at the time of the PMC. **RESULTS:** Twenty-nine of the 30 PMC procedures (97%) resulted in restoration of the medial canthus to a normal position (EGS grade I). One patient showed minimal residual medial scleral show after surgery (EGS grade II), but had complete relief of symptoms. There were no wound infections or perioperative complications. All patients healed rapidly with minimal morbidity. **CONCLUSIONS:** Pre-caruncular medial canthopexy is a new and effective procedure for repositioning the medial canthal tendon in all three vectors (horizontal, vertical and anteroposterior). The successful outcome of 30 procedures demonstrates the efficacy of this procedure.

**11:01 Tissue Engineering of Functional Salivary Glands for the Treatment of Radiation Induced Xerostomia**

Christopher A. Sullivan, MD, Boston, MA  
James J. Yoo, PhD, Boston, MA  
Akira Johraku, PhD, Boston, MA  
Anthony Atala, MD, Boston, MA

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to understand basic concepts of tissue engineering and its potential role in the management of radiation induced xerostomia.

**OBJECTIVES:** Treatment of radiation induced xerostomia is currently limited to administration of saliva substitutes and sialogogues. The transient effect of these medications necessitates frequent administration and systemic side effects may be intolerable. The creation of implantable, functional salivary gland tissue from autologous glandular cells would provide a physiologic solution to this problem. We investigated the feasibility of engineering such tissue in vivo for the treatment of radiation induced xerostomia. **STUDY DESIGN:** In vivo animal study with controls. **METHODS:** Primary human submandibular gland cells were grown, expanded and seeded on biodegradable polymer scaffolds. A total of 18 scaffolds with cells and 6 control polymers without cells were implanted subcutaneously in athymic mice. The implants were retrieved 2, 4 and 8 weeks after the implantation for phenotypic and functional analyses. **RESULTS:** Human salivary gland epithelial cells retained their phenotypic and functional characteristics at all culture stages. Histologically, formation of acinar gland-like structures was observed within the engineered tissue by 4 weeks after implantation. Immunocytochemical and Western blot analyses of the implanted tissues demonstrated the expression of human  $\alpha$ -amylase, cytokeratins AE1/AE3, and aquaporin-5 using cell specific antibodies. RT-PCR analyses confirmed the expression of human  $\alpha$ -amylase mRNA. The retrieved tissues demonstrated the production of human  $\alpha$ -amylase over time using a biochemical amylase detection system. **CONCLUSIONS:** Primary human salivary gland cells seeded on polymers are able to form functional tissues in vivo. The engineered tissue, composed of glandular epithelial cells is able to produce amylase and possesses water channel proteins. This autologous cell-based system may provide a new treatment modality for patients suffering from radiation induced xerostomia.

**11:09 Scapula Osteocutaneous Free Flap Reconstruction of the Head and Neck: Outcomes and Complications**

Russell B. Smith, MD, Iowa City, IA  
Douglas Henstrom, Iowa City, IA  
Kristi E. Chang, MD, Iowa City, IA  
David P. Goldstein, MD, Iowa City, IA  
Lucy H. Karnell, PhD, Iowa City, IA  
Gerry F. Funk, MD, Iowa City, IA

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to have an understanding of the role of scapula osteocutaneous flaps for head and neck reconstruction and potential outcomes and complications.

**OBJECTIVES:** The scapula osteocutaneous free flap is frequently used to reconstruct complex head and neck defects. Although its harvest is labor intensive and cannot be performed simultaneously with resection, this flap is often the first choice because of its tissue versatility. Also, due to a lack of atherosclerotic changes in its vascular pedicle, scapula flaps may be a second choice when other osteocutaneous flaps are contraindicated. **STUDY DESIGN:** Retrospective chart review. **METHODS:** This retrospective chart review of a single institute's scapula free flap experience between 1991-2003 will evaluate the complications and outcomes of scapula free flaps in head and neck reconstruction. **RESULTS:** Of the 23 scapula free flaps, 87.5% were used with ablative and 12.5% with traumatic defects. (The defects were two-thirds mandibular and one-third maxillary.) The flap survival rate was 100%. The percentage of patients with surgical wound complications was virtually identical ( $p=1.000$ ) for the 14 first-choice flaps (42.9%) and the 9 second-choice flaps (44.4%). However, second-choice flaps had a significantly higher rate of medical complications (77.8%) than first-choice flaps (21.4%;  $p=.009$ ). **CONCLUSIONS:** The scapula osteocutaneous flap has a high success rate in head and neck reconstruction. The substantial rate of complications associated with these flaps was equivalent regardless of whether the flap was used as a first or secondary choice. However, medical complications (major cardiopulmonary disease, stroke, patient death) were significantly higher for second-choice flaps. In addition to issues of survivorship and functional outcome, patients should be counseled about the high risk of perioperative medical morbidity when these flaps are utilized as a secondary choice.

**11:17 Discussion**

**MODERATOR: GAYLE E. WOODSON, MD\*, SPRINGFIELD, IL**

**11:22 Endoscopic Evaluation of Arytenoid Motion in Healthy Adults**

Seth H. Dailey, MD, Boston, MA  
James B. Kobler, PhD, Boston, MA  
Robert E. Hillman, PhD, Boston, MA  
Ekawudh A. Thananart, MD, Boston, MA  
Kittisard B. Tangrom, MD, Boston, MA  
Steven M. Zeitels, MD\*, Boston, MA

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to understand that accurate and reliable meas-

ures of arytenoid motion are now possible. Furthermore, they should recognize that there is considerable variation in the values of maximum abduction angle (MAA), maximum abduction velocity (MABV) and maximum adduction velocity (MADV) across healthy volunteers. Additionally, they should understand that adduction was more sensitive to an increase in gesture rate than was abduction.

**OBJECTIVES:** At present, arytenoid motion is subjectively evaluated and dependent upon reviewer bias. With the expanding complexity of the laryngologic procedures and a more recent focus on outcomes, understanding this motion is crucial. Therefore healthy volunteers were recruited to help characterize normal range and speed of arytenoid motion. **STUDY DESIGN:** Prospective, volunteer-based. **METHODS:** Nineteen healthy young (18-27) volunteers were recruited to undergo digitally archived flexible fiberoptic examination while performing “ee”-sniff tasks at different gesture rates (slow, medium and fast). Maximum abduction angle (MAA), maximum abduction velocity (MABV) and maximum adduction velocity (MADV) were measured using specially developed software. Statistical analysis was performed to assess reproducibility of data within and across subjects and the sensitivity of the different measures to gesture rate. **RESULTS:** The range of MAA across subjects was 34-71° (Mean 50-52°, sd-10.0-11.8°). Intra-subject reproducibility was 0.80-0.89. Gesture rate did not significantly alter MAA. For increasing gesture rates, the MABV/sd in degrees/s were 330/118, 388/223 and 440/185. The MADV/sd in degrees/s were 229/92, 309/100 and 475/187. MADV was more sensitive to increasing gesture rates than MABV. Within subjects, variance in gesture velocity decreased with increasing numbers of gestures, suggesting a “training effect”. **CONCLUSIONS:** The inter-subject range of MAA was surprisingly large (34-71 degrees) with little intra-subject variability. Velocity measures were more variable within subjects and were more sensitive to gesture rate. MADV was more strongly affected by gesture rate than MABV, suggesting underlying differences in motor control. These measures show potential for better quantifying normal and abnormal laryngeal geometry and motor function.

#### 11:30 **WITHDRAWN--Photochemical Repair of Vocal Fold Microflap Defects**

Jayne R. Dowdall, BA, Boston, MA  
Ramon A. Franco, MD, Boston, MA (*Presenter*)  
Christopher J. Amann, BA, Boston, MA  
Robert W. Redmond, PhD, Boston, MA  
Irene E. Kochevar, PhD, Boston, MA

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should understand the concept of photochemical tissue bonding (PTB) and discuss its application to phonomicrosurgery.

**OBJECTIVES:** To bond epithelial flaps following cold excision of benign lesions from the vocal folds using a sutureless, non-thermal laser-assisted method. Photochemical tissue bonding (PTB), an emerging tissue repair technique combining visible light and photosensitizing dyes to produce collagen cross-links, will be evaluated for this application. **STUDY DESIGN:** An ex-vivo study was carried out on microflaps produced in porcine larynges. The concentration of the dye, Rose Bengal, and the light fluence was varied and studied. The resulting flap adherence will be compared amongst the treatments. Cell viability will be assessed. **METHODS:** A microflap procedure is performed on the supero-medial surface of the vocal fold mucosa. The dye, Rose Bengal (RB) at concentrations between .6% and 1%, was subsequently applied to the free margins of the flaps. The surfaces were apposed and the site irradiated with 532 nm green light from a Nd:YAG laser at fluences varying from 150 J/cm<sup>2</sup> to 600 J/cm<sup>2</sup>. The experimental site is then subjected to a calibrated stream of compressed air. The bonding was considered positive when visible flap adherence was observed at a threshold of 2 pounds per square inch. **RESULTS:** Bonding is achieved with a minimum of 0.75% RB and 300 J/cm<sup>2</sup>. **CONCLUSIONS:** This pilot study elucidates parameters for vocal fold PTB, setting the foundation for further exploration of this technique with in-vivo models.

#### 11:38 **Voice Turbulence Index (VTI) as a Measurement of Adductor Spasmodic Dysphonia (ADSD)**

Natasha T. Mirza, MD, Philadelphia, PA  
Sandra A. Schwartz, MS, Philadelphia, PA

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to 1) to discuss the role of VTI as an acoustic measure in spasmodic dysphonia; 2) to compare the degree of aberrance of VTI in ADSD patients; and 3) to compare the VTI score in ADSD patients before and after injections with botulinum toxin.

**OBJECTIVES:** To evaluate the significance of voice turbulence index (VTI) in patients with ADSD and to compare the effect of botulinum toxin in the vocalis muscle in changing the VTI score in these patients. **STUDY DESIGN:** Prospective, nonrandomized study of 20 patients with ADSD comparing their VTI scores before and 2 weeks after botulinum toxin injections. **METHODS:** As part of the voice evaluation process, acoustic measures were obtained to assess the degree of aberrance of vocal parameters when compared to normative values. Acoustic analysis was performed during the production of a prolonged vowel /a/ using the multi-dimensional voice program (MDVP) software included in the Computerized Speech Lab (Kay Elemetrics). Statistical analysis was then performed to determine significant change across pre- and post-injection VTI measures. **RESULTS:** We studied the acoustic signals in patients presenting with spasmodic dysphonia who theoretically, due to tightly adducted vocal folds should demonstrate a reduction in VTI. Patients with ADSD showed an increase in their VTI scores compared to norms before Botox injections. After selective weakening with Botox they showed a significant decrease in their VTI scores. **CONCLUSIONS:** VTI (voice turbulence index) is a measure obtained during acoustic analysis which claims to be a correlate of laryngeal turbulence caused by “incomplete or loosely adducted vocal folds” or “breathiness” in the signal. The significance of this work was to revisit the acoustic definition of turbulence as increased airflow. We feel voice turbulence instead implies an interruption of airflow at the glottal level. VTI may therefore be a means of objectifying perceptual improvement in vocal quality after Botox injection in patients with ADSD.

#### 11:46 **Stroboscopic Findings After Primary Closure of Laryngeal Defects**

Richard T. Kelley, MD, Syracuse, NY  
Lauren A. Paseman, MA, Syracuse, NY  
Debra J. Stepp, BS, Syracuse, NY

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to discuss the advantages and disadvantages of primary vocal fold defect closure using suture.

**OBJECTIVES:** Wound healing of laryngeal defects following lesion removal can be primary or secondary. Suturing the vocal fold to attain primary closure has been reported in animal and human studies. Voice quality and vibratory behavior of the vocal folds after lesion removal are primary goals of surgery. This study aims to determine voice outcomes and stroboscopic findings in patients who have had vocal fold lesions removed and suture repair of the defect. **STUDY DESIGN:** A retrospective study of patients having undergone microscopic phonosurgery with removal of a benign lesion and repair using suture closure was conducted. **METHODS:** A review was conducted to identify patients who had laryngeal surgery consisting of lesion removal and repair with suture by the primary author. Pre- and post-operative evaluation using voice handicap index (VHI), subjective voice quality, and stroboscopic ratings were performed. Follow-up ranged from 3 to 15 months. Stroboscopic evaluation consisted of vocal fold edge, mucosal wave, periodicity, and glottic closure assessment. **RESULTS:** Ten patients were identified. Subjective voice improvement and reduced VHI were noted for all patients. Stroboscopic findings included improved edge, glottic closure, and vibratory behavior. Focal abnormalities, however, were noted at the suture site and included stiffness and inflammation. **CONCLUSIONS:** Suture closure of vocal fold defects following benign lesion removal may result in localized vibratory abnormalities of the repaired vocal fold.

**11:54 Discussion**

**12:00 Adjourn**

**POSTERS**  
**COMBINED POSTER RECEPTION, MAY 2ND FROM 6:00 - 7:30 PM**

**1. Gustatory Impairment in Patients Following Tonsillectomy or Uvulopalatopharyngoplasty**

Soo K. Abboud, MD, Philadelphia, PA  
Natasha T. Mirza, MD, Philadelphia, PA  
Richard L. Doty, PhD, Philadelphia, PA

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to explain to their patients prior to tonsillectomy or uvulopalatopharyngoplasty that post-operative taste disturbance can occur.

**OBJECTIVES:** We seek to determine if taste perception is affected long-term, and to what degree, after routine tonsillectomy or uvulopalatopharyngoplasty (UPPP). If taste is affected, we hope to determine which taste sensations are affected most (i.e., sweet, sour, bitter, or salty), and what region (anterior vs. posterior tongue). **STUDY DESIGN:** 30 patients who underwent tonsillectomy or uvulopalatopharyngoplasty 6 months to 2 years prior to presenting to a university-based smell and taste center were administered a 96 trial regional taste test. Subjects were required to determine whether a tastant was perceived as sweet, sour, bitter, or salty, and were asked to rate the confidence of their answer (scale 0-5) and the perceived intensity of the tastant (scale 0-9). **METHODS:** Subjects were divided into three groups. Persons in Group 1 (n=13) did not report alterations in taste perception following surgery; persons in Group 2 (n=17) reported decreased taste ability following surgery; subjects in Group 3 (n=50) served as controls without taste dysfunction. Regional taste test performances were calculated and averaged for each group and compared in multiple categories. **RESULTS:** Overall regional taste test performance (for all tastants) was decreased in subjects complaining of decreased taste perception following surgery (Group 2) compared to controls and subjects reported no taste change after surgery (Groups 3 and 1, respectively). Sour taste perception, both anteriorly and posteriorly, was affected to a greater degree than in this group. Reported intensity levels for all tastants were also decreased in this group. **CONCLUSIONS:** Patients who undergo tonsillectomy or palate surgery (mainly uvulopalatopharyngoplasty) are at significant risk of dysgeusia even many months after surgery. This dysgeusia or decreased taste perception does not preferentially affect posterior taste perception and did not decrease overall performance on our 96-trial regional taste test significantly. However, sour taste perception was markedly affected, although the reason for this phenomenon is not currently understood.

**2. Gastrostomy Tube Placement in Patients Undergoing Chemoradiation Treatment for Advanced Head and Neck Cancer**

Khwaja A. Ahmed, MD, Memphis, TN  
Sandeep Samant, MD, Memphis, TN  
Francisco Vieira, MD, Memphis, TN

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to discuss the need for enteral alimentation in certain patients being treated for advanced head and neck cancer.

**OBJECTIVES:** To measure the percentage of patients requiring gastrostomy tubes (G-tubes) and the timing of their placement, in addition to studying if pretreatment variables (T stage, tumor site, N stage) and intratreatment variables (weight loss during treatment) are valid predictors for the need for G-tube placement. **STUDY DESIGN:** Retrospective case control study. **METHODS:** Retrospective review of a prospectively collected database with chart reviews was carried out on 477 patients treated on a regimen of intra-arterial cisplatin and concurrent radiation. The likelihood of requiring a G-tube was calculated by studying several independent variables utilizing chi-square analysis and the unpaired T-test. **RESULTS:** Two hundred twenty (46%) patients had G-tubes placed, with mean time of placement being on day 20 after the initiation of treatment. Patients with T4 disease were statistically more likely to require a G-tube (50% vs. 37%,  $p < 0.05$ ). Patients were less likely to require a G-tube when the primary site of tumor involved the larynx or paranasal sinuses ( $p < 0.05$ ). There were no statistically significant differences between the two groups with regards to patient age, gender, N stage, and weight changes over the course of treatment. The odds of requiring a G-tube were highest for T4 tumors involving the oral cavity (66%), hypopharynx (58%), and oropharynx (51%). **CONCLUSIONS:** While clinical judgment seems to be sufficient for deciding when G-tube placement is warranted in our population, the threshold for placing a tube should be lower in those patients who had a higher likelihood of requiring a G-tube during the course of treatment, including those with advanced disease of the oral cavity, oropharynx, and hypopharynx.

**3. Low-Temperature Radiofrequency Molecular Disassociation (Coblation®) for Base-of-Tongue Reduction in Obstructive Sleep Apnea**

Lee M. Akst, MD, Cleveland, OH  
Cheryl Attree, Naples, FL  
David Greene, MD, Naples, FL

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to discuss the role of low-temperature radiofrequency molecular disassociation (Coblation®) for base-of-tongue reduction in obstructive sleep apnea, including its use and its safety profile.

**OBJECTIVES:** This pilot study investigates the feasibility, safety, and efficacy of using low-temperature radiofrequency molecular disassociation (Coblation®) for base-of-tongue reduction in patients with obstructive sleep apnea syndrome (OSAS). The technique and its place in multi-level surgery for OSAS was assessed. **STUDY DESIGN:** Retrospective case series. **METHODS:** A retrospective chart review of patients with OSAS and retroglossal obstruction was performed to identify patients who had received low-temperature radiofrequency molecular disassociation (Coblation®) for base-of-tongue reduction. Variables such as pre- and post-treatment respiratory disturbance index (RDI), the number of radiofrequency treatments, types of other therapy, incidence of complications, and other outcome indicators were recorded in order to assess the safety and efficacy of this intervention. **RESULTS:** Preliminary review identified 180 procedures using radiofrequency energy for base-of-tongue reduction to manage retroglossal obstruction in OSAS patients. Among these procedures are 22 patients who received low-temperature radiofrequency molecular disassociation (Coblation®) for base-of-tongue reduction (more patients are expected to be identified as chart review is completed). Most of these patients (20/22) were male, and age ranged from 32-75 years (mean  $\pm$  SD 56.0  $\pm$  13.2). Patients received an average of 2.2  $\pm$  0.9 (range 1-5) radiofrequency sessions, with between 3-7 sites treated each session. Treatment with low-temperature radiofrequency molecular disassociation (Coblation®) lasted between 12-15 seconds/site, and this rapidity of treatment led to increased patient acceptance of this procedure relative to traditional radiofrequency therapy which can take several minutes/site. 15/19 (79%) of patients available for follow-up reported res-

olution or marked improvement of OSAS symptoms following completion of the treatment protocol. Among patients with both pre- and post-therapy RDI, average degree of improvement was 72% (range 24-100%). Of the 180 procedures done overall, there were only 5 complications (3 edematous reactions and 2 small hematomas); only one required inpatient management. Of the 22 patients (49 procedures) receiving Coblation®, there was only 1 complication (floor-of-mouth edema which resolved with steroids). **CONCLUSIONS:** This pilot study supports the safety and efficacy of low-temperature radiofrequency molecular disassociation (Coblation®) for base-of-tongue reduction, likely equivalent to that achieved with traditional temperature-controlled radiofrequency ablation (Somnoplasty®). The more rapid tissue effect with this new technique may promote increased patient acceptance of base-of-tongue reduction.

#### 4. **Sensorineural Hearing Loss in an 8 Year Old Male with Unique Congenital Inner Ear Deformities**

Gregory J. Artz, MD, Philadelphia, PA  
Robert C. O'Reilly, MD, Wilmington, DE  
Richard A. Bernat, MD, Philadelphia, PA  
Rao Vijay, MD, Philadelphia, PA

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to discuss the congenital temporal bone deformities that cause sensorineural hearing loss, recognize the key radiological findings, and recognize the clinical presentations.

**OBJECTIVES:** To describe a never before described deformity of the inner ear causing moderate sensorineural hearing loss, describe the unique radiology findings as seen on CT and MRI, and review the pertinent literature. **STUDY DESIGN:** A case report by chart review and literature search of the otology and pediatric literature. **METHODS:** Retrospective chart review, radiology review by leading authority in head and neck imaging, and utilization of internet search engine for the pertinent literature. **RESULTS:** This is a case of a never before reported congenital abnormality of the inner ear causing a sensorineural hearing loss in an 8 year old male. The unique radiology findings are presented by a world expert in head and neck imaging. **CONCLUSIONS:** This is an interesting case of an 8 year old with uniquely oriented internal auditory canals and other inner ear deformities that have not been reported in the literature. It serves as a topic of discussion for the common congenital deformities of the inner ear causing hearing loss.

#### 5. **Role of Fine Needle Aspiration Cytology for Diagnosis and Management of Thyroid Disease**

Yogesh Bajaj, MRCS DLO MS DNB, Burton on Trent, UK  
Mriganka De, MRCS, Burton on Trent, UK  
Adrian C. Thompson, FRCS, Burton on Trent, UK

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to discuss the efficacy of FNAC in thyroid nodules.

**OBJECTIVES:** To determine the efficacy of fine needle aspiration cytology in the diagnosis and management of thyroid nodule. **STUDY DESIGN:** Case note analysis. **METHODS:** All the patients who underwent thyroidectomy between 1999 and 2002 were analyzed. The main objective was to evaluate the predictive value of pre-op fine needle aspiration cytology in surgical decision making by evaluating the final pathological diagnosis and comparing with the initial fine needle aspiration cytology result. **RESULTS:** 214 patients were included in our study. 161 (75%) underwent pre-operative FNAC. The overall accuracy of fine needle aspiration was in 122 (75%) patients. FNAC and histology did not correlate in 31 (19%) and FNAC was inadequate in 9 (2%) cases. Failures were mainly noted in cases of follicular neoplasm in our study. **CONCLUSIONS:** Our results indicate that the FNAC is accurate, minimally invasive and reliable investigation in the diagnosis of the thyroid pathology. However to distinguish between follicular adenoma from follicular carcinoma complete histopathological analysis is essential. FNAC is cost effective method of evaluating thyroid pathology pre-operatively and plays a vital role in planning the surgical management of thyroid nodule.

#### 6. **Steady State Response Audiometry in a Group of Patients With Steeply Sloping Sensorineural Hearing Loss**

Charles J. Ballay, MD, Houston, TX  
Ross Tonini, AuD, Houston, TX  
Spiros Manolidis, MD, Houston, TX

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to understand possible implications the shape of the audiogram may have with regards to steady state audiometry.

**OBJECTIVES:** The purpose of this study was to determine the predictive value of auditory steady state (ASSR) evoked potential thresholds and predicted behavioral thresholds in a group of patients with steeply sloping sensorineural hearing loss. **STUDY DESIGN:** Case series. **METHODS:** Thirty-two patients with varying degrees of steeply sloping sensorineural hearing loss, aged approximately eight to eighteen, were invited for speech, language and auditory steady state response (ASSR) audiometry testing over a three month period. **RESULTS:** Twenty-five patients underwent ASSR testing. Results were compared with pure tone behavioral audiometric results. Pearson-product correlation coefficients comparing behavioral responses with steady state evoked potentials ranged from .70 to .96. Steady state evoked potential thresholds were then converted to predicted behavioral thresholds using formula established by previous authors and these values are compared to predicted behavioral results. Correlation values as measured in this select group of patients differ from previous author's results. **CONCLUSIONS:** Steady state audiometry has been proposed as screening modality in severe to profound hearing impaired persons who are unable to confidently undergo behavioral audiometric testing. The modality's utility in predicting residual threshold values in persons with severe to profound loss has shown good correlation with behavioral thresholds by numerous authors. The present study focuses on persons with varying degrees of sloping hearing loss. Predictive behavioral values and steady state thresholds, while thought to be better correlated with high frequency and severe to profound loss, appear in this study to have some dependency on the degree of high frequency hearing loss.

#### 7. **Actinomycosis Associated Complications Following Multi-Modality Treatment for Squamous Cell Carcinoma of the Upper Aerodigestive Tract**

Eric T. Becken, MD, Minneapolis, MN  
Timothy A. King, MD, Minneapolis, MN  
Holly C. Boyer, MD, Minneapolis, MN

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to identify the signs and symptoms of potential actinomycosis infections in head and neck cancer patients. Be able to design, compare and implement optimal treatment modalities for these infections and associated problems.

**OBJECTIVES:** The objective of this study is to document the risk factors, signs, symptoms, and treatment modalities used in a series of head and neck cancer patients with actinomycosis-associated infections complicating their care following multi-modality treatment for squamous cell carcinoma of the upper aero-digestive tract. A through review of the pertinent literature will examine and compare the experience of others in the recognition, diagnosis, and treatment of these infections. **STUDY DESIGN:** Retrospective chart review. **METHODS:** A detailed retrospective chart review was performed on 5 patients with biopsy proven actinomycosis infections following multi-modality treatment for squamous cell carcinoma of the upper aero-digestive tract. **RESULTS:** Complications directly attributed to or exacerbated by actinomycosis infection in our series include persistent pharyngeal edema, severe laryngeal edema, infectious neck mass, and osteoradionecrosis of the mandible. Diagnosis was made by either direct laryngoscopy and biopsy or intra-office biopsy. The antibiotic of choice was penicillin with the length and route of administration of treatment dependent on the site of infection and the severity of symptoms. At the conclusion of treatment all symptoms attributed to the actinomycosis infections had resolved, including mucosal coverage of the previously exposed bone in the patient with osteoradionecrosis. **CONCLUSIONS:** Actinomycosis infection is a potential complication in patients following multi-modality treatment for squamous cell carcinoma of the upper aero-digestive tract. Prompt diagnosis and appropriate treatment of the infection are vital to hasten the resolution of the problem and return to patient to optimal function.

#### 8. Patient Evaluation of Students in an Otolaryngology Clinic

Michele M. Carr, DDS MD MEd, Hershey, PA  
Carol M. Zimbalatti, BSc, Toronto, ON Canada

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to discuss how otolaryngology clinic patients perceive involvement of students in their care, and to understand some of the issues in seeking opinions from these patients on students' performance.

**OBJECTIVES:** Interviewing skills are pivotal in the art of practicing medicine, but may not be evaluated reliably by staff physicians. This paper examines the viability of real patient evaluation of medical students by assessing whether patient demographics affect student evaluations, and determining if patients would feel willing to participate and would feel beneficial in the evaluation of student interviewing skills. **STUDY DESIGN:** Survey and semi-structured interview. **METHODS:** Surveys were given to 142 consecutive otolaryngology clinic patients who had been seen in part by medical students. Data included demographic information, ratings of the medical student and clinic experience, and opinions on patient evaluation of medical students. Of these participants, 13 consented to an audio taped interview. **RESULTS:** The participants' subjective measurement of waiting time was significantly correlated with their evaluation of the clinic visit. Patients perceiving shorter waiting times were more satisfied with their medical care ( $\tau\text{-c} = 0.181$ ), more satisfied with answers to their questions ( $\tau\text{-c} = 0.155$ ), and thought that the students were more knowledgeable ( $\tau\text{-c} = 0.179$ ), empathetic ( $\tau\text{-c}=0.143$ ), and professional in appearance ( $\tau\text{-c} = 0.172$ ). The interview participants each felt that patients could provide valuable information in the evaluation of student interviewing skills and most were willing to take part in the process as long as the criteria they were evaluating were reasonable and there was a comfortable medium to voice their opinions. **CONCLUSIONS:** Evaluation of the clinic experience and of the medical student was most closely correlated with the patients' assessment of the waiting time. Participants of this study had a keen interest in medical education and seem willing to take part in the education process.

#### 9. Malignant Mucosal Melanoma of the Supraglottis and Hypopharynx: A Case Report and Review of the Literature

Andy T. A. Chung, MD, Durham, NC  
Samuel R. Fisher, MD\*, Durham, NC

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to differentiate the differences between mucosal and cutaneous melanoma, understand the pathological criteria in diagnosing a metastatic versus a primary lesion, identify immunohistochemical markers used in diagnosing melanoma, understand the current staging of mucosal melanoma, describe the treatment options available and be familiar with the diagnostic imaging studies currently utilized.

**OBJECTIVES:** Malignant mucosal melanoma of the head and neck is rare. A review of all mucosal melanomas of the head and neck from 1970 through 1995 revealed 51 cases of known primary mucosal melanoma of the upper aerodigestive tract from 11,942 melanoma patients. Two patients demonstrated malignant mucosal melanoma involving the supraglottis and hypopharynx are reported here. Similar cases have only been reported eight other times in the literature. **STUDY DESIGN:** Case report. **METHODS:** Case report with literature review. **RESULTS:** Two patients with malignant mucosal melanoma involving the supraglottis and hypopharynx are reported here. **CONCLUSIONS:** Primary malignant melanoma of the hypopharynx, pharynx, and larynx are rare. They typically present later and tend to behave more aggressively than their cutaneous counterparts. Despite treatment with combined surgical resection and postoperative radiation therapy, these malignancies tend to recur locally and have significant metastatic potential. When aggressive local control of the melanoma is achieved early, survival rate can be significantly improved. Despite combined modality treatment, their overall prognosis still remains poor.

#### 10. Intratympanic Gentamicin for the Treatment of Meniere's Disease: A Meta-Analysis

Raanan Cohen-Kerem, MD, Toronto, ON Canada  
Vitaly Kisilevsky, MD, Toronto, ON Canada  
Thomas R. Einarson, PhD, Toronto, ON Canada  
Eran Kozer, MD, Tel-Aviv, Israel  
Gideon Koren, MD, Toronto, ON Canada  
John A. Rutka, MD, Toronto, ON Canada

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to discuss the up-to-date evidence based knowledge on intratympanic gentamicin treatment for intractable Meniere's disease.

**OBJECTIVES:** To systematically review the data on intratympanic gentamicin treatment for intractable Meniere's disease. **STUDY DESIGN:** Meta-analysis. **METHODS:** MEDLINE and EMBASE databases were searched for relevant papers. Articles that described the use of intratympanic gentamicin as the only treatment mode and reported their results according to AAO-HNS guidelines for reporting on Meniere's disease were considered for analysis. Two reviewers independently assessed trial quality and extracted data (vertigo control, hearing, word recognition and functional level). **RESULTS:** Fifteen trials met our inclusion criteria. The overall number of patients eligible for analysis was 627. All trials reported on 'before-after' outcome measures, patients were used as their own controls. Complete (class A) vertigo control was achieved in 74.7% (67.8-81.5; 95% CI) of patients. Complete or substantial (class B) vertigo control was achieved in 92.7% (89.5-96.0; 95% CI) of patients. Treatment success rate was not affected by gentamicin dosing or treatment regimen (fixed vs. titration). Hearing level and word recognition were not adversely affected regardless of gentamicin dosing or treatment regimen. Analysis of functional level was not performed due to lack of data in the selected articles. **CONCLUSIONS:** Intratympanic gentamicin treatment for intractable Meniere's disease appears to be effective and ototoxicity is most likely not a major side effect. However, the level of evidence reflected from the eligible articles is deficient, especially due to relatively poor study design. Hence, patients eligible for this type of treatment should be selected carefully and titrated with low dose gentamicin. Further investigation involving control subject is warranted.

#### 11. Cochlear Implantation Under 12 Months—Report on Nine Patients

Vittorio Colletti, MD, Verona, Italy  
Marco Carner, MD, Verona, Italy  
Veronica Miorelli, MD, Verona, Italy  
Liliana Colletti, MD, Verona, Italy  
Francesco Fiorino, MD, Verona, Italy

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to demonstrate better auditory performances in children submitted to cochlear implantation at an age below 12 months compared to older children.

**OBJECTIVES:** There is growing evidence that early application of a cochlear implant (CI) in children suffering from profound congenital hearing loss is of paramount importance for the development of an adequate auditory performance and language skills. For these reasons and due to implementation in audiological diagnosis and awareness of safety of CI, the age of implantation has substantially decreased over the past years. To date, children aging as early as 12 months are implanted in some centers. Based on our experience on very young children, we believe that the date of implantation may be further decreased up to 4-6 months. **STUDY DESIGN:** Over the period of time ranging from January 1993 to October 2003, 103 children were submitted to CI at our department. Sixty-three of them aged less than 3 years. In the present paper we focused our attention to the 9 children submitted to cochlear implantation at an age less than 12 months old. **METHODS:** Children's age ranged from 4 to 11 months (mean: 9,5 months). Four were males and 5 females. All received a Nucleus CI 24 M. Postoperative auditory performance, as evaluated at the latest follow-up, was based upon the "Category of Auditory Performance" (Archbold et al, 1995) and, for children aged more than 2 years, upon a battery of measures included in the "Common Protocol of Evaluation of Audiological Rehabilitation Results" which is the Italian version of the "Manual of Auditory Rehabilitation" (Cochlear AG, Basel, 1997). Results achieved in the 9 children less than 12 months old were compared with those obtained from other different age groups of the pediatric population. **RESULTS:** Surgery was uneventful and no immediate or delayed complications were encountered. Auditory performance dramatically increased as function of early age of implantation and length of implant use. **CONCLUSIONS:** Very early implantation is able to preserve neuronal survival and to facilitate a series of developmental processes occurring in the critical period of language acquisition, as change in place coding, representation of auditory areas in the central auditory system, neural plasticity.

#### 12. Use of Tissue Sealant in Day Surgery Parotidectomy: The Economic Benefits

Peter J. Conboy, MB ChB, Toronto, ON Canada  
Dale H. Brown, MB BCH\*, Toronto, ON Canada

**EDUCATIONAL OBJECTIVE:** To understand the rationale for the use of tissue sealant instead of drains in day surgery parotidectomy, and appreciate the inherent cost advantages.

**OBJECTIVES:** To evaluate the use of tissue sealant in facilitating day surgery parotidectomy without the use of surgical drains, and consider the economic benefit using this technique. **STUDY DESIGN:** Prospective cohort study of fifteen patients undergoing parotidectomy for nonmalignant disease. Surgery as a day procedure without the use of surgical drains was planned. The costs associated with parotidectomy, including the use of tissue sealant and its delivery system, versus inpatient admission were calculated and compared. **METHODS:** Parotidectomy was undertaken by one surgeon. Prior to wound closure the skin flap and wound bed were approximated using Tisseel tissue sealant. Data regarding costs of the tissue sealant, the delivery system and hospital inpatient stay were obtained to enable an economic comparison. Patients were followed to assess surgical outcome and document any complications. **RESULTS:** There were no major surgical complications. One patient required admission for control of post-operative nausea. One patient had a 3ml seroma aspirated one week post-operatively with no subsequent recollection. None of the patients felt that discharge had been premature. The cost advantage of this technique was \$2400 per case. **CONCLUSIONS:** Parotidectomy can be undertaken safely in a day surgery setting without the need for surgical drains. The increased cost associated with the use of tissue sealant compared with surgical drains is greatly overshadowed by the economic advantage of undertaking day surgery. When the total number of parotidectomies performed in any jurisdiction is considered, the yearly cost saving to the healthcare system is in the order of millions of dollars.

#### 13. Acute Alcohol Withdrawal in Microvascular Head and Neck Reconstruction: Symptom-Triggered Therapy

David A. Denman, MD, Omaha, NE  
Perry J. Johnson, MD, Omaha, NE  
William M. Lydiatt, MD, Omaha, NE  
Danial D. Lydiatt, MD, Omaha, NE  
Alan T. Richards, MD, Omaha, NE  
Ronald R. Hollins, MD, Omaha, NE

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to discuss the impact of acute alcohol withdrawal on the post-operative course of patients undergoing free flap reconstruction of the head and neck and discuss the current therapies utilized in the

treatment of acute alcohol withdrawal.

**OBJECTIVES:** To evaluate the effects of acute alcohol withdrawal on the post-operative course of patients undergoing free flap reconstruction of the head and neck and provide treatment recommendations of acute alcohol withdrawal based on a symptom-triggered approach. **STUDY DESIGN:** Retrospective case-series medical chart review. **METHODS:** Review of 55 consecutive patients undergoing head and neck reconstructive surgery with free flap repair over a twenty-four month period at a tertiary care center. **RESULTS:** Thirteen percent of patients in this study experienced acute alcohol withdrawal. The overall rates of flap thrombosis and failure for all patients in this study were 16% and 5% respectively. Patients experiencing acute alcohol withdrawal had a thrombosis rate of 14% and no flap failures. The average number of days spent in the intensive care unit and the hospital for patients who developed alcohol withdrawal was 6.29 and 16.43 compared to 4.86 and 14.02 in other patients. The overall hospital cost was \$76,385 in the alcohol withdrawal group and \$59,221 in patients not experiencing alcohol withdrawal. **CONCLUSIONS:** Acute alcohol withdrawal continues to be a common problem complicating the post-operative course of patients undergoing free flap reconstruction of the head and neck. Alcohol withdrawal did not negatively impact the rate of free flap thrombosis or survival in this study. There was a trend toward longer stays in the intensive care unit and the hospital and overall higher hospital costs in patients experiencing alcohol withdrawal. A review of the current therapies utilized in the treatment of alcohol withdrawal is provided with an emphasis on a symptom-triggered approach.

#### 14. **Bioreactor Environment Creates Improved in Vitro Tissue-Engineered Cartilage Using Hyaluronan Fleece and Rabbit Auricular Chondrocytes**

Brian R. Drew, MD, Cleveland, OH  
James E. Dennis, PhD, Cleveland, OH  
Amad S. Awadallah, BA, Cleveland, OH  
Arnold I. Caplan, PhD, Cleveland, OH

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to understand the components required in producing in vitro tissue engineered cartilage.

**OBJECTIVES:** We hypothesize that the improved nutrient transport conditions present in continuous flow bioreactors improves the effectiveness of three dimensional (3D) scaffolds for cartilage tissue engineering. Tissue engineered cartilage is presently being investigated at numerous centers for a variety of reconstructive applications in the head and neck. **STUDY DESIGN:** Laboratory research. **METHODS:** Cartilaginous constructs were engineered using cultured-expanded adult rabbit auricular chondrocytes seeded onto a scaffold composed of benzylated hyaluronan non-woven fleece. Two culture systems were compared: a constant-flow bioreactor system and static petri dishes. Construct size, histological appearance, DNA content, type II collagen, immunohistochemistry, and mechanical function (compressive modulus) were assessed. **RESULTS:** The bioreactor positively affected chondrogenesis when compared to static culture constructs at 14 days. Bioreactor-grown constructs had more uniform chondrogenesis with higher cell numbers and more intense staining with Alcian blue, higher wet weights, and increased compressive resistance. Immunohistochemistry showed more collagen type II in the matrix of bioreactor-grown constructs when compared to dish-grown constructs. **CONCLUSIONS:** The data imply that interactions between bioreactors and 3D tissue engineering scaffolds can be used to improve the structure and function of in vitro generated cartilage. The long-term goal is to use this engineered cartilage for laryngotracheal reconstruction in a rabbit model.

#### 15. **Halofuginone Prevents Subglottic Stenosis in a Canine Model**

Ron Eliashar, MD, Jerusalem, Israel  
Menachem Gross, MD, Jerusalem, Israel  
Bella Maly, MD, Jerusalem, Israel  
Jean-Yves Sichel, MD, Jerusalem, Israel  
Amon Nagler, MD, Tel-Aviv, Israel

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to discuss the potential role of halofuginone in preventing subglottic stenosis.

**OBJECTIVES:** Halofuginone, a low molecular weight quinazoline alkaloid coccidiostat, inhibits collagen Type-I synthesis, extracellular matrix deposition and angiogenesis. A study was conducted to assess its potential in preventing subglottic stenosis (SGS). **STUDY DESIGN:** 1) Prospective controlled animal study; 2) in-vitro human cultures. **METHODS:** 1) Animal study: SGS was induced in 10 dogs randomly divided into two groups. Each group received treatment between 3 days prior to and 21 days following the induction of SGS. One group received halofuginone 40micrograms/kg and the other was given placebo. The area of the subglottic lumen was measured endoscopically in all participants at baseline and three months later. 2) In-vitro study: Human trachea fibroblasts were cultured. The inhibitory effect of halofuginone was compared to the effect of mitomycin (currently used for prevention of SGS). **RESULTS:** 1) Animal study: All dogs survived throughout the study. No side effects were observed. After 3 months the dogs in the placebo group had between 66 to 80% stenosis (mean 72%), whereas no dog in the halofuginone group developed SGS. Pathologic examination revealed thick fibrotic tissue in placebo-treated larynges while normal architecture was observed in halofuginone-treated larynges. 2) In-vitro study: Halofuginone inhibited the growth of human fibroblasts by 75% compared to 60% inhibition by mitomycin. **CONCLUSIONS:** This preliminary animal study shows that halofuginone is effective in preventing SGS caused by an acute injury. No side effects were observed. Halofuginone may thus have a potential therapeutic role for subglottic stenosis in humans. Larger animal studies are in progress.

#### 16. **Purulent Chondritis of the Thyroid Cartilage--Etiology, Management and Outcome**

Ron Eliashar, MD, Jerusalem, Israel  
Menachem Gross, MD, Jerusalem, Israel  
Abraham Goldfarb, MD, Jerusalem, Israel  
Jean-Yves Sichel, MD, Jerusalem, Israel

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to discuss the etiology, management and outcome of purulent chondritis of the thyroid cartilage.

**OBJECTIVES:** To describe our experience with the rare finding of purulent chondritis of the thyroid cartilage. **STUDY DESIGN:** Case series in a tertiary care hospital. **METHODS:** Patients suffering from purulent chondritis of the thyroid cartilage are described. The pathogenesis, management

and outcome of this rare entity are discussed. **RESULTS:** Three patients, all males aged 56, 65 and 75 years, were diagnosed with purulent chondritis of the thyroid cartilage. The etiologies were a previous prolonged intubation, relapsing polyarthritides, and idiopathic respectively. The first 2 patients had diabetes. All patients suffered from hoarseness and inspiratory stridor for 1 to 3 months prior to diagnosis. They were treated symptomatically by their family physician. None complained of pain or swelling in the neck. Laryngoscopy showed supraglottic edema and precise diagnosis was made by CT-scan. Rigid endoscopy was performed and biopsies were taken to rule out malignancy. Treatment consisted of incision and drainage, followed by prolonged medical therapy. Culture results were staph. aureus in the first 2 cases and aspergillus fumigatus in the third. In the first patient the cricoid cartilage was also affected and he therefore required emergency tracheotomy. Laryngotracheal reconstruction failed to restore a functional airway and he remained tracheotomy dependent. The other 2 patients did not require airway intervention. **CONCLUSIONS:** Purulent chondritis of the thyroid cartilage presents with relatively mild symptoms. Diagnosis can thus be delayed, therefore a high index of suspicion is necessary. Correct diagnosis is made by CT-scan. Airway intervention may not be required if the cricoid cartilage is not involved.

**17. Benefits and Limitations of Intraoperative Parathyroid Hormone Monitoring in Surgical Therapy for Multiglandular Hyperparathyroidism**

J. Clayton Finley, MD, San Diego, CA  
Brendan Gaylis, MD, San Diego, CA

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to appreciate the complexity of this disorder. The role of intraoperative PTH monitoring will be discussed. Surgical strategy and outcomes will be presented.

**OBJECTIVES:** Secondary hyperparathyroidism is a disorder seen not uncommonly in patients with chronic renal failure and usually results in hyperplasia of all 4 parathyroid glands. The pathogenesis of the disorder is related to an underlying hyperphosphatemia and abnormality in vitamin D metabolism. The resulting hyperparathyroidism may burden patients with significant morbidity and mortality. This may result from intravascular deposition of calcium (calciophylaxis) which may result in myocardial infarction and stroke. A total or subtotal parathyroidectomy is the operation of choice in this situation. This paper will review our surgical experience with 30 patients. The role of intraoperative PTH monitoring will be discussed. **STUDY DESIGN:** Retrospective analysis. **METHODS:** Chart and lab review. **RESULTS:** Intraoperative PTH monitoring was found to be of significant benefit. PTH levels should return to around 100 or < 100pg/ml. Levels significantly higher should alert to the possibility of an ectopic or supernumerary gland. **CONCLUSIONS:** Secondary hyperparathyroidism is a potentially fatal condition and requires prompt attention. Until medications prove safe and effective surgical intervention will be the treatment of choice.

**18. Effects of Calcium and Streptomycin on Tectorial Membrane Stiffness, with Implications for Cochlear Function**

Geoffrey S. Getnick, MD, Chicago, IL  
Claus-Peter Richter, MD PhD, Chicago, IL

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to demonstrate an understanding of the importance of the tectorial membrane to cochlear function; participants should recognize that the tectorial membrane, and therefore cochlear mechanics, are exquisitely sensitive to the chemical composition of the surrounding solution.

**OBJECTIVES:** Recent studies have shown that the tectorial membrane (TM) plays a vital role in the sensitivity and frequency specificity of the mammalian cochlea. The objective of the current study was to investigate the effects of calcium and streptomycin on TM stiffness. TM stiffness changes are likely to alter cochlear mechanics and thus may provide an additional factor for ototoxic effects of streptomycin. **STUDY DESIGN:** Basic research animal experiment. **METHODS:** TM stiffness was measured in a gerbil hemicochlea preparation, using a piezoelectric sensor. Measurements were obtained at 5 locations along the cochlea in artificial endolymph, artificial endolymph with 5mM calcium, and artificial endolymph with 6.2mM streptomycin. The locations, named the basal, upper basal, middle, upper middle, and apical turns, were 2.9mm, 5.5mm, 7.3mm, 8.5mm, and 9.8mm from the basal end of the cochlea, respectively. **RESULTS:** In all solutions, a TM stiffness gradient was identified along the cochlea. Median stiffness measurements at the different locations were as follows: in artificial endolymph, 0.16N/m, 0.055N/m, 0.024N/m, 0.014N/m, and 0.0075N/m at the basal, upper basal, middle, upper middle, and apical turns, respectively; in artificial endolymph with calcium, 0.18N/m, 0.098N/m, 0.038N/m, 0.035N/m, and 0.029N/m, respectively; in artificial endolymph with streptomycin, 0.21N/m, 0.12N/m, 0.055N/m, 0.035N/m, and 0.022N/m, respectively. **CONCLUSIONS:** A TM stiffness gradient exists along the cochlea and is maintained for each solution. Furthermore, exposure to calcium or streptomycin increases TM stiffness and thus may affect cochlear function.

**19. Endoscopic Recurrent Laryngeal Nerve Monitoring and Stimulation in a Porcine Model**

Lisa D. Grunebaum, MD, Philadelphia, PA  
Edmund A. Pribitkin, MD, Philadelphia, PA  
David Rosen, MD, Philadelphia, PA  
William M. Keane, MD\*, Philadelphia, PA  
Debra Tereschuk, PA-C, Philadelphia, PA

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to discuss the usefulness and applicability of endoscopic recurrent laryngeal nerve [RLN] monitoring and stimulation during endoscopic anterior neck surgery.

**OBJECTIVES:** We demonstrate the use of RLN monitoring during endoscopic neck surgery in the anesthetized pig. Moreover, we introduce a new instrument enabling endoscopic RLN stimulation during endoscopic parathyroidectomy or thyroidectomy. **STUDY DESIGN:** This protocol employs a live animal model for operative training and technique. **METHODS:** Five pigs underwent endotracheal intubation with a nerve integrity monitoring tube and were placed under inhaled anesthesia. Following placement of endoscopic ports in the neck and insufflation, an anterior neck exploration was performed. Critical structures including carotid artery, jugular vein, thyroid gland and RLN were identified. The RLN was stimulated via an endoscopically deployed stimulator, and the resultant electromyographic potential was verified by the nerve monitor. Following endoscopic neck exploration, the pig was euthanized and an open neck dissection with laryngofissure was performed to verify the identified structures and the placement of the nerve integrity monitoring endotracheal tube. **RESULTS:** All 10 RLN's were successfully identified, stimulated and dissected using endoscopic techniques. Open neck dissection following endoscopic dissection confirmed nerve identity and integrity in all cases. **CONCLUSIONS:** Although endoscopic/minimally invasive neck surgery is a promising alternative to open neck surgery, few centers have standardized practices with regard to patient safety and technique. Intraoperative RLN monitoring has become the standard of care in parathyroid and

thyroid surgery, yet no means of intraoperative RLN stimulation during endoscopic thyroidectomy and parathyroidectomy exists. We describe a new technique for endoscopic RLN stimulation in the porcine model as a prelude to developing such techniques for use in human clinical trials.

**20. Aural Tuberculosis Revisited: A Case Report and Review of Literature**

Christopher J. Hall, MD, Memphis, TN  
Aaron R. Morrison, BS, Memphis, TN  
Charles B. MacDonald, MD, Memphis, TN

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to recognize a patient presentation consistent with aural tuberculosis and have a heightened awareness of the resurgence of this disease.

**OBJECTIVES:** Revisit a once rampant disease that is eliciting a resurgence. **STUDY DESIGN:** A 13 year old male presented with a 3 week history of a right-sided headache, lethargy, and otalgia. The patient noted increasing headache over five days, with the development of nausea, vomiting, and blurred vision. His history was significant for exposure to unpasteurized goat's milk. Exam findings included blood-tinged otorrhea (right ear) status post BMT. MRI/MRV revealed lateral venous sinus thrombosis. Mastoidectomy was performed, demonstrating a sclerotic mastoid, aditus block, and dark blood in the sigmoid sinus. Cultures grew tuberculous bacilli. In the 18th century, Jean Louis Petit was the first person to describe middle ear cleft tuberculosis (TB). The pathogenesis of aural TB was described by Turner and Fraser in 1915. Aural TB is likely related to the regurgitation or direct extension of infected sputum from the adenoids or nasopharynx to the middle ear space via the eustachian tube. Other methods of pathogenesis described are hematogenous spread, preexisting tympanic membrane perforation, and congenital TB. Early facial nerve palsy and fistula formation are hallmarks of the disease. Tuberculosis is the world's leading cause of death from a single infective agent. The resurgence of TB in last 30 years among industrialized nations has resulted primarily from immigration and the spread of HIV. The U.S. had a 5.8% average annual decline in TB from 1953-1985, but the incidence increased 20% from 1985-1992. **METHODS:** A case report. **RESULTS:** Successful management. **CONCLUSIONS:** Enlarging tympanic membrane perforations, middle ear granulations, and chronic unresponsive otitis media should be carefully scrutinized for TB in the HIV population.

**21. Effects of a Twenty-Four Hour Call Period on New York Surgical Residents' Performance During Simulated Endoscopic Sinus Surgery**

David M. Jakubowicz, MD, Bronx, NY  
Erin Price, MD, Queens, NY  
Harrison Glassman, BS, New York, NY  
Marvin P. Fried, MD\*, Bronx, NY  
Neil Mandava, MD, Queens, NY  
Walter P. Ralph, MD, Bronx, NY

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to better understand the difference in surgical performance in trained surgical residents after a twenty-four hour call period.

**OBJECTIVES:** Overnight duties with interrupted or no rest is an integral part of most surgical training programs. While previous studies demonstrate cognitive decline attributable to fatigue, only a few small studies examine the effects of these obligations on the safety and proficiency of surgical tasks and procedures. To increase our understanding of this crucial issue, we will determine whether endoscopic sinus surgery simulator (ES3)-measured performance changes before and after a twenty-four hour call period. **STUDY DESIGN:** Case control trial training general surgical residents on the novice mode of the ES3. These trained residents underwent testing a total of four times, two prior and two immediately subsequent to an on-call period. **METHODS:** Eight general surgical residents were enrolled in the study and trained on the novice mode of the ES3. These residents then were twice tested before and after on-call duties. The hazard score and performance were compared using a paired t-test. **RESULTS:** There was no statistically significant change in hazard score or overall performance in this study. The average hazard score decreased by 0.1 (95% CI -12.5 to 12.8) and overall score improved by 2.4 (95% CI - 2.7 to 7.4) after an on-call period. **CONCLUSIONS:** Tested subjects' performance on the ES3 was unaffected by a twenty-four hour on-call shift. Depending on perspective, this data could be used to support or refute the recent changes in work hours. Further study will be required on this important topic to assure patient safety without compromising residency training.

**22. Retrograde Weight Implantation for Correction of Lagophthalmos**

Chuan-Hsiang Kao, MD, Taipei, Taiwan ROC  
Kris S. Moe, MD, San Diego, CA

**EDUCATIONAL OBJECTIVE:** To demonstrate anatomic concepts essential for effective placement of upper eyelid implants and to describe a new procedure that is simpler and more effective for the correction of lagophthalmos. Platinum chain implantation will be reviewed.

**OBJECTIVES:** Numerous techniques for placement of the weight have been described, yet complications with these methods continue to occur (implant migration or extrusion, wound infection, failure to correct the lagophthalmos, and excessive postoperative ptosis). We developed a retrograde, post-levator aponeurosis method for implantation to improve the placement and fixation of the weight. This study describes the rationale, technique, and surgical outcome of the retrograde approach. **STUDY DESIGN:** Retrospective analysis. **METHODS:** Data were collected on 25 consecutive cases of primary retrograde upper lid weight implantation for paralytic lagophthalmos. Pre- and post-operative photographs were obtained, and patients were followed for at least 6 months. All procedures were performed by or under the direction of a single surgeon at tertiary academic medical centers. **RESULTS:** Twenty-five consecutive patients were evaluated, 16 male and 9 female, ranging in age from 27 to 86 years. There were no surgical failures or perioperative complications, and no instances of implant migration or extrusion. One patient developed a delayed infection requiring removal of the implant. **CONCLUSIONS:** Retrograde implantation allows more accurate placement of the weight, while creating a permanent circumferential seal for fixation. The procedure is minimally invasive, less traumatic than previous methods, and produces an excellent cosmetic result. The efficacy has been demonstrated in the outcome of the 25 cases described in this study.

**23. A Meta-Analysis of Bark Scale Phonatory Formant Difference Patterns**

Scott M. Kaszuba, MD, Houston, TX  
Charles J. Ballay, MD, Houston, TX

Ross Tonini, AuD, Houston, TX  
Spiros Manolidis, MD, Houston, TX

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to understand the nature of Bark scale utilization for speech driven rehabilitation of hearing impaired individuals.

**OBJECTIVES:** The purpose of this study is to compare voice analysis formant information (F0, F1, F2, F3) amongst individuals using Bark scale normalization techniques. The analysis was undertaken to provide possible guidelines towards rehabilitation of the hearing impaired as well as aid in the selection criteria for cochlear implantation. **STUDY DESIGN:** Meta-analysis. **METHODS:** Meta-analysis of formant frequencies obtained by various recording techniques and software calculations as determined in previous reports were performed. All reported frequencies were converted to Bark scale based on a critical band theory of auditory function. Resonant frequencies were then converted to Bark scale numerical values using previously accepted mathematical conversions. Values were compared to oral tongue placement and phonation patterns previously provided in the literature. **RESULTS:** Greater than 500 individual's formant frequencies were compared after converting to the Bark scale. Results comparing numerous authors' techniques of recording and analysis of resonance frequencies displayed stable Bark scale difference patterns among varying age groups with normal hearing. **CONCLUSIONS:** Bark scale may be utilized to "normalize" phonatory format information among subjects of various age groups with normal hearing. This pattern differs in hearing impaired persons as described in the literature. Bark scale utilization may assist in speech rehabilitation and speech therapy. Additional value may be found in the rehabilitation of the hearing impaired. The normalization of formant differences may hold promise in the rehabilitation of hearing impaired patients pre- and post-cochlear implantation.

**24. Treatment of Olfactory Dysfunction II: Studies with Minocycline**

Robert C. Kern, MD\*, Chicago, IL  
David B. Conley, MD, Chicago, IL  
Alan M. Robinson, PhD, Chicago, IL

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to discuss potential treatments for chronic sinusitis and anosmia.

**OBJECTIVES:** The treatment of anosmia has changed minimally in the last 30 years despite dramatic advances in our understanding of the molecular biology of olfaction. Recent studies from our laboratory have suggested that most common causes of clinical olfactory dysfunction appear to be associated with increased apoptotic death of olfactory sensory neurons (OSN). This appears to result in a decline in the number of functioning mature (OSNs) despite the capacity of the olfactory epithelium for regeneration. In chronic sinusitis and anosmia, OSNs appear to preferentially undergo apoptosis via the mitochondrial pathway of apoptosis. The current study will evaluate the ability of the antibiotic minocycline, to inhibit OSN apoptosis. This drug is known to inhibit the mitochondrial pathway of apoptosis separate from any anti-infective properties. **STUDY DESIGN:** Histologic analysis of animal olfactory tissue. **METHODS:** Mice underwent unilateral olfactory bulbectomy, with and without minocycline (45 mg/kg i.p.) given 12 hours prior to surgery and q 12hrs until sacrifice. Bulbectomy is a potent pro-apoptotic stimulus for OSN apoptosis mediated through the mitochondrial pathway. **RESULTS:** Minocycline results in a dramatic suppression of apoptosis at 2 days post-surgery when compared with untreated animals. **CONCLUSIONS:** Minocycline may have potential applicability in the chronic treatment of human olfactory dysfunction secondary to rhinosinusitis.

**25. Hyalinizing Rhabdomyosarcoma: A New Variant of Rhabdomyosarcoma with Predilection for the Head and Neck**

Thomas A. Knipe, MD, Memphis, TN  
Rakesh K. Chandra, MD, Memphis, TN  
M. Frederick Bugg, MD, Memphis, TN

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to describe the clinical and histopathologic features of hyalinizing rhabdomyosarcoma (HRMS), a newly identified variant of rhabdomyosarcoma (RMS) with a predilection for the head and neck in adults.

**OBJECTIVES:** To present a new case of hyalinizing rhabdomyosarcoma and describe the unique features of this unusual tumor. **STUDY DESIGN:** Case report and review of the literature. **METHODS:** A 66 year old female with a 35 year history of heavy smoking and daily alcohol use presented with a two month history of progressive dysphagia and dysarthria secondary to enlarging tongue mass. Urgent tracheostomy was performed for respiratory embarrassment. Direct laryngoscopy revealed a bulky, exophytic mass with an ulcerative surface involving the base of tongue. **RESULTS:** Initial frozen section analysis favored poorly differentiated carcinoma. Examination of the tumor under permanent section, however, brought this diagnosis into question. Additional work-up including immunohistochemistry revealed positivity for desmin and myogenin expression, leading to a diagnosis of HRMS. A search of the literature revealed only four other patients with HRMS. Including the present case, all known cases have occurred in adults, and 3/5 have occurred in the head and neck. The patient was treated with induction chemotherapy followed by radiation. **CONCLUSIONS:** Hyalinizing rhabdomyosarcoma is a rare variant of RMS that occurs in the head and neck. Microscopically, this tumor may mimic non-RMS sarcoma or even carcinoma. The otolaryngologist must be informed about this entity, particularly to distinguish it from squamous cell carcinoma, with which it may share a similar clinical presentation.

**26. WITHDRAWN--Adaptation of Otolith Responses Assessed by Off-Vertical Axis Rotation (OVAR)**

Glenn W. Knox, MD, Jacksonville, FL  
Gilles C. Clement, PhD, Toulouse, France  
Pierre P. Denise, MD PhD, Caen, France  
Millard F. Reschke, PhD, Houston, TX  
Scott J. Wood, PhD, Houston, TX

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to demonstrate how off-vertical axis rotation can be used as a measure of otolith function; explain factors involved in modulation of otolith function; and discuss and compare the effects of microgravity and vestibular ablation on motion perception, balance, and otolith function.

**OBJECTIVES:** The objective was to use off-vertical axis rotation to determine if vestibular surgery or microgravity caused changes in otolith signals produced by tilt to be misinterpreted by the central nervous system resulting in changes in perception of body motion and/or vestibuloocular reflex. **STUDY DESIGN:** Tilt angles of 10 and 20 degrees and rotational frequencies of 0.125 and 0.5 Hz were tested clockwise and counterclockwise. The subjects included controls (n=14), astronauts preflight and postflight (n=14), and patients who had unilateral vestibular ablation (n=3). **METHODS:** Nystagmus and motion perception of astronauts before and after space flight, control subjects, and patients who had unilateral vestibular ablation were recorded during OVAR at tilt of 0 to 20 degrees, in darkness. Three-dimensional eye movements were recorded by a binocular infrared video camera. Motion perception was verbally reported. **RESULTS:** In normal subjects, there is clear correspondence between eye movements and motion perception. Patients with unilateral vestibular loss had OVAR responses not substantially different than controls. Astronauts returning from space flight experienced larger sense of tilt and translation during OVAR. Torsion at 0.125 Hz and modulation of horizontal nystagmus at 0.5 Hz were similar to preflight values. **CONCLUSIONS:** The overestimation of tilt and translation during OVAR in returning astronauts may be due to a decrease in the perception of the internal body vertical. Eye movements from stimulation of the otolith organs were not altered after space flight or unilateral vestibular ablation. The imbalance and vertigo commonly observed in these groups indicates that changes in otolith signals alone may not be responsible for these problems.

**27. Implementation of Duty Hour Standards in Otolaryngology—Head and Neck Surgery Residency Training**

Todd A. Kupferman, MD, Shreveport, LA  
Timothy S. Lian, MD, Shreveport, LA

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to have a better understanding of the impact of the ACGME duty hours standards as they relate to otolaryngology-head and neck surgery residency training programs.

**OBJECTIVES:** To determine the impact, if any, the new duty hour standards have had on otolaryngology-head and neck surgery residency programs. **STUDY DESIGN:** Blinded survey. **METHODS:** Information was collected via survey in a blinded manner from otolaryngology-head and neck surgery training programs in the United States. **RESULTS:** Based on initial survey returns, U.S. otolaryngology-head and neck surgery programs have made structural changes other than administrative/documentation changes. Residency programs indicate that overall, the duty hour limitation requirements are not an improvement in otolaryngology-head and neck surgery residency training. **CONCLUSIONS:** The duty hour standards required by the Accreditation Council for Graduate Medical Education were designed to improve the residency training experience and thus ultimately improve patient care. Our survey shows that many otolaryngology-head and neck surgery residency programs feel that duty hour limitations negatively influence resident.

**28. Single Staged Postauricular Transposition Flap for Reconstruction of Cutaneous Helical Rim Defect**

Carol J. Langdoc, MD, Gainesville, FL  
Jack D. Sedwick, MD, Gainesville, FL

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to reconstruct helical rim defects with a new technique using a pedicled postauricular transposition flap.

**OBJECTIVES:** To demonstrate the utility of a single staged pedicled postauricular transposition flap as a novel technique for reconstructing helical rim defects. **STUDY DESIGN:** Case review study. **METHODS:** We reviewed a case of a 75 year old female who presented with a helical rim defect following Mohs excision of a basal cell carcinoma. The excised area measured 2.5 x 1 cm. A pedicled transposition flap was designed from the postauricular skin to correct the defect and reconstruct the contour of the helical rim. Ease of design and cosmetic results were evaluated. **RESULTS:** The helical defect was successfully repaired using the pedicled postauricular transposition flap. Flap design was simple and restoration of the helical rim contour was easily achieved. **CONCLUSIONS:** The postauricular transposition flap is a novel technique that can easily be designed for closure of helical rim defects. The pedicled nature of the flap provides a more reliable blood supply when compared to skin grafts. It may be performed in a single stage and allows for aesthetically pleasing results by repairing the helical contour and providing tissue match.

**29. The Role of the Otolaryngologist in Sentinel Lymph Node Dissection for Cutaneous Head and Neck Malignancies**

Doris Lin, MD, San Francisco, CA  
Mohammed Kashani-Sabet, MD, San Francisco, CA  
Mark I. Singer, MD\*, San Francisco, CA

**EDUCATIONAL OBJECTIVE:** To describe the role and contribution of the otolaryngologist in the management and treatment of patients with cutaneous malignancies of the head and neck.

**OBJECTIVES:** To determine the reliability of sentinel lymph node dissection (SLND) in head and neck cutaneous malignancies to accurately stage nodal basins, describe techniques for safe SLND in the neck and parotid regions and discuss treatments in cases of positive SLND. **STUDY DESIGN:** Retrospective chart review with follow-up range from 3 months to 3 years. **METHODS:** The charts of ninety patients treated for head and neck cutaneous malignancies were reviewed for presentation, treatment, and outcome. **RESULTS:** All patients received lymphoscintigraphy and sentinel lymph node dissection for melanoma Breslow depths > 1mm. Accurate preoperative lymphoscintigraphy and Lymphazurin blue dye along with facial nerve monitoring when indicated correlated with safe SLND. Sixteen patients required completion surgery following positive sentinel lymph node dissection and underwent evaluation for adjuvant therapies. **CONCLUSIONS:** Safe and reliable SLND depends on the knowledge of the anatomy in the head and neck region, reliability of preoperative lymph node mapping with lymphoscintigraphy, and possible additions of Lymphazurin blue dye and facial nerve monitoring. Complete surgical treatment of positive SLND cases along with adjuvant therapies potentially improve control of these cutaneous malignancies without added morbidity.

**30. Curcumin Suppresses Growth of Head and Neck Squamous Cell Carcinoma**

Maria M. LoTempio, MD, Los Angeles, CA  
Helen L. Steele, BA, Los Angeles, CA  
Eri S. Srivatsan, PhD, 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 the effects of the Indian spice curcumin on CCL 23 and CAL 27, laryngeal and tongue squamous cell carcinoma lines.

**OBJECTIVES:** To determine whether the Indian spice curcumin will trigger cell death in CCL 23 and CAL 27, laryngeal and tongue cancer cell lines, in a dose-dependent fashion. **STUDY DESIGN:** The MTT assay was used to assess mitochondrial function of CCL23 and CAL27 cells after treatment with curcumin. Control cells were treated with dimethylsulfoxide (DMSO), which was used to dissolve curcumin in the experimental groups. **METHODS:** CCL23 and CAL27 were plated into 96-well plates, serum starved for 24 hours to synchronize cell cycles, treated with curcumin or DMSO for eight hours, and allowed to incubate in regular growth media for 8 and 15 hours after treatment before analysis of cell viability. **RESULTS:** At both eight and fifteen hours after treatment, CCL23 cell lines showed the greatest reduction in cell viability at concentrations between 100-300uM, with nearly 100% cell survival at 100uM and less than 5% survival at 300uM. CAL27 cell lines showed a greater chemosensitivity to curcumin treatment, with a dose dependent reduction of cell viability. Reduction of cell viability began at 60uM, and 0% survived at concentrations of 300uM. Fifteen hours after treatment, CAL27 cell lines showed continued cell death, with an 83% reduction in cell viability at concentrations of 100uM. **CONCLUSIONS:** Curcumin has a direct effect on CCL23 and CAL27, reducing viability in both cell lines in a dose-dependent fashion. Both lines showed continued cell death over a period of several hours, suggesting that curcumin triggers the apoptotic pathway in these head and neck cancer cell lines rather than producing a sudden cell necrosis.

**31. COX-2 Expression in Warthin's Tumors: An Immunohistochemical Study**

Andrew H. C. Loy, MD, Singapore  
Thomas C. Putti, MD, Singapore  
Luke K. S. Tan, MD, Singapore

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to understand the expression of COX-2 in Warthin's tumor and possible significance in the etiology of the entity.

**OBJECTIVES:** Warthin's tumor is a benign salivary gland tumor occurring almost exclusively in the parotid, consisting of an oncocytic epithelial component and a variable lymphoid component. Prompted by recent findings of cyclooxygenase (COX)-2 upregulation in salivary gland carcinomas, we studied the immunohistochemical localization of COX-2 in Warthin's tumors. **STUDY DESIGN:** Immunohistochemical analysis. **METHODS:** Twenty-one paraffin-embedded Warthin's tumors specimens were analyzed for expression of COX-2 by established laboratory protocols. **RESULTS:** In all 21 study specimens, we found there was overexpression of COX-2 within the epithelial component of the tumors, while there was no expression in the lymphoid stromal component. There was also overexpression of COX-2 in the salivary ductal system of surrounding normal parotid tissue. **CONCLUSIONS:** Our findings suggest that COX-2 expression is also upregulated in benign salivary gland tumors, and may support the theory that Warthin's tumors arise from the proliferation of salivary ductal epithelial elements.

**32. Auditory Functioning of Patients Using Hearing Aids with Cochlear Implants**

Jane R. Madell, PhD, New York, NY  
Ronald A. Hoffman, MD\*, New York, NY (*Presenter*)  
Nicole A. Sislian, MA, New York, NY  
Shelly O. Ozdamar, MS, New York, NY  
Melissa A. Harawitz, MA, New York, NY

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to demonstrate which patients should be considered for evaluation with hearing aids on the unimplanted ear. At the conclusion of this presentation, the participants should be able to compare procedures for evaluating effectiveness of a hearing aid on the unimplanted ear.

**OBJECTIVES:** The binaural advantage is well recognized in normal hearing ears and for patients using hearing aids. Binaural hearing has been demonstrated to improve localization and speech perception in competing noise. Because patients who use cochlear implants hear much better in the implanted ear than they did with hearing aids, most elect not to use a hearing aid on the unimplanted ear. Some implant patients choose to continue to use a hearing aid on the unimplanted ear and use of a hearing aid providing binaural hearing is frequently recommended by auditory therapists working with children. Determine which patients benefit from use of a hearing aid on the unimplanted ear. **STUDY DESIGN:** This study evaluated patients using a cochlear implant on one ear and a hearing aid on the other. Testing was accomplished in the monaural (cochlear implant alone, hearing aid alone) and binaural conditions for CNC words and sentences in quiet and with competing noise. A questionnaire was used to evaluate how the patient, family, school and therapists felt about functioning in the binaural and monaural conditions. **METHODS:** Patients were mapped according to standard protocol. Following mapping, all patients interested in trying a hearing aid on the unimplanted ear would have an earmold impression taken. Patients were scheduled to return in 2-3 weeks for an amplification evaluation. When a hearing aid was selected for the unimplanted ear, patients were tested using the CI alone, the HA alone, and the CI and HA together. **RESULTS:** Preliminary results indicate that even though the hearing aid provided significantly less gain than the cochlear implant, speech perception improved in the binaural condition for most patients. Implications for evaluating the benefit of bilateral cochlear implants will be discussed. **CONCLUSIONS:** Bilateral hearing provides improved auditory functioning for many patients. Patients with cochlear implants should have the opportunity to try a hearing aid on the unimplanted ear and to be evaluated to determine benefit.

**33. Laryngeal Radionecrosis: A Treatment Algorithm**

Nicole C. Maronian, MD, Seattle, WA  
Neal D. Futran, MD DMD, Seattle, WA

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to 1) identify clinical findings in laryngeal radionecrosis; and 2) understand the different treatment options for laryngeal radionecrosis.

**OBJECTIVES:** To provide a treatment algorithm for patients with laryngeal radionecrosis utilizing conservative, surgical and hyperbaric oxygen treatment options. **STUDY DESIGN:** Retrospective chart review from 1999-2003. **METHODS:** Patients were identified with laryngeal pain or stridor following radiation therapy (XRT) for primary head and neck malignancy. The patients were evaluated with endoscopy, imaging, and biopsy for diagnosis with laryngeal radionecrosis. Treatment was graduated from conservative therapy with antibiotics to OR biopsy +/- debridement of

necrotic tissue. Hyperbaric oxygen (HBO) was utilized in those patients without response to conservative measures in attempts at organ salvage. Total laryngectomy was reserved for patients' failures with conservative modalities. **RESULTS:** 15 patients (12 male, 3 female) with an age range of 38-75 (mean 55) received primary XRT for treatment of laryngeal (10), supraglottic (2), base of tongue (1), hypopharynx (1), and tonsil (1) carcinomas staged Tcis-T3. Primary symptoms included pain, stridor, dysphagia, recurrent infection or hoarseness. The median interval to onset of symptoms was 5 months. Three patients were able to be managed with repeated antibiotics (1) or surgical debridement (2) alone. 10 patients required airway control with tracheotomy (8) and/or debridement of tissue (2). 11 patients received HBO with 63% noting better airway or less pain. Despite airway improvement, decannulation was successful in only 3 of 8 (37%). Two patients proceeded to total laryngectomy for intractable pain and airway compromise. **CONCLUSIONS:** In patients with laryngeal sequelae of radiation therapy, treatment decision making is complex. In this patient population treated with an algorithm of graduated intervention, laryngeal preservation was accomplished in the majority.

#### **34. Impact of Sentinel Node Navigation Technique for Lingual Carcinoma With Cervical Node Metastases**

Takashi Matsuzuka, MD, Fukushima, Japan  
Makoto Kano, MD, Fukushima, Japan  
Tomohiro Miura, MD, Fukushima, Japan  
Koichi Omori, MD, Fukushima, Japan

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to demonstrate the impact of sentinel node navigation technique for lingual carcinoma with cervical node metastases.

**OBJECTIVES:** We attempted lymph node mapping for clinically positive neck cases using sentinel node navigation technique. **STUDY DESIGN:** Retrospective study. **METHODS:** We examined 11 patients with squamous cell carcinoma of the tongue (N1: 6 cases, N2a: 1 case, N2b: 4 cases). Technetium labeled colloidal rhenium sulfide was injected as a radiotracer. After surgery, we removed the lymph nodes and measured the radioactivity. Then, we examined pathologically, whether the lymph node was metastatic or not. Lymph nodes were divided into high and low radioactivity. **RESULTS:** The number of metastatic nodes was totally 34. The number of high radioactive nodes with malignant cells was 18 (Group A), while the number of low radioactive nodes with malignant cells was 16 (Group B). These two groups were compared as to the area ratio of malignant cells to whole node (AR). Average AR of Group A was 57% and that of Group B was 90%. There was significant difference between the two groups. Average number of metastatic nodes in the cases with lymph node of Group B (4.7 nodes) was significantly more than that in the cases without lymph node of Group B (1.8 nodes). **CONCLUSIONS:** Based on these results, when the sentinel lymph node was partly occupied by malignant cells, injected colloid flowed to sentinel node. When the sentinel node was mostly occupied by malignant cells, injected colloid could not flow to sentinel node and flowed to a different lymph node through another basin. Sentinel node navigation technique presents the real time lymphatic flow in positive neck cases.

#### **35. Rofecoxib in Postoperative Otolaryngology Pain Control**

Chad D. McCormick, MD, Columbus, OH  
Lowell A. Forrest, MD, Columbus, OH  
Richard T. Irene, MD, Columbus, OH  
Jeffery B. Hiltbrand, MD, Columbus, OH  
Iain L. Grant, MD, Columbus, OH  
Michael G. Guertin, MD, Columbus, OH

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to evaluate the safety and compare the efficacy of rofecoxib to standard of care combination acetaminophen/opioid pain medication for acute pain control after nasal/sinus surgery.

**OBJECTIVES:** To evaluate the efficacy and safety of the perioperative and postoperative use of rofecoxib for acute pain control in patients who undergo nasal/sinus surgery. The hypothesis is that the use of rofecoxib will 1) decrease perioperative and postoperative pain levels; 2) decrease perioperative and postoperative acetaminophen/opioid pain medication use; and 3) cause no increase in postoperative complications compared to standard of care acetaminophen/opioid pain medication use. **STUDY DESIGN:** Prospective, randomized, double blind, placebo controlled study of 60 patients undergoing nasal/sinus surgery. **METHODS:** Study patients who undergo nasal/sinus surgery will be randomly divided into 3 groups: Group 1—placebo pre-op, placebo post-op, and placebo QD X 4 days, Group 2—placebo pre-op, rofecoxib 50 mg post-op, and rofecoxib 50 mg QD X 4 days, Group 3—rofecoxib 50 mg pre-op, placebo post-op, and rofecoxib 50 mg QD X 4 days. Data on the following major variables was recorded: recovery room hourly pain level, hourly opioid rescue use, and time to discharge; postoperative daily pain level and acetaminophen/opioid rescue use; postoperative complications and overall satisfaction with postoperative pain control. **RESULTS:** No differences were found between the groups in regard to recovery room hourly pain level, hourly opioid rescue, or time to discharge. However, a significant trend for decreased postoperative daily pain level and acetaminophen/opioid rescue use was seen in the rofecoxib groups as compared to placebo. Additionally, no differences in complications or overall satisfaction with postoperative pain control were seen between the placebo and rofecoxib groups. **CONCLUSIONS:** The daily use of rofecoxib in the perioperative and postoperative setting shows a significant trend toward decreased postoperative daily pain levels and decreased acetaminophen/opioid rescue use with no increase in complications as compared to placebo. Rofecoxib may prove to be a safe and effective alternative to opioid pain medication in the management of acute postoperative pain for selected otolaryngology procedures.

#### **36. Utility of Preoperative CT Imaging in Detecting Patients at Risk for Perilymph Gusher**

Michael D. McFadden, MD, Gainesville, FL  
Patrick J. Antonelli, MD\*, Gainesville, FL  
Anthony A. Mancuso, MD, Gainesville, FL

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to understand the utility of preoperative CT imaging in identifying patients at risk of developing perilymph gusher and be able to use this information when comparing utility versus cost during the preoperative workup of patients in preparation for inner ear surgery.

**OBJECTIVES:** Stapes or perilymph gusher (PG) is a very rare occurrence with inner ear surgery which may lead to adverse outcomes. In the absence

of a family history to indicate X-linked PG, it is very difficult to determine preoperatively if a patient is at risk. Radiographic imaging is often performed in an attempt to identify such problems, but there is little data to support the value of these studies. The purpose of this study was to evaluate temporal bone computed tomography (CT) for anomalies in patients with known PG. **STUDY DESIGN:** Retrospective case series of 3 known PGs. **METHODS:** High resolution CT imaging was reviewed by 3 independent examiners for abnormalities which may indicate PG, including dilated internal auditory canal, abnormal or dilated vestibule, enlarged cochlear aqueduct, enlarged vestibular aqueduct and cochlear dysplasia. **RESULTS:** In each of these three cases, none of the structures examined on preoperative CT scans were found to be abnormal. There were no findings on preoperative CT scanning to indicate that any of the three patients were at risk for developing PG. **CONCLUSIONS:** Sporadic PG is a rare complication of inner ear surgery that is very difficult to predict preoperatively. The surgeon should be prepared to manage a PG intraoperatively as there are no known means of predicting its occurrence.

**37. Cochlear Impedance Measurements in the Mammalian Hemicochlea**

Alan G. Micco, MD, Chicago, IL  
Gagan A. Kumar, MD, Chicago, IL  
Claus P. Richter, MD PhD, Chicago, IL

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to understand the electrical resistivity of the mammalian cochlea and its potential effects on cochlear implant function.

**OBJECTIVES:** Electrical impedances of the cochlear bone may have significant impact on the function of a cochlear implant. We have previously measured the electrical resistivity of cadaveric human temporal bone. In order to assure that fixation of the specimen had no effect on the measurements from fresh porcine cochlea were obtained with the hypothesis that there would be no difference. **STUDY DESIGN:** Fresh porcine cochlea were used since they are readily available. Hemicochlea preparations were created with a diamond saw, obviating the need for decalcification. Six cochlea were studied. Ten measurements at each site were conducted, and the median value was used. Results were then compared to the previously obtained human temporal bones. **METHODS:** Impedance measurements were obtained using the four-electrode coefficient method. A fresh specimen was obtained the day of measurement from a local meat packing facility. The cochleae were harvested and cut along the mid-modiolar plane using a diamond saw. Custom-made Teflon insulated thin four-wire electrodes were used to conduct the measurements. Two electrodes inject current and two measure the voltage adjacent to the injecting electrodes. **RESULTS:** Cochlear bone revealed a resistivity of approximately 800-1000  $\Omega\text{cm}$ . The apex of the cochlea seemed to be electrically "capped" and the resistance of the modiolar wall was smaller compared to the resistance of the cochlear wall. There was a distinctly higher resistivity in the bone immediately surrounding the cochlea, as compared to the rest of the temporal bone. Current paths for currents injected via scala tympani electrodes seemed to follow along the scalae towards the round window or the facial nerve canal. **CONCLUSIONS:** These findings are consistent with the findings in the cadaveric human temporal bones. Therefore fixation of the cadaveric specimens has no effect on the measurement of cochlear bone resistivity. There appears to be shunting along the facial canal. These experiments will help us to further understand the current flow through the cochlea. This information will potentially help with improving electrode design.

**38. "Coin" in the Esophagus: When the Routine Case Isn't So Routine**

George L. Murrell, MD, Camp Pendleton, CA

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to demonstrate a working practical knowledge of a clinical routine for children with esophageal foreign bodies.

**OBJECTIVES:** To present an unusual esophageal foreign body case in which the initial history and x-ray data were routine and consistent with a "coin" in the esophagus. **STUDY DESIGN:** Case report. **METHODS:** Retrospective of a clinical case and review of current literature. **RESULTS:** A 2 year old male child underwent intraoperative endoscopy and was found to have a dime in the upper esophagus. It is the author's routine to perform a "second look" of the aerodigestive tract after removal of a foreign body. In this case, the "second look" yielded a second dime in the posterior pharynx. In retrospect, it became clear that the 2 dimes were coapted and appeared as a single coin on preoperative x-ray. Careful analysis of the preoperative x-ray does give some hint of this. After the x-ray, the dimes had separated, with one staying in the esophagus and one migrating to the posterior pharynx. **CONCLUSIONS:** A set clinical routine offers the patient and the surgeon a layer of safety when a routine case ends up being not so routine. A "second look" after removal of a foreign body is advocated: to check for injury secondary to the foreign body or its removal, to check for unrelated concomitant disease, and, as illustrated by this case, to check for another foreign body. If the second coin in this case had been missed, a catastrophic outcome was possible.

**39. Impact of Multislice CT Scan for the Temporal Bone Surgery**

Hiroshi Ogawa, MD, Fukushima, Japan  
Yukio Nomoto, MD, Fukushima, Japan  
Kikuko Ozawa, MD, Fukushima, Japan  
Aya Maruko, MD, Fukushima, Japan  
Takashi Matsuzuka, MD, Fukushima, Japan  
Koichi Omori, MD, Fukushima, Japan

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to understand the clinical efficiency of multislice CT scan.

**OBJECTIVES:** This study presents the visualization of minute configuration images for the temporal bone surgery using multislice CT scan system. **STUDY DESIGN:** Focus group study. **METHODS:** An Aquilion manufactured by TOSHIBA CO. Ltd. was used to perform helical scanning under the following conditions: tube current 260mA, tube potential 135kVp and helical pitch 2.5. A thickness of 0.5mm with 0.5mm interval axial images was used. 3-D images and multi planar reconstruction (MPR) images were constructed using the software application. Several cases with middle ear anomaly, cochlear implant, and traumatic stapes dislocation were presented for clinical application. Temporal bone dissection was also demonstrated using simultaneous 3-D images. **RESULTS:** Axial images of the ear with anomalies allowed exquisite delineation of the tympanic cavity and its contents, the inner ear structures, and the entire of the facial nerve. MPR images of the ear with cochlear implant demonstrated the route of the electrode clearly. 3-D image of the ear with cochlear implant demonstrates the simulation of the surgical image. MPR image in the

ear trauma case demonstrated the dislocated stapes in the vestibule. Temporal bone cadaver dissection was also demonstrated using 3-D images of the multislice CT scan. **CONCLUSIONS:** Using this multislice CT scan system, it makes possible to obtain more realistic 3-D images of the temporal bone rather than the conventional CT system. Thereby, the rendering of the surgical fields is possible for simulation. The current system provides useful visualization of minute configuration image, diagnosis and treatment of temporal bone lesions for surgical interventions.

**40. The Ingrowth of Outer Stratified Squamous Epithelium in the Central Tympanic Membrane Perforations**

Mehmet F. Oktay, MD, Minneapolis, MN  
Sebahattin Cureoglu, MD, Minneapolis, MN  
Patricia A. Schachern, PhD, Minneapolis, MN  
Michael M. Paparella, MD\*, Minneapolis, MN  
Shin Kariya, MD, Minneapolis, MN

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to discuss the ingrowth of outer stratified squamous epithelium in the central tympanic membrane perforations.

**OBJECTIVES:** To evaluate the ingrowth of outer stratified squamous epithelium through the perforation edges in central tympanic membrane perforations. **STUDY DESIGN:** Descriptive research design. **METHODS:** Twenty-five temporal bones from 20 cases (11 male, 9 female) with central tympanic membrane perforations were included in this study. Ages ranged from 3 to 88 years. All the cases were diagnosed with chronic otitis media. Seven cases had a history of ventilation tube insertion. A scale was developed to evaluate the extension of the migration of stratified squamous epithelium where mucocutaneous junction ends at the outer surface of the tympanic membrane perforation, reaches the inner surface, and is detected at any point within the inner surface. **RESULTS:** Thirty out of fifty perforation edges were classified as type I; 11 as type II; and 9 as type III. In type III cases, the average ingrowth of the stratified squamous epithelium was 0.79 mm (max 1.55 mm) in the cases without history of ventilation tube insertion and 1.16 mm (max 1.96 mm) with a history of ventilation tube insertion. **CONCLUSIONS:** Outer stratified squamous epithelium can migrate from the perforation edges to the inner surface of the tympanic membrane. Therefore, this stratified squamous epithelium should be removed before placement of a connective tissue graft to close the perforation. Otherwise, there may be an increased risk of cholesteatoma formation and no migration of epithelial cells over the graft to close the perforation.

**41. Facial Nerve Schwannoma: A Pediatric Case Report in an 18 Month Old**

David A. Opperman, MD, Minneapolis, MN  
Francis L. Hobson, MD, Minneapolis, MN  
Eric Nussbaum, MD, Minneapolis, MN  
Samuel Levine, MD\*, Minneapolis, MN

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to discuss the diagnosis and treatment of a pediatric facial nerve schwannoma.

**OBJECTIVES:** Present a case study of what we believe to be the youngest patient with an occurrence of a facial nerve schwannoma and discuss its presentation, diagnosis and management. **STUDY DESIGN:** This study represents a case study of an 18 month old who met criteria for translabyrinthine acoustic schwannoma resection. Schwannomas of the cerebellopontine angle are most often derived from the eighth cranial nerve and less commonly from the fifth cranial nerve. These lesions arise from the schwann cell nerve sheath and can involve any nerve segment from the medullopontine angle to the intraparotid branches of the facial nerve. In the literature a seventh cranial nerve schwannoma is rare with less than 400 cases having been reported. Furthermore, pediatric facial nerve schwannoma cases are even less commonly documented and pose unique diagnosis and operative challenges. **METHODS:** A single case study is used to describe the occurrence of a seventh cranial nerve schwannoma in an eighteen month old female. The unique aspects of diagnosis and treatment, along with the patient's presenting symptoms are explored. **RESULTS:** The obtained pathologic specimen, following translabyrinthine resection, demonstrated an architectural pattern consistent with a schwannoma and the specimen stained positive for S-100. However, interpretation by pathology could not exclude a malignant process. **CONCLUSIONS:** Pediatric schwannomas pose unique and serious challenges to the neurotologist. Their management requires in-depth discussion with the family regarding management options and a combined surgical approach with neurosurgery.

**42. C-Kit Proto-Oncogene Positivity in Medullary Thyroid Carcinoma**

Todd D. Otteson, MD, Washington, DC  
Kenneth D. Burman, MD, Washington, DC

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to explain the role of c-kit proto-oncogene expression in specific tumors and the relevance of blockade of this proto-oncogene for the treatment of medullary thyroid cancer specifically.

**OBJECTIVES:** Expression of the c-kit proto-oncogene and constitutive activation of the KIT protein tyrosine kinase is thought to be responsible for the pathogenesis of gastrointestinal stromal tumors (GIST) and to contribute to their notorious resistance to radiation therapy and chemotherapy. As relative radioresistance is also characteristic of medullary thyroid carcinoma, a study was undertaken to assess the prevalence of KIT positivity in these tumors, particularly in light of the dramatic clinical and radiologic response of GIST tumors to the tyrosine kinase inhibitor imatinib mesylate. **STUDY DESIGN:** Retrospective histopathologic review. **METHODS:** A retrospective review of 14 patients previously diagnosed with medullary thyroid carcinoma was performed including retrieval of specimens from the surgical pathology files which were immunohistochemically stained to assess reactivity toward KIT protein. **RESULTS:** The study group consisted of four men and 10 women ages 39 to 71. Four of the 14 patients (29%) demonstrated some degree of positivity on immunohistochemical staining toward KIT protein. **CONCLUSIONS:** Treatment of medullary thyroid carcinoma is primarily surgical with variable efficacy of postoperative radiation therapy or chemotherapy. A subset of medullary thyroid tumors that stain positive for KIT protein may be amenable to the addition of imatinib mesylate as an adjunct to the existing therapeutic options. Further studies investigating the efficacy of this agent as a feasible treatment modality in c-kit positive medullary thyroid carcinomas are warranted.

**43. Endoscopic Sinus Surgery for Chronic Sinusitis with Antrochoanal Polyp**

Kiminori Sato, MD PhD, Kurume, Japan

Tadashi Nakashima, MD, Kurume, Japan

**EDUCATIONAL OBJECTIVE:** To evaluate the previous preliminary report, more and longer term follow-up cases were examined. At the conclusion of this presentation, participants should be able to learn one of the reliable surgical procedures of endoscopic sinus surgery for pediatric and adult chronic sinusitis with antrochoanal polyp.

**OBJECTIVES:** To estimate the surgical procedure of endoscopic sinus surgery using CO2 laser and/or microresector for chronic sinusitis with antrochoanal polyp. **STUDY DESIGN:** Twelve children with ages ranging from 7 to 14 and thirteen adults with ages ranging 27 to 67 underwent the present surgical procedure. **METHODS:** Endoscopic sinus surgery is performed under general anesthesia in children and local anesthesia in older children and adults. In this operative procedure the following two techniques were used to remove the antral portion, especially the base, of antrochoanal polyp with a 70-degree endoscope. 1) CO2 laser: a pipe guide handpiece with a deflective tip was inserted into the nasal cavity and the base of the antrochoanal polyp was vaporized and removed via an enlarged natural ostium. 2) Microresector: the curved and straight blade of a microresector was inserted into the maxillary antrum via an enlarged natural ostium and/or nasoantral window opened under the inferior turbinate. The polyp was resected. **RESULTS:** In the endoscopic follow-up for 4 to 51 months, no patient who underwent the primary surgery required reoperation for antrochoanal polyp recurrence. One out of the seven patients who underwent secondary surgery required a revised operation with microresector and CO2 laser, consequently all 25 cases have been well controlled. **CONCLUSIONS:** By the present surgical procedure: 1) chronic sinusitis with antrochoanal polyp is an indication for endoscopic sinus surgery; 2) the greater portion of the antral part of the polyp can be removed with the healthy antral mucosa left intact; and 3) this operation is applicable for antrochoanal polyp in children as well as adults.

#### 44. **The Impact of Race and Age on Major Medical Complications and Resource Utilization Among Head and Neck Squamous Cell Carcinoma Patients**

Andrew G. Sikora, MD PhD, New York, NY  
Arnold Komisar, MD DDS\*, New York, NY  
Mark D. DeLacure, MD, New York, NY

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to describe the impact of race and increasing age on the likelihood of major medical comorbidity during hospitalization for head and neck surgical procedures. They will also be able to explain race- and age-related trends in hospital length of stay, discharge disposition, and payer mix among HNSCCA patients.

**OBJECTIVES:** To examine race- and age-related differences in health care resource utilization among patients with head and neck squamous cell carcinoma (HNSCCA). **STUDY DESIGN:** Retrospective review of a national hospital database. **METHODS:** We searched the National Hospital Discharge Survey (NHDS) database for 2000 and 2001. For each of the 411 patients who had major head and neck surgical procedures, we examined the length of stay (LOS), payer source, and ICD-9 codes for medical complications. **RESULTS:** Elderly patients (75 and older) made up 19% of the study population; however, they accounted for 36% of major medical complications, and 56% of postoperative deaths. The risk of medical complication was 16.7% for the elderly, and 6.9% for younger patients. The risk of death for elderly patients was 6.4%, and 1.2% for younger patients. While uncomplicated admissions had a median LOS of 6 days, LOS rose to 14.5 days after one or more postoperative medical complications. White and black patients did not have a substantially different risk of death or complication. However, the median LOS was somewhat longer for blacks (9 days vs. 6 days). Blacks were also substantially more likely than whites to utilize Medicaid as a primary payment source (29% vs. 11%), or to be billed as either self-pay or no charge (13% vs. 2.7%). **CONCLUSIONS:** Elderly patients have a higher rate of complication than younger patients. Blacks and whites have a similar incidence of complications, but blacks have a longer average LOS and are less likely to have sources of health insurance other than Medicaid.

#### 45. **Comparison of Effectiveness of Treatment Techniques in 1000 Cases of Benign Paroxysmal Positional Vertigo**

Ronald L. Steenerson, MD, Atlanta, GA  
Gaye W. Cronin, MS, Atlanta, GA (*Presenter*)

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to compare the efficacy of canalith repositioning procedures, liberatory maneuvers, and redistribution exercises in the treatment of benign paroxysmal positional vertigo.

**OBJECTIVES:** The study's purpose is to present 1000 cases of benign paroxysmal positional vertigo (BPPV) and compare the effectiveness of canalith repositioning procedures, liberatory maneuvers, and redistribution exercises in the treatment of these cases. **STUDY DESIGN:** The study design is a retrospective case review. **METHODS:** The patients had either posterior or horizontal canal BPPV. Diagnosis was based upon history of transient paroxysmal vertigo, a positive Dix-Hallpike response with torsional or horizontal nystagmus, and electronystagmography. Patients with posterior canal BPPV numbered 748, and 252 had horizontal canal BPPV. Intervention techniques were canalith repositioning, liberatory maneuvers, and redistribution exercises. Four hundred and thirty-five patients received canalith repositioning, 404 received liberatory maneuvers, and 161 received redistribution exercises of positional movements. Following treatment intervention, patients were reassessed at 3, 6, and 12 month intervals. **RESULTS:** There were 631 women and 369 men from 15 to 91 years (average 42). The average duration of symptoms, prior to intervention, was 46 months. Outcome measures were considered met when symptoms and signs of BPPV disappeared. In the repositioning group, 404 (93%) experienced symptom resolution after an average of 3 sessions, 357 (88%) had symptom resolution in the liberatory maneuver group with an average of 4 sessions, and 143 (89%) experienced symptom resolution in the redistribution group after 4 weeks of daily exercises. Seventy-two patients had recurrence of BPPV at 6 months. The other patients had long-term retention for up to one year follow-up. **CONCLUSIONS:** Treatment of BPPV can be effective using either repositioning procedures, liberatory maneuvers, or redistribution exercises.

#### 46. **Intracapsular Adult Tonsillectomy with a Microdebrider**

Michael H. Stevens, MD\*, Salt Lake City, UT  
Daniel C. Stevens, BS, Portland, OR

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to know that the use of a microdebrider for adult intracapsular tonsillectomy significantly reduces the time patients need to take narcotic pain medication postoperatively.

**OBJECTIVES:** To help participants to know that the use of a microdebrider to perform an intracapsular tonsillectomy in adults significantly short-

ens postoperative recovery and allows them to return to normal activities sooner. **STUDY DESIGN:** Twenty four (24) adult patients over the age of 12 with significant tonsillar hypertrophy were entered into a prospective, blinded, and randomized study to see if the use of a microdebrider to perform an intracapsular tonsillectomy would reduce the time they needed to take narcotic analgesics postoperatively. **METHODS:** Twelve (12) adults had a traditional complete tonsillectomy by means of a needle point bovie and served as a control group. Twelve (12) had a partial intracapsular tonsillectomy to see how long they required narcotic analgesics postoperatively and when they were able to resume normal activities. **RESULTS:** The control group took narcotics an average of 9.92 days, whereas the microdebrider group took them only 6.00 days ( $p=0.001$ ). This significant reduction of time allowed adults to return to normal activities sooner. **CONCLUSIONS:** Since the time required to return to work is often of paramount interest to patients having surgery, the use of the microdebrider should be considered in patients with tonsillar hypertrophy as it will allow an earlier return to normal activities.

**47. Peritonsillar Abscess Following Intracapsular Tonsillectomy**

Benjamin G. Swartout, MD, New York, NY  
Phillip Song, MD, New York, NY  
Joseph M. Bernstein, MD, New York, NY

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to identify the atypical presentation of peritonsillar abscess in a patient who has had an intracapsular tonsillectomy.

**OBJECTIVES:** The incidence of peritonsillar abscess (PTA) following total tonsillectomy is exceedingly low. In the English literature there are only two reports documenting this phenomenon. We present two cases of PTA following intracapsular tonsillectomy with radiofrequency ablation (coblation). **STUDY DESIGN:** Both cases presented with several days of worsening sore throat more than a year after an intracapsular tonsillectomy was performed. Both patients had trismus with a midline uvula and unilateral fullness of the soft palate. **METHODS:** One patient underwent needle aspiration of the PTA. **RESULTS:** After 24 hours of IV antibiotics both patients showed significant improvement and were discharged. Completion tonsillectomy was performed after resolution of the acute infection. **CONCLUSIONS:** PTA in children requires appropriate and effective treatment to avoid such complications as extension of the abscess and airway compromise. PTA following partial tonsillectomy presents a unique diagnostic challenge. As in our cases, there may be no uvular deviation or tonsillar fullness to raise suspicion for PTA. Additionally, a history of prior tonsillectomy may lower the concern for PTA among clinicians. With the increased popularity of intracapsular tonsillectomy to address tonsillar hypertrophy we may be seeing changes in the clinical presentation of peritonsillar abscess. Clinicians should be aware of the atypical presentation and should maintain an appropriate index of suspicion in order to diagnose an abscess in a child who has had a tonsillectomy.

**48. Prevalence of Gastroesophagopharyngeal Acid Reflux: An Evidence Based Systematic Review**

Seckin O. Ulualp, MD, Dallas, TX  
Peter S. Roland, MD\*, Dallas, TX  
Robert J. Toohill, MD\*, Milwaukee, WI  
Reza Shaker, MD, Milwaukee, WI

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to evaluate the pharyngeal pH monitoring findings in patients with reflux laryngitis.

**OBJECTIVES:** To identify variables contributing to discrepant gastroesophagopharyngeal acid reflux (GEPR) findings and to critically assess the prevalence of GEPR in healthy individuals and patients with reflux laryngitis (RL). **STUDY DESIGN:** Quantitative systematic review. **METHODS:** Pharyngeal pH monitoring studies of healthy individuals and RL patients were identified through a MEDLINE search of publications between 1966 and 2003. Pooled results of the measured pharyngeal acid exposure characteristics and the prevalence of GEPR events were analyzed. Statistical comparisons performed using a chi-squared test. **RESULTS:** 181 controls and 184 RL patients were included. Subjects' age ranged from 19 to 85 years. GEPR events were detected at 1, 2, and 4 cm above UES and 0.5cm below arytenoids, with varying rates. The prevalence of GEPR ranged from 0% to 83% in controls and 27% to 86% in RL. After excluding the healthy subjects with abnormal esophageal acid exposure, prevalence of GEPR decreased from 35% to 17% ( $P<.002$ ). GEPR in RL was significantly more prevalent than in the entire group of controls as well as in controls without abnormal esophageal acid exposure ( $P<.001$ ). **CONCLUSIONS:** The prevalence of GEPR in controls and RL patients varies in the studied 4 areas above the UES. The percentage of the subjects with GEPR increased as the probe was located more closely to the UES. Differences in demographic characteristics of the subjects, interventions used to select subjects, and pharyngeal pH monitoring techniques were identified as factors possibly contributing to inconsistent pharyngeal pH monitoring findings.

**49. Expression of Toll-Like Receptors and Complement Genes in Human Sinonasal Tissues**

Joseph B. VanderMeer, MD, Baltimore, MD  
Quan Sha, PhD, Baltimore, MD  
Andrew P. Lane, MD, Baltimore, MD  
Robert P. Schleimer, PhD, Baltimore, MD

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to identify the expression of several innate immune receptors in sinonasal tissue and the function and expression of the toll-like receptor family of receptors in sinonasal tissue.

**OBJECTIVES:** To further understand the pathogenesis of sinusitis, we assessed human sinonasal tissue for the expression of effector molecules involved in innate immune responses. We determined the level of expression of genes of the complement system and members of the cell surface pathogen receptor family, the toll-like receptors (TLR). **STUDY DESIGN:** Laboratory research. **METHODS:** Human sinonasal surgical specimens from patients with chronic rhinosinusitis were obtained with informed consent and mRNA was extracted. Messenger RNA was also isolated from BEAS2B epithelial cells at baseline or after stimulation with TLR ligands including double-stranded RNA (dsRNA), LPS and zymosan. Expression of TLR and complement genes was assessed using quantitative Taqman real-time PCR analysis. **RESULTS:** Expression of all ten known TLRs was detected in human sinonasal tissue and the BEAS2B epithelial cell line. Components of the alternate pathway of complement (Factors B, H, I and P) were detected in human sinonasal tissue and BEAS2B cells while the Mannose-binding pathway components (MBL, MASP1 and MASP2) were expressed at low levels in sinonasal tissue and were undetectable in the BEAS2B cells. Factors B and H were significantly induced

by the TLR3 ligand and dsRNA. **CONCLUSIONS:** Toll-like receptors and alternate pathway complement proteins are expressed in human nasal mucosal tissue in vivo and in cultured airway epithelial cells. The expression of some of these innate immune effectors can be significantly induced by stimulation with double-stranded RNA. Expression of effectors of innate immunity by epithelial cells may play a role in inflammation and immunity in sinonasal cavities

**50. Is Fast Spin Echo T2 MRI Adequate for Evaluation of Asymmetric Sensorineural Hearing Loss in a Public Hospital Setting?**

Daniel J. Verret, MD, Dallas, TX  
Ravi N. Samy, MD, Dallas, TX

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to discuss the pros and cons of fast spin echo vs. contrast enhanced MRI.

**OBJECTIVES:** Several methods can detect the presence of a retrocochlear process in patients with asymmetric sensorineural hearing loss (ASNHL). We determined if fast spin echo (FSE) T2 MRI was equivalent to gadolinium enhanced MRI in the screening evaluation of ASNHL in a county hospital. **STUDY DESIGN:** A retrospective review of patients was performed at a tertiary care county hospital; these patients had ASNHL and no neurologic/vestibular abnormalities; these patients underwent FSE T2 and enhanced MRI to rule out a retrocochlear process between 01/02 and 09/03. **METHODS:** Patients were included in the study if they presented with at least 30dB difference in hearing at one frequency or 10dB hearing difference at three frequencies and if they underwent FSE T2 and enhanced MRI scanning. Information collected included age, gender, side of SNHL, and presence of retrocochlear or other intracranial pathology. **RESULTS:** 146 patients were identified. There were 56 males and 90 females. Their average age was 60 years. The right ear had SNHL in 68 patients; the left ear had SNHL in 78 patients. Of the 146 MRI's performed, 71 were abnormal (demonstrating primarily sinus disease and gray/white matter changes). However, no patients had retrocochlear processes, the reason for performing imaging. **CONCLUSIONS:** For the purpose of ruling out a retrocochlear process in a county hospital setting, FSE T2 MRI was equivalent to gadolinium enhanced MRI. If only FSE scans were performed, savings of approximately \$150,000 would have occurred. However, even though FSE scans save valuable resources, the potential does exist to miss non-retrocochlear pathology.

**51. Safety of Minimally-Invasive Pituitary Surgery (MIPS) Compared to a Traditional Approach**

David R. White, MD, Cincinnati, OH  
Robert E. Sonnenburg, MD, Chapel Hill, NC  
Matthew G. Ewend, MD, Chapel Hill, NC  
Brent A. Senior, MD, Chapel Hill, NC

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to explain difference in complication rates between two approaches to pituitary surgery.

**OBJECTIVES:** Transsphenoidal hypophysectomy is becoming progressively less invasive. Recent endoscopic techniques avoid nasal or intraoral incisions, use of nasal speculums, and nasal packing. Several case series of endoscopic endonasal pituitary surgery have been reported, but relatively little data exists comparing complication rates to more traditional approaches. We compare the complications of our first fifty cases of endoscopic, minimally-invasive pituitary surgery (MIPS) to our last fifty sublabial transseptal (SLTS) procedures. **STUDY DESIGN:** Case control. **METHODS:** Fifty consecutive MIPS procedures and fifty consecutive SLTS procedures were reviewed retrospectively. Complication rates were analyzed and compared. **RESULTS:** Total complications per patient ( $p=0.005$ ), postoperative epistaxis ( $p=0.031$ ), lip anesthesia ( $p=0.013$ ), and deviated septum ( $p=0.028$ ) occurred more often in the SLTS group. No significant difference was seen in cerebrospinal fluid leak, meningitis, ophthalmoplegia, visual acuity loss, diabetes insipidus, intracranial hemorrhage, or death. In the MIPS group, length of stay ( $p<0.001$ ), use of lumbar drainage ( $p=0.007$ ), and nasal packing ( $p<0.001$ ) were also significantly reduced. **CONCLUSIONS:** Endoscopic endonasal pituitary surgery provides improved complication rates when compared to sublabial transseptal approaches. In addition, we note advantages of the MIPS approach including reduced length of hospital stay and decreased use of lumbar drainage and nasal packing.

**52. A Precise Human Model With Operable Paranasal Sinuses for ESS Training**

Juli Yamashita, BSc, Tsukuba, Ibaraki Japan  
Kazunori Yokoyama, MD, Tsukuba, Ibaraki Japan  
Osamu Morikawa, PhD, Tsukuba, Ibaraki Japan  
Ryoichi Hashimoto, PhD, Tsukuba, Ibaraki Japan  
Yukio Fukui, PhD, Tsukuba, Ibaraki Japan  
Yasushi Yamauchi, PhD, Tsukuba, Ibaraki Japan

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to discuss pros and cons in ESS surgical skill training using cadavers and the newly developed operable human nasal model.

**OBJECTIVES:** Intensive training is indispensable to acquire ESS surgical skills. Cadaver dissection must be the best, however, its opportunity is limited and decreasing. Lacking appropriate animal model, a good artificial training model of human paranasal sinuses has been sorely needed. **STUDY DESIGN:** Skill training model should reproduce the narrow and complex shape of sinuses, which makes the operation so difficult, and the haptic sensation of resecting thin bone walls of sinuses, to learn how much force to apply. **METHODS:** The model was developed with rapid prototyping (RP) technology; starting with a simple 3D bone shape reconstructed from CT images of an actual patient (res.: 0.41x0.41x0.5mm), missing parts as ethmoidal cells which do not appear on CT were manually extracted on a CAD system. To reproduce haptic response, a thin "bone" net structure coated with resin membrane was newly invented, and RP systems by Z Corp., USA, with plaster based material was chosen through sensation tests by experienced surgeons. **RESULTS:** The model is so precise that its 3D reconstruction from its CT is just included in its original 3D shape. Wide range of "hardness" can be reproduced, which expert surgeons interestingly reported as "N-year inflammation." Operating areas are replaceable parts, which minimizes training costs. **CONCLUSIONS:** Considering that the model is more like a dry skull, whose precision is limited by the resolution of its original CT, it still is very much useful for basic ESS training, with better mucosal color and no danger of infection.

**53. In Vivo Trial for the Regeneration of Mastoid Mucosa**

Masaru Yamashita, MD, Kyoto, Japan

Shin-ichi Kanemaru, MD, Kyoto, Japan  
Akhmar Magrufov, MD, Kyoto, Japan  
Koichi Omori, Fukushima, Japan  
Tatsuo Nakamura, Kyoto, Japan  
Juichi Ito, MD, Kyoto, Japan

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to realize that mucosa with newly formed capillaries can be regenerated in the mastoid by tissue engineering technique.

**OBJECTIVES:** The mucosa of the mastoid air cells plays an important role in the control of middle ear pressure. Recently it has been revealed that the middle ear pressure is adjusted not only by the opening of eustachian tube but also by the gas exchange function of the mastoid mucosa. The patients with intractable otitis media have poor developed mastoids. We believe that preservation or regeneration of mucosa after surgery is essential. Therefore, the aim of our study was regeneration of mastoid mucosa of experimental animal—chinchilla. **STUDY DESIGN:** For this purpose tissue engineering technique has been used. According to the concept of tissue engineering, collagen coated 3 dimensional hydroxyapatite (3D-HA), with the high ratio of micropore, was used as a scaffold. Bone marrow derived stromal cells (BSCs), the source of cells, were harvested from the femur of experimental animal. **METHODS:** After amplification of their number they were subcultured on the surface of 3D-HA. Mastoidectomy was performed on experimental animal and 3D-HA with the BSCs, cultured on its surface, was implanted. The pieces of 3D-HA were placed in such a manner as to mimic the mastoid air cells' structure. We evaluated the CT images, local macroscopic findings during reopening, and histological data. **RESULTS:** The CT images showed good aerated mastoid cavity at the implanted side. Mucosa, which expressed epithelial characteristics in the immunohistological examination, was seen on the surface of the implanted hydroxyapatite. **CONCLUSIONS:** These tissue engineering methods may be utilized for the mastoid regeneration.

#### 54. A Comparison of 35mm Analog to 5 Megapixel and 3 Megapixel Digital Photography in an Otolaryngology Setting

Leopold K. Yin, MD, Columbus, OH  
Thomas H. Hammond, MD, Columbus, OH  
Kamran E. Barin, PhD, Columbus, OH  
Leslie K. Winter, BA, Columbus, OH  
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**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to compare the quality of images from a 35mm SLR camera to those from a 5 megapixel and a 3 megapixel digital camera.

**OBJECTIVES:** To compare the quality of images from a professional 35mm SLR macro camera with those from two digital cameras of differing resolution in four different otolaryngology settings. **STUDY DESIGN:** A single blinded prospective analysis was undertaken for four image categories taken by each of the three different cameras in full automatic mode. The scenes included facial plastics, intra-operative, radiologic, and general landscape images. Five image sets were evaluated for each image category by nine judges. These judges included three professional photographers, three otolaryngologists, and three evaluators with no medical or photography experience. **METHODS:** The resolution, color accuracy, contrast, and overall quality were evaluated for each image based on an ordinal scale of 1 to 6. In addition, a rank was given to each of the images within an image set. One way analysis of variance was used to test whether the average scores across cameras were significantly ( $p < 0.05$ ) different. Post-hoc analysis was then used to analyze differences between cameras. **RESULTS:** The null hypothesis that there is no difference between images taken with the various cameras was rejected ( $p < 0.001$ ) for each of the image qualities, including rank. The images produced by the 5 megapixel (Nikon Coolpix 5000) and 3 megapixel (Olympus 3000) digital cameras were not significantly different. The images produced by the digital systems were significantly ( $p < 0.001$ ) better than images produced by the 35mm SLR (Nikon F5, 105-mm F2.8). **CONCLUSIONS:** The prints developed from both digital cameras were significantly better than those from the analog camera. Digital photography appears to be a viable alternative to analog.