SELECTED ABSTRACTS

POSTER PRESENTATIONS

IN ORDER OF PRESENTATION

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AMERICAN OTOLOGICAL SOCIETY

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Phoenix Convention Center
Phoenix, AZ

(Oral presentations are Fri/Sat April 24-25)

Preliminary Clinical Evaluation of a Digital Auditory-Cognitive Rehabilitation Program for Age-Related Hearing Loss

Kyoungho Park, MD, PhD; Sunwoo Lee, MD; Chanmi Lee, MD
Minchae Jeon, MD; Jihyung Lim, MD

Objective: To evaluate the preliminary efficacy and safety of a digital auditory-cognitive rehabilitation program (DP-DTx-002) for age-related hearing loss (ARHL).

Study Design: Prospective, randomized, controlled pilot study.

Setting: Tertiary referral center; ambulatory

Patients: Twenty-six participants aged 60–85 years with mild to moderate sensorineural hearing loss (PTA ≥25 dB, SDS ≤90%) were randomized to treatment or control groups.

Interventions: The treatment group used a mobile auditory-cognitive training app for 30 minutes, three times weekly, over four weeks; controls received no digital intervention.

Main Outcome Measures: Changes in Korean Hearing Handicap Inventory for the Elderly (KHHIE), Digit Span Test (DST), Korean Mini-Mental State Examination (K-MMSE), and speech discrimination scores (SDS).

Results: The treatment group demonstrated a statistically significant improvement in speech discrimination scores (SDS) following 4 weeks of digital auditory-cognitive training (ANCOVA $p = 0.008$, 0.023 for the right and left ears, respectively).

Conclusions: DP-DTx-002 was safe and feasible, showing trends toward auditory-cognitive benefit. Larger, longer trials are warranted to confirm clinical efficacy.

Learning Objective: To recognize the potential clinical benefits and limitations of app-based rehabilitation programs.

Desired Result: Increased implementation of digital therapeutic tools for remote and accessible auditory rehabilitation.

Level of Evidence - Level IV

Indicate IRB or IACUC: Exempt

Word Recognition and Cognitive Function in Older Adults with Hearing Loss: A Cross-Sectional Study Using a Standardized Neuropsychological Battery

Kyoungho Park, MD, PhD; Sunwoo Lee, MD

Objective: Assessment of the association between hearing loss and cognitive disorders

Study Design: Retrospective case review

Setting: Tertiary referral center; ambulatory

Patients: A total of 801 participants aged ≥60 years. The mean age was 77.1 ± 9.7 years, and the sex distribution was 313 males and 488 females.

Interventions: Speech audiometry was performed bilaterally. Cognitive function was assessed by using the Korea Mini-Mental State Examination (K–MMSE) and the Seoul Neuropsychological Screening Battery.

Main Outcome Measures: The mean speech recognition threshold was 39.6 ± 4.8 dB, and the speech discrimination score averaged 74.3 ± 29.9%. The mean K–MMSE score was 25.1 ± 4.3. Cognitive status was categorized as normal (n = 205), mild cognitive impairment (n = 438), and dementia (n = 158).

Results: Logistic regression revealed that age, sex, and hearing loss were significantly associated with cognitive impairment ($p < 0.05$).

Conclusions: The integration of audiological screening into cognitive risk assessments and raise the possibility that addressing hearing loss may help preserve cognitive function during aging.

Learning Objective: To emphasize the clinical importance of early hearing assessment and intervention to prevent cognitive decline.

Desired Result: Early intervention at the stage of mild hearing loss is crucial to prevent further deterioration of hearing and associated cognitive decline.

Level of Evidence - Level V

Indicate IRB or IACUC: Exempt

Traumatic Tympanic Membrane Perforations Treated with Tympanic Membrane Regeneration Therapy

Tomoya Yamaguchi, MD; Shin-ichi Kanemaru, MD, PhD; Rie Kanai, MD; Eriko Otonari, MD
Maki Yamasoba, MD; Yuki Fujii, MD; Hiroyuki Harada, MD; Toshiki Maetani, MD, PhD

Objective: To evaluate the characteristics and treatment outcomes of traumatic tympanic membrane perforations (TMPs) compared with non-traumatic perforations in tympanic membrane regeneration therapy (TMRT).

Study Design: Intervention study

Setting: Department of Otolaryngology, Medical Research Institute Kitano Hospital

Patients: A total of 568 ears treated with TMRT were analyzed, comprising 65 traumatic TMPs (traumatic group) and 503 non-traumatic TMPs (non-traumatic group). The mean age was 53.3 years in the traumatic group and 61.0 years in the non-traumatic group.

Interventions: All patients underwent TMRT, which involved freshening of the perforation edge, insertion of a gelatin sponge impregnated with basic fibroblast growth factor and sealing with fibrin glue. The procedure was repeated up to four times until closure was achieved.

Main Outcome Measures: Closure rate, age distribution, and presence of tympanic membrane calcification were compared between the two groups.

Results: The closure rate was 98.5% (64/65) in the traumatic group and 98.4% (495/503) in the non-traumatic group. Calcification of the tympanic membrane was observed in 61.5% (40/65) and 72.8% (366/503), respectively. The traumatic group showed a younger age distribution and a lower incidence of calcification. No major complications were observed.

Conclusions: In traumatic tympanic membrane perforations, the absence of chronic inflammation related to their etiology and background was associated with a relatively younger age and a lower incidence of tympanic membrane calcification. The closure rate was excellent in both groups, regardless of the cause of perforation.

Learning Objective: To understand the clinical characteristics of traumatic tympanic membrane perforations compared with non-traumatic perforations in the context of tympanic membrane regeneration therapy, and to recognize how the absence of chronic inflammation and tympanic membrane calcification may influence regenerative outcomes.

Desired Result: To demonstrate that traumatic perforations, typically occurring in younger patients and without chronic inflammatory background, show lower calcification and achieve equally excellent closure rates following tympanic membrane regeneration therapy.

Level of Evidence: IV

Indicate IRB or IACUC: IRB No. 2106006, Medical Research Institute Kitano Hospital (initial approval: June 14, 2021). TMRT has been covered by Japanese national health insurance since November 2019.

Robotic-Assisted Versus Conventional Cochlear Implantations - A Comparative Assessment

Kenneth R. Feehs, MD; Mia Z. Ferry, BS; Robert P. Hyatt, BS; Michele M. Gandolfi, MD, MS
Pedrom C. Sioshansi, MD; Eric M. Kraus, MD, MS

Objective: To assess differences in operative duration, postoperative complications and audiometric outcomes between conventional versus robotic-assisted cochlear implantations.

Study Design: Retrospective case control.

Setting: Single-institution, tertiary referral center.

Patients: Seventy-eight total adult patients were evaluated from December 2023 – February 2025, including 37 who underwent robotic-assisted cochlear implant insertion and 41 who underwent conventional cochlear implant insertion.

Interventions: Cochlear implantation using either conventional manual insertion or robot-assisted electrode insertion with iotaSOFT Insertion System.

Main Outcome Measures: Operative duration, post-operative complication rate, and audiometric outcomes including post-operative pure tone average (PTA), AzBio, Consonant-nucleus-consonant (CNC)-Word and CNC-phoneme scores.

Results: Patients who underwent robotic-assisted cochlear implantation had longer mean operative times (187.8 versus 172.1 min) and higher complication rates (10.8% versus 4.9%) though neither difference was statistically significant. Post-operative improvement in PTA was 50.5 dB in the robot-assisted group and 55.0 dB in the conventional group ($p > 0.05$). Average post-operative AzBio (76.1 versus 67.2), CNC-Word (47 versus 46.5) and Phoneme (64.5 versus 61.4) scores were all higher in the robot-assisted group compared to conventional implant insertion though no difference was statistically significant.

Conclusions: Robotic-assisted cochlear implant insertion demonstrates similar complication rates and operative durations compared to conventional cochlear implantation. Preliminary data suggest that patients who undergo robotic insertion may have improved audiometric outcomes compared to conventional CI insertion though this difference was not statistically significant.

Learning Objective: To better understand robotic-assisted CI insertion audiometric outcomes as compared to conventional CI insertion.

Desired Result: Attendees will have an enhanced understanding of the relationship between the use of robotic assistance during cochlear implant insertions and post-operative audiometric outcomes.

Level of Evidence - Level III

Indicate IRB or IACUC: IRB00125142 – Wake Forest University School of Medicine

Cochlear Implant Performance Prediction: Using the Stroop Test as a Marker of Top-Down Processing in Hearing and Speech-in-Noise Ability

Maaz S. Haji, BS; Irina Cheng, BS; Claus-Peter Richter, MD, PhD

Objective: To assess whether Stroop test scores, a measure of top-down cognitive processing ability, can predict speech-in-noise performance and help identify potentially poor cochlear implant performers.

Study Design: Prospective cross-sectional study

Setting: Academic research setting

Patients: 26 adult participants with normal hearing to mild hearing loss.

Interventions: Each participant completed a standard audiometric hearing test, a computerized Stroop test, and a Quick Speech-in-Noise (QuickSIN) test. The signal-to-noise ratio (SNR) loss was used as a proxy for speech-in-noise understanding.

Main Outcome Measures: Correlation between Stroop test times (s) and QuickSIN SNR loss (dB).

Results: Stroop test times naming the colors with incongruent information correlated significantly with QuickSIN SNR loss (N = 26; **$r = 0.68$; $p < 0.05$; power > 95%**). Participants with slower interference resolution consistently demonstrated poorer speech-in-noise performance, suggesting that top-down cognitive control meaningfully contributes to hearing outcomes in speech processing.

Conclusions: Even among individuals with normal hearing to mild hearing loss, slower Stroop performance predicted poorer speech-in-noise scores. Given that the Stroop test is a reliable measure of top-down processing abilities, a battery of similar tests may help identify individuals who struggle to use hearing at a cognitive level and could inform pre-implant assessment models which currently are limited to audiometric evaluation only.

Learning Objective: Recognize how the Stroop test can capture top-down cognitive processing relevant to hearing and predict speech-in-noise performance.

Desired Result: Promote inclusion of cognitive tests that measure top-down processing ability in cochlear implant assessments to better identify individuals at risk for poor listening outcomes post-surgery.

Level of Evidence - Level III

Indicate IRB or IACUC: Northwestern University – IRB#: STU00223538 – Obtained 06/26/2025

A Pilot Study of Virtual Reality-Vestibular Physical Therapy for Refractory Dizziness

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Objective: To assess the tolerability and efficacy of Virtual Reality-Vestibular Physical Therapy (VR-VPT) in individuals with refractory symptoms after conventional vestibular rehabilitation

Study Design: Prospective Cohort Study

Setting: Tertiary referral center

Patients: Individuals with vestibular disorder offered VR-VPT if they (1) still had symptoms after conventional vestibular physical therapy or (2) were considered to have a specific problem suited to VR-VPT

Interventions: Treatment consisted of approximately eight 45-minute sessions, each directed by a physical therapist.

Main Outcome Measures: Differences in baseline and post-treatment surveys, provider-based assessments, and pre- and post-session Simulator Sickness Questionnaire (SSQ) scores were analyzed.

Results: Among our cohort of 18 participants, there were 10 individuals with vestibular loss (VL), six with vestibular migraine (VM), and four with Persistent Postural-Perceptual Dizziness (PPPD). Significant improvements were seen post-treatment in the Dizziness Handicap Inventory (n=15, mean difference: -11.7, 95% CI: [-18.2, -5.2], p=0.002) and the Functional Gait Assessment (n=17, mean difference: 2.3, 95% CI: [0.8, 3.8], p=0.005). Video head impulse testing and dynamic visual acuity improved in a subset of VL participants who underwent both baseline and post-treatment testing. VR-VPT sessions did not significantly provoke symptoms captured in SSQ responses, such as nausea (average difference: 0.32 ± 0.68) or general discomfort (average difference: 0.14 ± 0.68).

Conclusions: This pilot study suggests that VR-VPT can be tolerated and may benefit many patients with refractory symptoms, with additional benefits in vestibular function observed in individuals with vestibular loss.

Learning Objective: VR-VPT may improve patient-reported and objective measures of vestibular or balance function in difficult-to-treat patients.

Desired Result: To consider the role of VR-VPT in managing vestibular disorders.

Level of Evidence - IV

Indicate IRB or IACUC: 21-33311.

Listening Fatigue Contributes to Hearing-Related Quality of Life in Adult Cochlear Implant Candidates

Andrew L. S. Thornton, BA; Annie Shen, BS; Andrea J. DeFreese, AuD; Jessica H. Lewis, AuD
*Benjamin W. Y. Hornsby, PhD; **T**errin N. Tamati, PhD; Aaron C. Moberly, MD*

Objective: To gain a better understanding of demographic, audiologic, and psychosocial factors associated with hearing-related quality of life (QOL) in adult cochlear implant (CI) candidates.

Study Design: Retrospective cross-sectional analysis.

Setting: Tertiary academic medical center.

Patients: A total of 198 adults evaluated for CI candidacy completed the Cochlear Implant Quality of Life-10 Global (CIQOL-10 Global) and other preoperative patient-reported outcome measures (PROMs). Among these, 72 patients had complete data for both the Vanderbilt Fatigue Scale 10-item version (VFS) and Tinnitus Handicap Inventory (THI) and were included in regression analysis.

Interventions: Preoperative audiologic, demographic, and PROM testing (VFS and THI).

Main Outcome Measures: Preoperative CIQOL-10 Global score.

Results: Preoperative CIQOL-10 Global scores were significantly negatively correlated with VFS ($r = -0.60$, $p < .001$) and THI ($r = -0.27$, $p = .005$), such that increased fatigue and tinnitus were associated with poorer quality of life. No significant correlations were observed for age, duration of deafness, or preoperative AzBio Sentences in Quiet (AzBio) scores in the ear to be implanted. In a multivariable regression analysis of preoperative CIQOL-10 Global including all five variables (VFS, THI, age, duration of deafness, AzBio), only VFS remained a significant independent and negative predictor of CIQOL-10 Global ($\beta = -0.58$, $p < .001$; $R^2 = 0.33$).

Conclusions: Worse listening fatigue was the sole independent factor explaining poorer preoperative hearing-related QOL, underscoring its distinct psychosocial role beyond traditional audiologic measures. In contrast, tinnitus perception, age, duration of deafness, and speech-recognition ability did not independently contribute to QOL. These findings suggest that assessing listening fatigue may provide insight into the broader cognitive or emotional costs of hearing not captured by standard metrics, allowing for enhanced counseling and expectation setting. However, a substantial portion of variance in QOL remains unexplained, highlighting the need for additional research.

Learning Objective: Recognize the role of listening fatigue as an independent contributor to hearing-related quality of life in adults prior to cochlear implantation.

Desired Result: Highlight listening fatigue screening as a potential valuable addition to preoperative cochlear implant evaluation.

Level of Evidence: Level III.

IRB: Approved, Vanderbilt University Medical Center #231259.

Speech Perception and Device Use After Cochlear Implantation in Children with Single-Sided Deafness

Emily S. Xu, PhD; Cara M. Donahue, AuD; Katherine Farnsworth, AuD; Alison Olivo, AuD
Denise Thomas, AuD; Elizabeth Tournis, AuD; Susan Reynolds, AuD
Maura Ryan, MD; Nancy M. Young, MD

Objective: To evaluate speech perception outcomes and device use in implanted children with single-sided deafness (SSD)

Study Design: Retrospective cohort review.

Setting: Tertiary care center.

Patients: 39 children with SSD diagnosed at mean age of 4.6 years (1 month -15.7 years). All children had normal cochlear nerves and no significant malformation of the cochlear turns as determined by MRI. Onset group and mean age at diagnosis: Referred Newborn Hearing Screening (Group 1) N=16, 12 months; Unknown (Group 2) N=17, 5.6 years; Sudden Loss (Group 3) N=6, 11.7 years. Seven children had other conditions in addition to SSD placing them at risk for delay in speech perception and language development.

Interventions: Unilateral CI.

Main Outcome Measures: Speech perception and average daily device use measured by hearing hour percentage (HHP).

Results: Mean age at CI 7.4 years (1.2-16.7). Mean length of device use 2 years (1-3). 90% (35/39) developed speech perception: 10 (26%) closed-set; 25 (64%) open-set. 4 (10%) improved detection without speech perception. Most children in each onset of loss group developed speech perception. Group 1: 14 (88%) 8 closed-set; 6 open-set. Group 2: 16 (94%) 1 closed-set; 15 open-set. Group 3: 5 (88%) 1 closed-set; 5 open-set. All 7 children with complicating conditions developed speech perception (1 closed-set; 6 open-set). Mean HHP for all 39 children was 41% (4%-93%): closed-set group 35%; open-set group 44%; children with no speech perception 36%; and with complicating conditions 48%. Higher socioeconomic status was significantly correlated with higher mean HHP ($p<.001$). Three (8%) children were non-users: two teenagers with sudden hearing loss and one 6-year-old with unknown age at onset of hearing loss. Two non-users had developed measurable open-set skills. Angular insertion depth of the 39 implanted electrode arrays will be determined from immediate post operative X-rays to determine if correlations with outcome measures are present.

Conclusions: Most implanted SSD children developed speech perception in the implanted ear, including those with complicating conditions. Daily device use measured by HHP was lower than has been recommended to optimize CI performance. However, the vast majority remain as device users. Further research is needed to understand the influences impacting daily device use by CI children with SSD. Whether use is driven by the child and/or parent's perception of benefit, the presence or risk of language delay, risk of loss in the normal hearing ear, as well as the influence of the home versus school environment are important to understand the impact of implantation and to improve counseling.

Learning Objective: Understand and describe range of speech perception outcomes and hours of daily device use in a heterogenous population of implanted children with SSD.

Desired Result: To improve clinicians' ability to counsel families of children with SSD and to encourage further research into device use and outcomes.

Level of Evidence - Level IV

Indicate IRB or IACUC: Lurie Children's Hospital IRB#2018-1650

Impact of Contralateral Hearing Status on Cochlear Implant Device Engagement

Stephanie M. Younan, MPH, BS; Lourdes Kaufman, BA; Pearl Doan, BS
Connie Chang-Chien, BS; Nicole T. Jiam, MD

Objective: The expanding indications for cochlear implantation (CI) have perpetuated diverse hearing loss profiles among this patient population, including single-sided deafness (SSD), asymmetric bilateral hearing loss (AHL), and bilateral symmetric hearing loss (BSHL). This study quantifies CI utilization patterns to identify populations at high risk for non-use and inform targeted protocols.

Study Design: Retrospective cohort study.

Setting: Tertiary academic center.

Patients and Intervention: 84 adult CI recipients (2018-2024) with complete audiometric classification. Patients were classified by preoperative pure-tone averages: SSD (non-implanted ear ≤30dB, n=26), AHL (both ears ≥50dB with >15dB asymmetry, n=18), and BSHL (both ears ≥50dB with ≤15dB asymmetry, n=40). Groups were well-matched on age at implantation and duration of deafness.

Main Outcome Measures: Mean daily CI usage from device datalogging.

Results: Overall CI usage differed significantly across the three configurations (Kruskal-Wallis $p<0.001$). SSD patients demonstrated significantly lower utilization compared to both AHL and BSHL groups (7.2±4.1 vs 10.6±3.8 vs 11.4±3.4 hours/day, respectively; $p=0.008$ for SSD vs AHL, $p<0.001$ for SSD vs BSHL). Notably, the AHL and BSHL groups showed statistically equivalent mean daily usage (10.6±3.8 vs 11.4±3.4 hours/day, $p=0.297$, Cohen's $d=0.25$). Full-time usage (≥8 hours/day) was achieved by 50.0% of SSD patients versus 88.9% of AHL and 87.5% of BSHL patients, representing a highly significant difference across categories (χ^2 $p<0.001$). Compared to BSHL, SSD patients were 43% less likely to achieve full-time use (Relative Risk 0.57) and faced a 4.0-fold higher risk of device disengagement (suboptimal usage <8 hours/day: 50.0% vs 12.5%).

Conclusions: Contralateral hearing status predicts CI engagement, with SSD representing a uniquely vulnerable population. These findings underscore the need for tailored counseling, intensified monitoring, and targeted support strategies for SSD recipients to mitigate a high risk for device abandonment.

Learning Objective: To understand that preoperative hearing loss configuration is a fundamental determinant of cochlear implant utilization patterns, with single-sided deafness conferring significantly elevated risk for device non-use and abandonment.

Desired Result: The implementation of configuration-specific counseling and intensified monitoring protocols in clinical practice to identify high-risk SSD recipients and guide timely, targeted support strategies to improve device engagement.

Level of Evidence - Level III

Indicate IRB or IACUC: UCSF IRB # 25-43648; Approval Date: 07/30/25

Practice Makes Perfect: Relationship of Early Datalogging and Speech Scores in Veterans Affairs Cochlear Implant Users

W. Craig Kemper, MD; Kaitlyn A. Brooks, MD; Anna Henry AuD; Benjamin D. Lovin MD
Alex D. Sweeney MD; Angela S. Peng MD; Nathan R. Lindquist, MD

Objective: To investigate the relationship between cochlear implant daily usage "datalogging" and speech recognition scores in veterans.

Study Design: Retrospective cohort study

Setting: Tertiary referral veterans affairs medical center (VAMC).

Patients: Patients who underwent initial cochlear implantation at a single-institution VAMC between December 1998 and May 2024.

Interventions: Cochlear implant, speech recognition testing

Main Outcome Measures: Daily datalogging, speech recognition scores

Results: A retrospective chart review at a large VAMC cochlear implant center identified 29 patients implanted between December 1998 and May 2024 with 1-month datalogging information. Patient datalogging at 1-month was strongly positively correlated with datalogging at 3-month (r_s=0.9029, p<0.01), 6-month (r_s=0.8857, p<0.01), and 12-month (r_s=0.6832, p<0.01) visits. Datalogging at 1-month was moderately positively correlated with AzBio scores at 1-month but strongly correlated with increased AzBio and CNC scores at 12-months (AzBio: r_s=0.6410, p<0.01, CNC: r_s=0.6008, p<0.01). 12-month datalogging was moderately positively correlated with 12-month AzBio (r_s=0.5903, p<0.01) and mildly positively associated with 12-month CNC scores (r_s=0.4017, p=0.047). Linear regression models suggest that 1-month "early" datalogging is more significant than even age or pre-operative scores in predicting 12-month AzBio (β = 6.511, 95% CI 2.361 to 10.66, p=0.0046) and 12-month CNC (β = 5.214, 95% CI 1.711 to 8.717, p=0.0063) outcomes.

Conclusions: A growing interest in recording daily device usage "datalogging" has demonstrated a correlation between cochlear implant datalogging and postoperative speech scores. This data demonstrates that 1-month datalogging is a powerful predictor of long-term CI device usage and speech recognition scores in the veteran population.

Learning Objective:
1. Understand the impact of early CI device usage in the veteran population.

Desired Result:
Improve our understanding of the relationship between early device usage and speech recognition outcomes in the veteran population.

Level of Evidence: Level IV

Indicate IRB or IACUC: Michael E. DeBakey Veterans Affairs Medical Center IRB #1773722-5, BCM IRB H-54164

Antihypertensive Medications' Effects on Hearing Preservation in Vestibular Schwannoma Patients

Anika S. Walia, BA; Harshini Ravi, BS; Alina Galaria, BA
Michael Lee, BSN; Pranav Bingi, BS; Khoa Nguyen, BS; Jacob B. Hunter, MD

Objective: Most vestibular schwannoma (VS) patients experience progressive hearing loss, with prior research showing potential hearing preservation qualities with angiotensin receptor blockers (ARBs). Our objective is to examine whether specific antihypertensive medication classes differentially affect hearing decline in VS patients.

Study Design: Retrospective cohort study.

Setting: Tertiary academic medical center.

Patients: Of 290 VS patients, 218 patients with ≥2 audiograms were included in longitudinal analysis (mean follow-up 4.8 years). Overall, 138 patients were documented taking an antihypertensive medication.

Interventions: Observational exposure to hypertensive medications of varying classes.

Main Outcome Measures: The primary outcome measure is audiometric change, measured by change in pure tone average air conduction (PTA-AC) and across frequencies ranging from 0.5 - 8kHz, and secondary measures include dose response relation.

Results: Patients without hypertension medications (n =80) experienced tumor-side PTA-AC decline of 11.6±16.9 dB/year. Not considering all other medications, patients taking CCBs (n =34) demonstrated the strongest protective trend (5.5±9.6 dB/year; -6.1 dB/year difference, p=0.072, Cohen's d= -0.44), representing 53% slower decline. Effects were consistent across doses (low ≤5mg: -6.6 dB/year; high >10mg: -8.2 dB/year). ARBs (n=39) showed modest effects (6.4±25.8 dB/year; -5.3 dB/year, p=0.32, Cohen's d=-0.24), though no clear dose-response relationship emerged. Other medication classes (beta blocker, ACE inhibitors, and diuretics) showed minimal effects (all p>0.4, Cohen's d > -0.1). Among patients taking greater than one medication, those taking a CCB (n=23) had 44% slower hearing decline compared to non CCB including regimens (n=26) (- 4.8 dB/year, p =0.10, Cohen's d = -0.48). All frequencies (0.5-8 kHz) were proportionally affected without frequency-specific vulnerability.

Conclusions: Despite prior research demonstrating ARB are protective for hearing loss with VS, we found that calcium channel blockers demonstrated the strongest potential for hearing preservation (53% slower decline), despite nearly half of medicated patients being on multiple concurrent antihypertensive medications.

Learning Objective: To understand the effects of antihypertensive medications on hearing changes in vestibular schwannoma patients and specifically evaluate CCBs.

Desired Result: To establish rationale for prospective randomized controlled trials for CCBs for hearing protection in VS patients and guide clinical decision-making regarding antihypertensive medication selection in vestibular schwannoma patients when hearing preservation is a priority.

Level of Evidence - Level III – Cohort Study

Indicate IRB or IACUC: Exempt iRISID-2023-2306 Thomas Jefferson

Anatomy Based Fitting vs. Clinically Based Fitting in Cochlear Implants - Quantifying Map Parameter Differences

Anika S. Walia, BA; Pranav Bingi, BS; Lauren Lucas AuD; Janvi Shukla, BA
Thomas O. Willcox, MD; Rebecca Chiffer, MD; Jacob B. Hunter, MD

Objective: To quantify the difference in map parameters between anatomy-based fitting (ABF) and clinically based fitting (CBF) in cochlear implant (CI) patients and evaluate if certain electrode arrays or patient characteristics are associated with differences.

Study Design: Retrospective cohort study.

Setting: Tertiary academic medical center.

Patients: Twenty-three cochlear implant patients with Med-El arrays were included. Central frequency (CF) [Hz] and most comfortable level (MCL) were obtained from maps at electrodes 1-12 immediately prior to and post ABF was applied.

Interventions: Cochlear implant programming map information was collected for CI patients who underwent ABF, and volume measurements were determined using preoperative CTs in Otoplan 3.1.0.

Main Outcome Measures: Primary measures include mean changes between MCL and CF across all twelve electrodes between CBF and ABF. Secondary measures include associations of CF change to electrode array type (Flex-28 and FlexSoft) and scala tympani (ST) volume.

Results: Of 23 patients, demographics included 14 females, 9 males, with 87% identifying as Caucasian, and mean age at surgery of 65.7 yrs +/- 14.8 yrs. Basal electrodes (1-4) showed progressively increasing mean CF changes from base to apex (120.4 Hz, 224.3 Hz, 342.5 Hz, and 469.1 Hz), and middle electrodes (5-10) showed substantially greater changes following a similar pattern (638.04 Hz, 827.55 Hz, 972.35 Hz, 1093.87 Hz, 1312.41 Hz, 1148.68 Hz), though apical electrodes (11-12) demonstrated a tapering pattern (722.44 Hz, 247.55 Hz). ANOVA analysis indicated significant differences ($p < 0.0001$) in mean CF change when comparing across all electrodes. Mean MCL changes across electrodes 1-12 did not follow an overt pattern and ranged from 0.75 to 2.77, with no significant differences ($p=0.95$).
Between patients implanted with Flex28 (n =17) vs. FlexSoft (n=5), significant differences in mean CF change were observed at electrodes 2-4 ($p < 0.05$), with Flex28 having greater changes. Pearson correlation of ST volume (n =12) to mean change in CF across all electrodes per patient ($r = 0.188$, 95% CI [-0.596, 0.788], $p = 0.656$) and in MCL across all electrodes per patient ($r = -0.591$, 95% CI [-0.930, 0.292], $p = 0.162$) revealed no significant relationship. Average cochlear duct length for Flex28 patients was 31.4 mm and for FlexSoft 33.67mm.

Conclusions: Change in electrode CF from CBF to ABF is significantly different across different electrodes, with greater differences observed in middle electrodes (electrodes 5-10) in comparison to more basal or apical electrodes. Electrode array type may influence ABF frequency reassignment patterns in the basal-middle cochlear region, with significantly larger changes in Flex28 implants across electrodes 2-4 than in FlexSoft. Differences in electrode CF change indicate the benefit of ABF in CI patients and suggest further research in optimizing CBF CI programming with logarithmic maps if ABF is not available, or change in electrode design.

Learning Objective: To understand which electrode positions require the greatest programming adjustments in ABF and understand the role of electrode type and cochlear anatomy in predicting mapping changes.

Desired Result: To guide evidence-based expectations for programming changes when implementing ABF and guide decisions about which patients may benefit most from ABF.

Level of Evidence – Level III cohort study

Indicate IRB or IACUC: Exempt iRISID-2023-2348 Thomas Jefferson

Cochlear Implantation in Nonagenarians: Are the Benefits Worth the Risks?

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Yin Ren, MD, PhD; Oliver F. Adunka, MD, MBA; Robert J. Macielak, MD

Objective: To assess if cochlear implant (CI) insertion is safe and effective in the ≥90-year-old population and how long these patients derive meaningful benefit from implantation.

Study Design: Retrospective case series

Setting: Academic tertiary referral center

Patients: Patients who underwent cochlear implantation with an age at surgery of ≥90-years.

Interventions: Cochlear implantation

Main Outcome Measures: Duration of CI use, average daily CI use, and audiometric outcomes including Consonant-Nucleus-Consonant (CNC) word and AzBio sentence testing in quiet.

Results: Total of 12 patients were identified, with a mean age at surgery of 91.4 years (SD ± 1.1 years). These patients had preoperative mean CNC and AzBio scores in quiet of 10 and 12.9, respectively (SD ± 13.0, 12.2). There were no intraoperative complications, and few perioperative anesthetic complications (one patient [8%] with urinary retention requiring repeated straight catheterizations and one patient with delayed oxygen wean despite lack of contributing comorbidities). After surgery, 3 patients were admitted with 1 patient having a conservatively managed hematoma, 1 patient experiencing difficulty weaning supplemental oxygen, and 1 patient (8%) undergoing planned admission due to preexisting comorbidities. Two patients (17%) experienced late complications with one experiencing device failure occurring 10 months after implantation and one patient having new-onset disequilibrium. The mean time to latest postoperative audiogram was 17.2 months (SD ± 19.5 months). Mean postoperative CNC and AzBio scores in quiet increased to 32 and 42.2, respectively (SD ± 18.3, 27.1). On average, patients used their CIs for 9.1 hours per day (SD ± 5.3 hours) and derived 2.6 years of meaningful CI use (range 0.25 to 6, SD ± 2.0 years).

Conclusions: Overall, CI surgery was generally well-tolerated in a very elderly patient population despite some anticipated perioperative challenges. Moreover, these patients had improvement in hearing outcomes postoperatively and experienced multiple years of meaningful use after implantation, highlighting the quality-of-life benefits despite their advanced age.

Professional Practice Gap & Educational Need: The length of benefit and complications associated with cochlear implantation in nonagenarians is sparsely studied in the literature.

Learning Objective: To identify the safety and efficacy of cochlear implantation in nonagenarians.

Desired Result: To assist clinicians and patients with outcomes in nonagenarians.

Level of Evidence: Level IV

Indicate IRB or IACUC: The Ohio State University IRB Protocol #2023H0410

Quantitative Temporal Bone Analysis Reveals Inflammation-Dependent Matrix Proliferation in Cholesteatoma

Nathan M. Jacob, BS; Abigail R. Montalmant, BS; Yassine Balhi, MD
Amanda M. Lauer, PhD; Zahra N. Sayyid, MD, PhD

Hypothesis: Localized inflammation promotes cholesteatoma proliferation and increased keratinization is associated with ossicular erosion.

Background: Cholesteatoma is a destructive middle ear lesion whose growth may be driven by local inflammation. Defining this relationship can clarify mechanisms of progression and inform treatment strategies.

Methods: Hematoxylin and eosin–stained slides from fourteen post-mortem temporal bones from ten affected patients were analyzed on QuPath software. Extent of keratinization (0–2), ossicular erosion (malleus, incus, stapes; 0–2), and other histologic features were qualitatively assessed. Contralateral ears were examined for pathology. Quantitative analysis measured cholesteatoma matrix length and cell layers across graded inflammatory environments using Image J software (0–2; mild, moderate, severe).

Results: The cohort's mean age was 46.9 ± 14.4 years. Of the participants, 43% were male and 57% were Caucasian. The extent of keratinization was significantly associated with erosion of the malleus and incus but not the stapes (malleus $\rho = 0.047$, incus $\rho = 0.002$, stapes $\rho = 0.112$). Contralateral cholesteatoma was present in three of four ears but did not correlate with ipsilateral severity. Quantitative analysis showed that cholesteatoma matrix length increased with severity of inflammation (67.7 ± 46.0 μm for mild, 141.3 ± 60.7 μm for moderate, and 226.2 ± 55.3 μm for severe; $F(2,42) = 26.03$, $p < 0.00001$). Mean cell layers also increased with severity of inflammation from 10.0 ± 4.4 to 21.8 ± 9.6 and 28.7 ± 6.2 ($F = 24.74$, $p < 0.00001$), with all pairwise differences being significant (Tukey $p < 0.01$).

Conclusions: Localized inflammation is associated with cholesteatoma proliferation, while keratinization is associated with ossicular erosion. Contralateral pathology is common but independent of ipsilateral severity.

Learning Objective: Understand the role of localized inflammation in cholesteatoma proliferation and the utility of quantitative histology.

Desired Result: Highlight links between inflammation and cholesteatoma growth for clinical and research contexts.

Level of Evidence: Level V

Indicate IRB or IACUC: IRB00203441, Johns Hopkins University Department of Otolaryngology – Head and Neck Surgery

Impact of Hormone Replacement Therapy on Hearing Loss, Tinnitus, and Vestibular Dysfunction in Menopause: A Multi-National Database Study

Neeti Gandra, BA; Warren Chun, MD; Shaun A. Nguyen, MD
Robert F. Labadie, MD, PhD; Ted A. Meyer, MD, PhD

Objective: To evaluate whether hormone replacement therapy (HRT) mitigates the incidence of hearing loss, tinnitus, and vestibular dysfunction in patients with menopause.

Study Design: Retrospective Cohort Database Study

Setting: TriNetX Global Collaborative Network provides real-time, de-identified, HIPAA compliant data from 156 healthcare organizations worldwide (178 million patients, September 2025).

Patients: Females aged 40-60 with and without HRT were evaluated for new diagnoses of tinnitus, hearing loss, or vestibular dysfunction following menopause. Propensity matching controlled for age, race, and ethnicity.

Interventions: Hormone Replacement Therapy

Main Outcome Measures: Means, odds ratios (OR), and risk differences (RD) with 95% confidence interval (CI) for tinnitus (H93.1), hearing loss (H90), or vestibular dysfunction (H81).

Results: The study included 41,118 HRT users and 229,648 non-users (mean ages 51.4 vs. 50.1 years). After propensity matching, HRT use was linked to higher odds of tinnitus (OR 1.22, 1.11–1.33; $p<0.0001$) and hearing loss (OR 1.28, 1.17–1.41; $p<0.0001$), but not vestibular dysfunction. Sub-analyses showed increased odds of sensorineural hearing loss specifically (OR 1.39, $p<0.0001$). To account for potential confounding effects, further sensitivity analyses were performed; associations with tinnitus and hearing loss persisted after excluding ototoxin exposure (OR 1.13, $p=0.03$; OR 1.24, $p=0.001$) and anatomical abnormalities (OR 1.24, $p=0.001$; OR 1.22, $p<0.0001$). Among patients with BMI ≥ 30, HRT showed higher odds of tinnitus (OR 1.30), hearing loss (OR 1.35), and vestibular dysfunction (OR 1.23; all $p\leq0.008$).

Conclusions: In this large, real-world analysis, HRT use was associated with higher odds of tinnitus and hearing loss, while effects on vestibular dysfunction were inconclusive. These findings highlight the need to consider auditory and vestibular risks in HRT management.

Learning Objective: To identify the impact of HRT therapy on auditory and vestibular health for patients with menopause including hearing loss, tinnitus, and vestibular dysfunction outcomes.

Desired Result: To advocate for future prospective studies and encourage consideration of these effects when promoting HRT for patients with menopause.

Level of Evidence – Level III

Indicate IRB or IACUC: Exempt

Early Comparative Audiometric Results of a Total Ossicular Replacement Prosthesis With and Without a Stapes Footplate Shoe

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Matthew M. Dedmon, MD, PhD; A. Morgan Selleck, MD
Margaret T. Dillon, AuD, PhD, Kevin D. Brown, MD, PhD

Objective: To compare postoperative audiologic outcomes for ossicular chain reconstruction (OCR) with a total ossicular replacement prosthesis (TORP) with and without a footplate shoe (FPS)

Study Design: Retrospective chart review

Setting: Tertiary Referral Center

Patients: Data were reviewed for adult and pediatric patients who underwent OCR with TORP from January 1, 2015-January 1, 2025. Patients with a history of stapedectomy or immobile footplate were excluded. Audiometric data within 1 year of surgery were available for 57 patients with TORP only and 26 with TORP + FPS.

Interventions: Ossicular chain reconstruction using TORP ± FPS

Main Outcome Measures: Air conduction pure tone average (AC PTA4), Bone Conduction pure tone average (BC PTA4), Air Bone Gap (ABG), change in ABG, % of patients with ABG ≤ 30 dB HL

Results: Using ANOVA, there was a significant effect of group (TORP + FPS vs TORP only) on postoperative ABG ($p=0.047$), change in ABG ($p=0.050$), and percentage of ABG closure ($p=0.025$) ≤1 year after surgery. Mean postoperative ABG ≤1 year after surgery for the TORP + FPS group was 23.5 dB HL (SD: 10.1) and 32.0 dB HL (SD: 13.4) for the TORP only group. Mean change in ABG for the TORP + FPS group was -10.7 dB HL (SD: 16.4) and -7.5 dB HL (SD: 15.6) for TORP only. Postoperative ABG ≤ 30dB HL <1 year after surgery was achieved in 84.6% (22/26) of TORP + FPS patients vs. 49.1% (28/57) TORP only patients.

Conclusions: OCR using a TORP + FPS showed statistically significant improvement in postoperative ABG, change in ABG, and rate of ABG closure to ≤30 dB HL for patients ≤1 year after surgery when compared to OCR using a TORP alone.

Learning Objective: To understand the FPS, the indications for its use and when it would be helpful. To describe the implications of OCR on sound mechanics and expected changes in audiogram after this procedure.

Desired Result: Better post-operative audiologic outcomes when using a FPS with an OCR, particularly in patients with a CWD cavity.

Level of Evidence - III

Indicate IRB or IACUC: UNC IRB 24-038

Role of Surgery for Tissue Culture Directed Antimicrobials in Skull Base Osteomyelitis Treatment

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Objective: Skull base osteomyelitis (SBO) is a rare but life-threatening complication of malignant otitis externa. Mainstay treatment is intravenous antimicrobials. The role of surgical intervention, namely mastoidectomy with ear tube placement, for intraoperative tissue culture remains unclear. We aim to characterize the role of surgery in facilitating culture-directed antimicrobial therapy and associated outcomes in SBO management.

Study Design: Retrospective chart review.

Setting: Tertiary academic healthcare system.

Patients: Patients treated for SBO at Rutgers Health between 2011 and 2025.

Intervention: Mastoidectomy with pressure-equalization tube placement for intraoperative tissue culture.

Main Outcome Measures: Antibiotic regimen modification following culture results and subsequent disease recurrence.

Results: A total of 48 patients with a mean age of 67.2 years (79.5% male) met inclusion criteria. Surgery was performed in 60.4% (29/48) of patients, with surgical cultures obtained from the external auditory canal (EAC) (60.7%), middle ear (21.4%), and mastoid (46.4%). EAC cultures were obtained for 87.5% of patients who did not undergo surgery. Positive cultures were identified in 69.3% of surgical specimens, most commonly Candida species (20%), Pseudomonas aeruginosa (15%), and Staphylococcus epidermidis (15%). Initial antimicrobial regimens were modified based on surgical culture results in 65% of cases ($p=0.011$). Among patients receiving antimicrobials modified after surgical culture, the recurrence rate was 23.6% (5/19), compared to 40.0% (4/10) in those receiving antibiotics that did not change ($p = 0.37$). The mean time to recurrence differed by 36.5 days between those with modification of antimicrobials compared to maintenance (89 vs 52.5 days, respectively) ($p=0.34$).

Conclusions: Mastoid surgery for tissue analysis provided high therapeutic yield, prompting antibiotic modification in patients with SBO. Surgery may provide diagnostic benefit through tissue sampling to guide early targeted antimicrobial selection.

Learning Objective: To understand the diagnostic and therapeutic role of surgery in guiding antimicrobial therapy and improving clinical outcomes in skull base osteomyelitis.

Desired Result: Clinicians will recognize the value of surgical tissue culture collection in enabling targeted antimicrobial modification and reducing disease recurrence in patients with skull base osteomyelitis.

Level of Evidence: III

Indicate IRB or IACUC: Rutgers University Pro2024002225

Evaluation of the Effects of Monitored Anesthesia Care on Intraoperative Electrically-Evoked Stapedial Reflex Thresholds with Cochlear Implantation

Janice J. Chung, MD; Jacob Iveland, AuD; Akira Ishiyama, MD

Objective: Electrically-evoked stapedial reflex thresholds (eSRTs) direct upper stimulation levels of cochlear implant (CI) recipients. However, eSRTs can be difficult to achieve clinically. Intraoperative eSRTs offer an alternative. eSRT registration is depressed by general anesthesia (GA). Thus, the potential role of eSRT during CI under monitored anesthesia care (MAC) was studied.

Study Design: Retrospective cohort study.

Setting: Cochlear implant program at a tertiary medical center.

Patients: CI recipients with intraoperative eSRT between January 2023 and October 2025.

Interventions: eSRTs, CIs performed under MAC and GA.

Main Outcome Measures: Intraoperative and postoperative eSRTs compared across patients who underwent CI under MAC and GA.

Results: 50 CI632 CIs had eSRTs under general anesthesia and 4 had eSRTs under MAC. Electrodes 22, 17, 12, 6, and 1 were utilized. All 4 CIs under MAC utilized pulse width (PW) 25. 52% of the CIs under GA utilized PW 25, 10% PW 37, 16% PW 50, and 22% PW 100. There was an expected, but statistically significant, inverse relation between PW and eSRTs in electrodes 22 ($F=4.0$, $df=3$, $p<0.05$), 17 ($F=7.3$, $df=3$, $p<0.001$), and 12 ($F=3.2$, $df=3$, $p<0.05$). Notably eSRTs for electrode 17 ($U=10$, $p<0.01$) at PW 25 were significantly decreased under MAC compared to GA. The average discrepancies of eSRTs between GA and clinic were 25.6 (E22), 25 (E17), 28.3 (E12), and 35.7 (E6). Electrode 1 was clinically challenging to ascertain. Clinical discrepancies for CI under MAC were 17 (E22), 3 (E17), and 0 (E12).

Conclusions: Previous studies have suggested eSRTs remain stable within subjects over time. However, eSRTs can be challenging to establish clinically. Intraoperative eSRTs offer an alternative, and this preliminary study suggests CI under MAC may enable greater fidelity.

Learning Objective: Attendees will be able to describe the utility of intraoperative eSRTs and consider the potential benefits of MAC when performing CI.

Desired Result: Optimizing CI outcomes for patients through augmentation of the quality of intraoperative CI assessment.

Level of Evidence - IV

Indicate IRB or IACUC: Exempt.

Exploring Delays in Pediatric Hearing Loss Treatment: Timing, Access, and Outcomes

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Objective: This study aims to characterize delays in intervention among pediatric patients with sensorineural hearing loss and to identify contributing factors, with the goals of reducing treatment delays, improving adherence, and enhancing patient outcomes.

Study Design: Retrospective cohort review and caregiver phone survey.

Setting: Tertiary otologic referral center.

Patients: Patients aged 0-18 years who underwent ABR screening, were diagnosed with sensorineural hearing loss, and were recommended an intervention such as hearing aids or cochlear implants.

Interventions: Patients with a documented delay of more than six months in receiving hearing loss treatment were contacted for a brief phone survey to identify barriers to care, reasons for delays, and potential additional resources.

Main Outcome Measures: The primary outcomes were the rate of treatment delay (≥6 months) and factors associated with delay and adherence.

Results: 188 patients were identified in an 11-year period, with 30% (n=56) experiencing treatment delays exceeding six months. Among delayed cases, 39% (n=22) never received intervention, and overall, only 53% (n=77) of patients were fully adherent to treatment. Race was not significantly associated with treatment delays ($p=0.098$), while neurological comorbidities were significantly associated ($p<0.05$). The degree of hearing loss was not significantly related to delay, however, both adherence and age demonstrated significant associations. Adherence and treatment delay were significantly correlated ($p<0.001$), with patients experiencing longer delays less likely to remain adherent. Preliminary phone surveys identified provider communication (50%) and scheduling difficulties (40%) as the most reported contributors to delays.

Conclusions: Timely intervention for pediatric hearing loss remains a persistent challenge, affecting 30% of patients. Efforts to improve communication, coordination, and access to hearing loss services are essential for reducing delays and optimizing developmental outcomes.

Learning Objective: To identify key factors contributing to delays in receiving care and suboptimal adherence in pediatric hearing loss care.

Desired Result: Clinicians will enhance their understanding of these factors, explore treatment strategies to promote timely follow-up and adherence, and mitigate developmental delays.

Level of Evidence - III

Indicate IRB or IACUC: Albert Einstein College of Medicine, RB Number: 2024-16523

Association Between Mastoid Aeration and Temporal Bone Fracture Patterns and Complications

Karen K. Hoi, MD; Gregory D. Disse, MD, PhD
Osama Raslan, MD; Doron Sagiv, MD

Objective: This study investigates the relationship between mastoid air cell volume and temporal bone fracture (TBF) patterns and complications.

Study Design: Retrospective cohort study.

Setting: Single tertiary level 1 trauma center.

Patients: Adult patients with TBF who underwent temporal bone computed tomography (CT) between 2018-2024.

Interventions: Quantitative 3-dimensional (3D) volumetric analysis of the mastoid air cell system and mastoid bone using CT imaging and 3D segmentation software (Mimics InPrint).

Main Outcome Measures: Percent mastoid aeration (mastoid air cell system volume divided by total mastoid volume) was compared between TBF patients and matched healthy controls, and among subgroups defined by otic capsule (OC) involvement, facial nerve status, and CSF leak presence.

Results: Forty-two TBF patients (50 fractures) and 42 matched controls were included. Mean mastoid aeration was 23.6% in TBF patients and 26.2% in controls (p=0.07). Patients with CSF leak had significantly less mastoid aeration than those without (14.2% vs. 24.9%; p=0.002). Aeration did not differ by fracture pattern (OC-violating 20.9% vs. OC-sparing 23.9%, p=0.19), or by presence of complete facial paralysis – which included patients presenting with House-Brackmann VI paralysis or those intubated without corneal reflexes or pain grimace – compared with those without complete paralysis (22.5% vs. 23.5%; p=0.30). Among patients able to undergo a voluntary facial nerve examination at presentation, greater mastoid aeration correlated with better facial function, reflected by lower House-Brackmann scores (p=0.04).

Conclusions: To our knowledge, this is the first study that investigates mastoid aeration in TBF using whole-mastoid volumetric analysis. Greater mastoid aeration was associated with a lower rate of CSF leak, supporting a potential role of the mastoid air cell system in modulating injury severity and fracture-related complications.

Learning Objective:

1. Evaluate the relationship between mastoid aeration and temporal bone fracture severity and complications.

Desired Result: Attendees will recognize that reduced mastoid aeration may be associated with worse facial nerve outcomes and CSF leak following temporal bone trauma, suggesting that mastoid aeration could influence fracture-related complications and patient outcomes.

Level of Evidence - III

Indicate IRB or IACUC: Exempt

Referral Patterns for Dizziness and Vertigo Patients at a Tertiary Otolaryngology Clinic

Kunal A. Koka, BS; Pallavi Kulkarni, MD; Marc D. Polanik, MD
Veenadhari Kollipara, BA; Mark E. Whitaker, MD

Objective: This study aimed to characterize referral trends for patients presenting with dizziness to a tertiary Otolaryngology clinic, with a specific focus on the incidence of vestibular migraine (VM), to identify opportunities for optimizing care pathways.

Study Design: Retrospective Chart Review

Setting: Tertiary Referral Center

Patients: Adult patients referred over a one-year period to a tertiary Otolaryngology clinic with the diagnosis of dizziness/vertigo, imbalance, postural instability, or abnormal gait.

Interventions: Diagnostic and Therapeutic

Main Outcome Measures: Outcomes measured included: specialty of referring provider, initial referral diagnosis, prior diagnostic work-up and treatments, the Otolaryngologist's diagnosis, and additional testing or treatments initiated as a result of the evaluation.

Results: Of the 119 patients seen, most patients (60%) were referred without a definitive diagnosis. Of the patients who received a diagnosis following Otolaryngology evaluation, the most common pathologies were VM (25.8%), benign paroxysmal positional vertigo (13.7%), and Meniere's (8.9%). VM was the most underdiagnosed and incorrectly diagnosed condition with only 1/32 patients having that diagnosis at referral and 11/32 patients being incorrectly diagnosed prior to Otolaryngology evaluation. Most patients with VM were referred to neurology (53%) following Otolaryngology evaluation. Prior to Otolaryngology referral, 82% of Meniere's and 81% of VM patients were not trialed on appropriate first-line therapy.

Conclusions: Most patients referred for dizziness had an absent or incorrect diagnosis at referral, often delaying initiation of appropriate first-line therapy, especially patients with VM. This underscores a need for enhanced recognition of common vestibular pathologies and refinement of initial management and referral practices for patients presenting with dizziness.

Learning Objective:

- Identify the frequency and implications of inaccurate diagnosis and initial management of dizzy patients by referring providers.
- Emphasize the high prevalence of vestibular migraine among patients referred for dizziness and the need to improve recognition and referral practices for this population.

Desired Result: Emphasize the need for outreach and education of referring providers to improve recognition of common dizziness pathologies, especially vestibular migraine, to reduce unnecessary referrals, diagnostic delays, and inappropriate treatments.

Level of Evidence – Level IV

Indicate IRB or IACUC: The Pennsylvania State University IRB STUDY #00023970, approved on 1/11/2024.

Risk of Developing Otosclerosis in Female Patients Using Exogenous Estrogen

Kunal A. Koka, BS; Veenadhari Kollipara, BA; Caitlin Papalia, BS; Varun Patel MD

Objective: Otosclerosis is more prevalent in female patients, and symptom severity worsens during pregnancy. One proposed mechanism for this finding is fluctuating estrogen levels and its impact on bone remodeling through regulation of inflammatory pathways and osteoclast activity. However, the impact of exogenous estrogen use in females on risk of developing otosclerosis remains unclear. The aim of this study is to determine the association between exogenous estrogen use and development of otosclerosis in female patients.

Study Design: Retrospective Cohort

Setting: TriNetX is a global health research network containing de-identified patient electronic health record data from over 105 health care organizations around the world.

Patients: The TriNetX Research Database was queried for adult female patients using exogenous estrogens between 2009-2018 with at least 5 years of follow up and a control cohort, without exogenous estrogen use, propensity score matched for age, pregnancy status, and race. Female patients with a diagnosis of otosclerosis, stapedectomy, or stapedotomy prior to exogenous estrogen use were excluded.

Interventions: Exogenous estrogen use

Main Outcome Measures: Risk ratio with 95% confidence intervals for otosclerosis (ICD-10: H80) development between 1 day and 5 years following the initiation of exogenous estrogen was measured.

Results: We identified 1,892,623 female patients using exogenous estrogen and 16,215,831 patients in the control cohort. After propensity score matching, the exogenous estrogen cohort had a 0.041% risk of developing otosclerosis compared to a 0.023% risk amongst the control cohort (risk ratio: 1.77, 95% confidence interval: 1.57-1.99, $p < 0.0001$).

Conclusions: Our study found an increased relative risk of developing otosclerosis in female patients using exogenous estrogen compared to the control cohort. This finding suggests that an increased estrogen level due to exogenous estrogen supplementation is positively correlated to the development of otosclerosis.

Learning Objective:

- Describe the association between exogen estrogen exposure and the development of otosclerosis.
- Explain proposed mechanisms through which estrogen levels contribute to higher risk of otosclerosis in females.

Desired Result:

- Understand the impact of exogenous estrogen on development of otosclerosis.
- Early detection of otosclerosis through increased clinical suspicion in patients using exogenous estrogen.

Level of Evidence – Level IV: Retrospective cohort study

Indicate IRB or IACUC: Exempt

Association Between Socioeconomic Status, Hearing Level, and Adaptive Functioning in Deaf or Hard-of-Hearing Preschoolers

Lourdes Kaufman, BA; Arielle Spellun, MD; Dylan K. Chan, MD, PhD

Objective: Hearing loss is a well-established risk factor for developmental delays due to reduced language access during critical developmental periods. Adaptive behavior—a core developmental measure of a child's ability to function in their environment—is an important patient-centered outcome in deaf or hard-of-hearing (D/HH) preschoolers but remains poorly characterized. This study evaluates predictors of adaptive behavior in D/HH preschoolers.

Study Design: Prospective cohort study

Setting: Multi-institutional

Patients: D/HH children aged 1-5 years

Interventions: This is a secondary analysis of a randomized clinical trial (NCT04928209). High- and low-income cohorts were defined as +/- 266% Federal Poverty Level. Pure tone average in the better ear (PTA) and amplification device use were obtained from medical records and evaluated as covariates.

Main Outcome Measures: Adaptive Behavior Assessment System – Third Edition (ABAS-3) Parent Form Conceptual Standard Score, encompassing Communication, Functional Pre-Academics, and Self-Direction skills.

Results: Among 84 participants, 66.7% were low-income (n=56) and 92.5% used amplification devices. Mean PTA was 43.2 dB (SD = 29.4, range: 7.5–110 dB). The overall cohort scored below population average on conceptual skills (Mean = 93.0, 95% CI [88.7, 97.3], 32nd percentile). Children from lower-income families scored significantly lower (Mean = 88.1, 95% CI [82.9, 93.3]) than higher-income peers (Mean = 103.0, 95% CI [96.1, 110.0]), $p = 0.0008$. In multiple linear regression controlling for PTA and amplification use, income remained a significant predictor ($\beta = -17.46$, SE = 4.66, $p < 0.001$), with lower-income children scoring 17.5 points lower. PTA ($\beta = -0.01$, $p = 0.93$) and amplification use ($\beta = 2.04$, $p = 0.82$) were not significantly associated with adaptive behavior.

Conclusions: Socioeconomic status is independently associated with adaptive behavior in D/HH children, while hearing level and amplification device use were not.

Learning Objective: To identify factors associated with higher adaptive behavior development in a diverse population of D/HH children.

Desired Result: Clinicians will appreciate that social factors have a significant influence on a D/HH child's adaptive behavior, while hearing level and use of devices do not. Understanding this can help clinicians advocate for socioeconomic support services and shift focus from purely audiological interventions to addressing broader social factors to improve functional outcomes for D/HH children.

Level of Evidence - Level III

Indicate IRB or IACUC: IRB #24-41251 University of California, San Francisco, Approval: 7/3/2025

Watchful Waiting Versus Immediate Treatment and the Risk of Acute Otitis Media Complications

Nicole E. Smolinski, PharmD, PhD; Patrick J. Antonelli, MD, MS; Jingchuan Guo, MD, PhD
Yu-Jung Jenny Wei, PhD; Almut G. Winterstein, RPh, PhD

Objective: To compare acute otitis media (AOM) outcomes among children managed with watchful waiting (WW) versus immediate antibiotics for uncomplicated, non-recurrent AOM.

Study Design: Retrospective cohort study

Setting: National Medicaid and MarketScan® Commercial Claims databases from 2005-2019

Patients: Children 6 months-12 years old with AOM without otitis-related complications within 6 months prior, and no other infections in the 2 weeks before to one week after index diagnosis of AOM.

Interventions: WW was defined as no pharmacy dispensing of oral antibiotics within 2 days of diagnosis compared to immediate antibiotic treatment within 2 days of diagnosis.

Main Outcome Measures: Non-serious outcomes included recurrent AOM, AOM recurrence, tympanic membrane perforations (TMP), hearing loss, chronic suppurative otitis media (CSOM), and myringotomy. Serious complications in the month after diagnosis included mastoiditis and meningitis.

Results: Among over 1 million AOM episodes in children with continuous enrollment since birth, WW (17.2% of episodes) was associated with a significant decrease in the risk for recurrent AOM (RR 0.86, 95% CI 0.83-0.89) and any following AOM recurrence (0.88, 0.84-0.94) compared to immediate antibiotics. In both populations, there was no significant difference in the risk of myringotomy, hearing loss and severe complications. Conversely, in the publicly insured population, we found that WW leads to a slight increase in the risk of CSOM (1.10, 1.04-1.18) and acute TMPs (1.29, 1.14-1.47). Of note, less than 5% of episodes managed with WW were treated within a week of diagnosis. In children with incomplete follow up since birth, we found comparable results indicating no significant difference in serious complications of AOM between WW and immediate antibiotics.

Conclusions: Evidence suggests no benefit of antibiotics in preventing most AOM complications, indicating many children may be unnecessarily exposed to antibiotics.

Learning Objective: To assess the risk of complications following management of AOM.

Desired Result: Clinicians will more closely adhere to clinical guidelines with watchful waiting for uncomplicated, non-recurrent AOM.

Level of Evidence - III

Indicate IRB or IACUC: University of Florida, IRB202302138, Jan 2024

Trends & Determinants of Watchful Waiting for Acute Otitis Media in Publicly Insured Children

Nicole E. Smolinski, PharmD, PhD; Patrick J. Antonelli, MD, MS; Jingchuan Guo, MD, PhD
Yu-Jung Jenny Wei, PhD; Almut G. Winterstein, RPh, PhD

Objective: To assess the trends and determinants of watchful waiting (WW) for the management of acute otitis media (AOM) in publicly insured children

Study Design: Retrospective cohort study

Setting: National Medicaid claims data from 2005 to 2018

Patients: Children 6 months to 12 years old with AOM, without otitis-related complications in prior 6 months were included.

Interventions: WW was defined as no pharmacy dispensing of oral antibiotics within 3 days of diagnosis.

Main Outcome Measures: We assessed monthly WW prevalence and determinants of WW using multivariable logistic regression models.

Results: Our cohort included 1,650,326 uncomplicated, non-recurrent AOM episodes with 17% managed by WW, decreasing from 20% to 12% over the study. Black children were more likely than White to be managed by WW (1.12, 95% CI 1.17-1.20). Other patient factors had minimal impact on WW use. Otolaryngologists were more likely to use WW compared to pediatricians (OR 14.1, 95% CI 13.58-16.64) as were low-proclivity antibiotic prescribers (antibiotics dispensed for ≤20% of AOM episodes) when compared to high-proclivity prescribers (antibiotics dispensed for ≥80%, OR 58.05, 95% CI 53.77-62.67).

Conclusions: WW for the management of uncomplicated, non-severe AOM is used in a minority of cases. Clinician factors are stronger determinants of WW than patient factors. Further research is needed to understand the drivers of AOM antibiotic management and reduce unnecessary antibiotic prescribing.

Learning Objective: To describe the determinants and trends of watchful waiting for pediatric AOM.

Desired Result: Clinicians will increase use of WW for the management of AOM with targeted quality improvement in areas with lower likelihood of WW.

Level of Evidence - III

Indicate IRB or IACUC: University of Florida, IRB202302138, Jan 2024

Preoperative Imaging Studies for Primary Otosclerosis Surgery

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Ophir Handzel, MD; Nidal Muhanna, MD, PhD; Shiri L. Maymon, MD

Objective: To quantify the cumulative number needed to scan (NNS) with preoperative high-resolution temporal bone computed tomography (HR-TBCT) to yield a single management change in patients undergoing primary stapes surgery for otosclerosis-related hearing loss.

Design: Retrospective case review.

Setting: Tertiary referral center.

Patients: All patients referred for primary stapes surgery between the years 2010-2025.

Intervention: Preoperative HR-TBCT findings were compared to intraoperative findings. All findings that altered informed consent, surgical candidacy, or surgical approach were recorded.

Main Outcome and Measure: To calculate the cumulative and temporal bone (TB)-specific condition NNS.

Results: A total of 892 patients were identified (male-to-female ratio 305:587) with an average age of 49.3. HR-TBCT revealed concomitant TB pathology resulting in management change in 14% (124 ears). Prevalence of TB conditions that alter management of stapes surgery included third window lesions (5.8%), lateral ossicular chain fixation (4.1%), overhanging facial nerve (1.3%), obliterative otosclerosis (1.0%), far-advanced otosclerosis (1.0%), and persistent stapedial artery (0.6%). The cumulative NNS for at least one management change, confirmed intraoperatively, was 38 (95% confidence interval 77-22).

Conclusion: Routine preoperative HR-TBCT identifies clinically significant TB pathology that alters management in approximately 14% of stapes surgery candidates. HR-TBCT facilitates more accurate patient selection, improves informed consent, and reduces intraoperative complications.

Professional Practice Gap & Educational Need: The clinical value of routine preoperative HR-TBCT for primary stapes surgery is uncertain. Establishing a NNS could improve informed decision making for both surgeon and patient.

Learning Objective: To become aquatinted with the beneficial clinical value of preoperative HR-TBCT.

Desired Result: To improve comprehensive presurgical counselling and planning by incorporating HR-TBCT into the preoperative assessment.

Level of Evidence: III

Indicate IRB: 056323TLV

Longitudinal Investigation of Shared-Care Networks and Their Impact on Cochlear Implant Practice

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Marine Prevost, AuD; Ashley Randall, AuD; Nancy Flores, AuD

Objective: Investigate the impact of a provider-network/shared-care (PN/SC) model on a high-volume adult cochlear implant (CI) practice.

Study Design: Prospective cohort study. Longitudinally captured every CI encounter at our institution from 2021-July 2025 (program inauguration-endpoint).

Setting: Single tertiary care center.

Patients: Adult (age ≥18yr) CI candidates/recipients. Inclusion criteria: initial consultation with the lead surgeons and ≥ 1 subsequent clinical and/or post-surgical visit. Patients were divided into PN and non-PN (fully managed internally) groups based on referral pathway. PN patients were subdivided into PN-map (returned to PN for mapping) and PN-def groups (PN deferred mapping).

Interventions: Candidacy workup, surgery, auditory rehab, bimodal hearing aid fitting.

Main Outcome Measures: Demographics, surgical conversions, time to surgery, AZBIO-Q outcomes, percentage of patients returning for PN-mapping, bi-modal hearing aid fitting rates.

Results: 519 patients/543 ears were included. Of these, 406 patients/421 ears were non-PN. 113 patients/122 ears were PN referred (22% of total n=). Of these, 79% underwent PN-delivered CI evaluations. 67 patients/74 ears (59%) returned for PN-mapping. PN patients required fewer preop clinic visits than non-PN patients (1.6vs.2.8; $p < 0.001$), had significantly higher surgical conversion rates (87.7vs.66.5%; $p < 0.0001$), and experienced quicker time to surgery (126vs.150 days; $p = 0.0009$). Non-PN, and PN-map patients did not significantly differ in either preop presentations or postop AZBIO-Q scores (65.1vs.67.5%; $p = 0.54$). A new bimodal hearing aid was fit in 42-60% of CI recipients as reported by PN practices.

Conclusions: Implementation of a PNSC model had significant impacts on surgical conversion rates, time to surgery, and postoperative outcomes. Patients returning to their PN group for mapping had good outcomes.

Learning Objective: Describe the potential impact of PNSC on CI practice.

Desired Result: Educate providers on potential benefits of PNSC models.

Level of Evidence - III

Indicate IRB or IACUC: PHXU-24-500-074-73-12. St. Joseph's Dignity Health

Air–Bone Gap Closure After Stapedotomy: Impact of Patient Sex and Otosclerosis Pattern

Sudhir Manickavel, MD; Samantha Cerasiello, MD; Michael Castle, MD
Hossein Mahboubi, MD; William H. Slattery, MD; Kevin A. Peng, MD

Objective: To evaluate whether prosthesis length independently predicts postoperative air–bone gap (ABG) closure ≤10 dB after stapedotomy and to quantify the contributions of otosclerosis pattern and patient sex to outcomes.

Study Design: Retrospective cohort.

Setting: Private practice tertiary otology center.

Patients: Adults undergoing primary stapedotomy for otosclerosis (2020–2024).

Intervention: Transcanal laser-assisted stapedotomy with Eclipse piston prosthesis.

Main Outcome Measures: ABG closure ≤10 dB at the first postoperative audiogram; covariates included age, sex, preoperative ABG, prosthesis length, and intraoperative otosclerosis pattern (Anterior, Bipolar, Diffuse, Obliterative).

Results: Of 120 cases, meeting inclusion criteria with pre-operative and 3-month post-operative audiograms,77.5% achieved ABG closure ≤10 dB. Mean prosthesis length was 4.39 mm (SD 0.26) in men and 4.27 mm (SD 0.22) in women. In multivariable models, male sex was associated with higher odds of closure (adjusted OR 7.35, 95% CI 1.76–30.62, p=0.006). Compared with Bipolar, Anterior (aOR 0.13, 95% CI 0.03–0.55, p=0.006) and Obliterative (aOR 0.02, 95% CI 0.0006–0.58, p=0.023) sites had lower odds. Prosthesis length was not independently associated with closure after adjustment; higher preoperative ABG showed a nonsignificant inverse trend (aOR 0.95, 95% CI 0.89–1.00, p=0.07).

Conclusions: In our study, patient sex and disease site—particularly anterior and obliterative foci—are key determinants of ABG closure, whereas prosthesis length within standard ranges is not. These data can focus preoperative counseling on disease pattern and patient factors.

Professional Practice Gap & Educational Need: Variation in prosthesis length selection and underreporting of site- and sex-adjusted outcomes may limit optimized counseling and expectations.

Learning Objective: Recognize that, after adjustment, sex and otosclerosis site more strongly predict ABG closure than prosthesis length within standard ranges.

Desired Result: Improve preoperative counseling by emphasizing disease pattern and patient factors over incremental length adjustments.

Level of Evidence: Level IV.

Indicate IRB or IACUC: IRB-approved

Device-specific and Modality-level Effects of Neuromodulation for Subjective Tinnitus: A Systematic Review and Meta-Analysis

Anusha A. Gogulapati, BS; Katherine Guo, BS; Lane D. Squires, MD

Objective: Compare clinical efficacy, safety, population characteristics, and protocol parameters of Lenire, a bimodal neuromodulation device delivering synchronized sound and tongue stimulation, to other tinnitus neuromodulation modalities.

Data sources: Databases searched included PubMed, ScienceDirect, Web of Science, and Embase, covering studies published through 2025. Indexing keywords related to *tinnitus*, *bimodal neuromodulation*, *Lenire*, *Tonguetip*, *neurostimulation*, and *hearing device* were combined to maximize retrieval. Editorials, case reports, and conference abstracts were excluded.

Study selection: Eligible studies included adults ≥18 years with subjective tinnitus treated with Lenire or comparable neuromodulation interventions, reporting pre- and post-treatment Tinnitus Handicap Inventory (THI) or Tinnitus Functional Index (TFI) scores. Studies lacking quantitative outcomes, duplicate populations, or follow-up <8 weeks were excluded.

Data extraction: Two independent reviewers extracted study characteristics, mean or change ± SD in THI/TFI, responder rates, and adverse events following PRISMA guidelines. Risk of bias was assessed with RoB 2 for RCTs and ROBINS-I for nonrandomized studies. Certainty of evidence was appraised using GRADE methodology.

Data synthesis: Two randomized controlled trials (n = 517) and one real-world chart review (n = 212) met inclusion criteria. Both RCTs demonstrated significant within-subject THI improvement (mean change ≈ –14 to –18 points, $p < 0.001$). Random-effects meta-analysis revealed a pooled standardized mean difference = –0.88 [95% CI –0.99, –0.77]; $p < 0.001$; $I^2 = 0\%$, indicating a large, statistically significant treatment effect with low heterogeneity. Sensitivity analysis yielded similar results. Retrospective study showed 91.5% responder rate (95% CI 86.9–94.5%) and mean THI change –27.8 ± 1.3 points, supporting real-world effectiveness.

Conclusions: Bimodal neuromodulation via Lenire demonstrates large, consistent reductions in tinnitus handicap. While findings are robust in magnitude, current literature is limited by few independent trials and industry sponsorship bias. Further non-industry, head-to-head studies comparing Lenire with other neuromodulation devices are warranted.

Professional Practice Gap & Educational Need: Despite commercial availability, clinicians lack consolidated evidence on Lenire's comparative efficacy, durability, and generalizability beyond trial populations. This review synthesizes existing data to guide counseling and treatment selection for tinnitus patients.

Learning Objective: Understand current evidence on the efficacy and limitations of bimodal (tongue + sound) neuromodulation in tinnitus management.

Desired Result: Enable clinicians to make evidence-based recommendations regarding neuromodulation devices and identify priority areas for future independent research.

Level of Evidence - Level II

Indicate IRB or IACUC: Exempt

Estimating Middle Ear Implant Lengths Using Photon-Counting CT Imaging and Deep Learning Ossicular Segmentations

Aunika Zheng, BS; Andy S. Ding, MD, MSE; John P. Carey, MD
Charles C. Della Santina, MD, PhD; Francis X. Creighton, MD; George S. Liu, MD

Objective: To assess the reliability of automated ossicular segmentations in estimating ossicular chain reconstruction (OCR) prosthesis lengths using photon-counting CT scans of temporal bones.

Study Design: Retrospective review.

Setting: Tertiary academic center.

Patients: Eight subjects with unoperated temporal bones and intact ossicles.

Interventions: Photon-counting CT scans of 13 temporal bones were obtained and de-identified. Manual ground truth segmentations of ossicles were completed in 3D using 3D Slicer software. Automated segmentations were generated using a validated nnU-Net deep learning model.

Main Outcome Measures: Three distances were manually measured from both segmentation methods to estimate prosthesis lengths: (1) stapes footplate to umbo of tympanic membrane (TORP), (2) stapes capitulum to umbo (PORP), and (3) footplate-incus distance (stapes prosthesis). Statistical analysis used repeated measures ANOVA with post-hoc Sidak t-tests.

Results: Automated and manual segmentations showed high agreement for the malleus (Dice coefficient 0.97 ± 0.02, mean $\pm$ SD), incus (0.98 ± 0.02), and stapes (0.78 ± 0.12). There were no differences for TORP (4.8 ± 0.4 mm vs. 4.8 ± 0.4 mm, $p > 0.05$) and stapes prosthesis length estimates (4.0 ± 0.2 mm vs. 4.0 ± 0.2 mm, $p > 0.05$). Automated PORP estimates were greater than manual estimates (3.2 ± 0.4 mm vs. 3.0 ± 0.4 mm, $p < 0.01$). Qualitative review of CT scans revealed variable visualization of the stapes suprastructure.

Conclusions: Deep learning-driven ossicular segmentations in photon-counting CT scans is a reliable and automated approach for estimating multiple common OCR prosthesis lengths. Further research is needed to improve visualization of the stapes superstructure and validate these measurements against intraoperative data.

Learning Objective: To understand limitations and potential enhancements for assessing OCR prosthesis lengths via preoperative temporal bone CT scans.

Desired Result: To demonstrate reliability of an innovative automated method for preoperative OCR prosthesis lengths assessments using photon-counting CT.

Level of Evidence - IV

Indicate IRB or IACUC: IRB00322104, Johns Hopkins Medicine, approved 5/29/2022.

Prevalence of Asymmetric Hearing Loss and Retrocochlear Pathology in Cochlear Implant Candidates

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Nadine I. Ibrahim, MD; David S. Haynes, MD; Kareem O. Tawfik, MD

Objective: 1) To estimate the prevalence of asymmetric sensorineural hearing loss (AHL) in adult cochlear implant (CI) candidates, and 2) to characterize the sensitivity and specificity of AHL in identifying retrocochlear pathology in this population.

Study Design: Retrospective cohort.

Setting: Tertiary referral center.

Patients: Two thousand thirty-eight adult patients who underwent a CI evaluation between 2002 and 2024.

Interventions: Cochlear implant candidacy evaluation and magnetic resonance imaging (MRI) of the temporal bone.

Main Outcome Measures: Three different criteria were used to define AHL: 1) interaural asymmetry ≥10 dB at 3 consecutive frequencies (10 dB AHL), 2) interaural asymmetry ≥15 dB at 2 consecutive frequencies (15 dB AHL), and 3) interaural asymmetry ≥20 dB or ≥30 dB at 2 consecutive frequencies if <65 or ≥65 years old, respectively (American Neurotology/Otological Society [ANS/AOS] AHL guidelines). Presence or absence of retrocochlear pathology was determined on MRI.

Results: The prevalence of AHL was 67.0%, 60.4%, and 34.5% when using 10 dB AHL, 15 dB AHL, and ANS/AOS AHL guidelines, respectively. Retrocochlear pathology was identified in 3.5% of patients that underwent MRI. The ANS/AOS AHL guidelines offered higher specificity in identifying retrocochlear pathology when compared to the 15 dB AHL and 10 dB AHL guidelines (64.8%, 38.9%, 32.3%, respectively) yet came at the tradeoff of reduced sensitivity (54.4%, 78.9%, 82.5%, respectively).

Conclusions: The prevalence of AHL in CI candidates varies widely based on definition, ranging from 34.5% to 67.0% in the present cohort. The new ANS/AOS guidelines for AHL demonstrated the highest specificity yet lowest sensitivity in the identification of retrocochlear pathology in this population. These findings may aid clinicians in the preoperative selection of imaging modality for CI candidates.

Learning Objective: Many patients referred for evaluation of cochlear implant candidacy present with a "better-hearing ear." The objectives of this presentation are 1) to understand the prevalence of asymmetric sensorineural hearing loss in cochlear implant candidates and 2) to describe the sensitivity and specificity of various definitions of asymmetric hearing loss in identifying retrocochlear pathology in this population.

Desired Result: At the conclusion of this presentation, providers should be able better counsel patients on the utility of preoperative magnetic resonance imaging in detecting retrocochlear pathology in cochlear implant candidates with asymmetric sensorineural hearing loss.

Level of Evidence – Level IV

Indicate IRB or IACUC: IRB #240876, Vanderbilt University

Cochlear Implant Outcomes in Far Advanced Otosclerosis

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Matthew L. Carlson, MD, MBA; James R. Dornhoffer, MD

Objective: To describe the outcomes of cochlear implantation (CI) in patients with far advanced otosclerosis (FAO).

Study Design: Retrospective matched cohort.

Setting: Tertiary academic medical center.

Patients: Patients with FAO who underwent CI, and age/sex-matched control patients without prior diagnosis of FAO who underwent CI.

Interventions: Cochlear implantation.

Main Outcome Measures: Speech perception outcomes quantified by Az Bio sentence and CNC word scoring. Postoperative incidence of facial nerve stimulation and new-onset vestibular complaints.

Results: In total, 96 ears amongst 81 total patients who had a history of otosclerosis and underwent ipsilateral CI, with 96 control ears. A large proportion of the ears (78/96) had undergone some form of prior treatment for otosclerosis, with the most common being stapedotomy (72 patients [92%]). Speech perception improved significantly following CI, with median ipsilateral CNC word score increasing from 2% (IQR 0-20) to 70% (IQR 52-82) and median bilateral Az Bio sentence score in quiet increasing from 0% (IQR 0-23) to 82% (IQR 72-92). Median postoperative speech testing was slightly but significantly greater in the FAO group compared to controls for both CNC word scores (70% FAO, 60% Control; p=0.002) and Az Bio sentence scores (82% FAO, 73% control; p=0.015) Postoperatively, 11 of 96 implanted ears (11%) experienced some form of facial stimulation, which resolved in 10 cases with implant reprogramming. New postoperative vestibular complaints were reported in 18 cases (19%), with 12 patients requiring vestibular therapy.

Conclusions: CI in patients with FAO is a safe and effective intervention that can result in excellent improvements in speech recognition despite the complex anatomy and prior surgical history associated with this population.

Learning Objective: To describe the outcomes of CI in the FAO population.

Desired Result: The audience will understand the speech outcomes, and potential for facial nerve stimulation as well as vestibular symptomatology following CI in patients with FAO.

Level of Evidence – Leve IV

Indicate IRB or IACUC: IRB approved 8/18/2025 (ID: 22-000183)

Newborn Hearing Outcomes and Delayed Hearing Loss in Neonatal Intensive Care Unit Graduates

Myeongsin Kang, MD; Myung-Whan Suh, MD, PhD (presenter);Sang-Yeon Lee, MD, PhD
Moo-Kyun Park, MD, PhD; Seung Han Shin, MD, PhD
Ee-Kyung Kim, MD, PhD; Hye Jeong Jin, RN

Objective: To evaluate the practicality and role of the hearing screening system in the neonatal intensive care unit (NICU) setting, and to elucidate the incidence of newborn hearing loss and delayed hearing loss in NICU neonates.

Study Design: Retrospective review of 11 years of NICU hearing test outcomes.

Setting: Tertiary referral center

Patients: 1,070 neonates born at a gestational age of less than 32 weeks or weighing less than 1,500 g at birth.

Interventions: Universal newborn hearing screening (UNHS), confirmatory auditory brainstem response (ABR) testing, and hearing threshold evaluation at a corrected age of 7 months.

Main Outcome Measures: Referral rate, hearing loss confirmation rate, incidence of delayed hearing loss, causes of hearing loss, and types of hearing intervention.

Results: Screening rates consistently met or exceeded 95%, ensuring timely hearing assessment. The referral rate was 25.7%. Hearing loss was confirmed in 4% (43/1,070) of NICU neonates. Cochlear implantation was performed in 5 cases, and hearing aids were prescribed in 5 cases. The referral rate was 6–7 times higher, and the incidence of hearing loss was 10 times higher than that of well-babies. Delayed hearing loss was observed in 1.2% (13/1,070). Most cases of delayed hearing loss were due to otitis media, and one patient developed cholesteatoma requiring surgery.

Conclusions: Continuous quality assurance of hearing screening and confirmation in the NICU setting are crucial, as the incidence of hearing loss was 10 times higher than that of well-babies. Although hearing was normal at birth, 1.2% of NICU graduates developed delayed hearing loss, emphasizing the need for regular hearing evaluations.

Learning Objective: To understand the effectiveness and challenges of UNHS in high-risk populations.

Desired Result: To provide a realistic picture of hearing loss in high-risk populations and motivate continuous improvement of hearing screening protocols in every NICU.

Level of Evidence - Level IV

Indicate IRB or IACUC: This study was approved by the Institutional Review Board of Seoul National University Hospital (project number 1303-092-476).

Revisiting the Role of Pressure Dressing After Otologic Surgery: A Systematic Review and Meta-Analysis

Pey-Yu Chen, MD; Che-Yi Lin, MD, MMS; Harrison W. Lin, MD
Mehdi Abouzari, MD, PhD

Objective: To evaluate the effectiveness of pressure dressing after otologic surgery for evidence-based postoperative care.

Data sources: We searched PubMed, Embase, Cochrane Library and Airiti Library using Boolean operators for literature written in English or Mandarin from inception to October 10, 2025.

Study selection: Abstracts compared patients with and without pressure dressing after otologic surgery and evaluated postoperative surgical site outcomes were included.

Data extraction: The total number of patients, number of patients with complications in each group (pressure dressing (PD) *vs.* control), and the mean and standard deviation of the visual analogue scale (VAS) scores were extracted.

Data synthesis: The selected effect measure for complications was the Peto odds ratio (OR), whereas the mean difference (MD) was used for VAS scores. Effect estimates from individual studies were pooled using the DerSimonian and Laird random-effects model.

Results: Forty-nine articles were identified; twelve relevant articles were reviewed in detail, and seven studies reported data on 11 types of complications. Of these, 10 complications had sufficient data for meta-analysis. The PD group experienced significantly higher incidences of three complications: auricular bruising (6/397 *vs.* 0/358; odds ratio [OR] 7.90, 95% confidence interval [CI] 1.59–39.54; $I^2 = 0\%$), dress-related headache (4/44 *vs.* 0/48; OR 8.69, 95% CI 1.18–63.89; $I^2 = 0\%$), and skin erythema (103/414 *vs.* 4/378; OR 11.20, 95% CI 7.35–17.07; $I^2 = 0\%$). Two studies that reported VAS pain scores showed significantly higher pain scores in the PD group (pooled MD 2.20, 95% CI 0.31–4.10; $I^2 = 95.1\%$).

Conclusions: Pressure dressing increased minor complications (skin erythema, auricular bruising, and pain) without reducing hematoma/seroma, suggesting it may be unnecessary with adequate hemostasis.

Learning Objective: Summarize current evidence regarding the role of pressure dressing after otologic surgery.

Desired Result: To improve patient comfort and reduced unnecessary interventions.

Level of Evidence: I

Indicate IRB or IACUC: Exempt.

Analysis of Cochlear Duct Length Based on Computed Tomography Images of Temporal Bones in Patients of the Institute of Physiology and Pathology of Hearing

Piotr H. Skarzynski, MD, PhD, MSc; Emilia Czaplicka, MSc; Anita Obrycka, PhD
Artur Lorens, Prof; Henryk Skarżyński, Prof

Objective: To analyse cochlear length in the Polish population and establish normative reference values, including sex-specific differences, USING computed tomography (CT) imaging of the temporal bone.

Study Design: Retrospective cohort study.

Setting: Tertiary referral center.

Patients: A total of 1056 cochleae were examined, derived from 528 individuals. Of these, 517 (49%) belonged to females and 539 (51%) to males. Inclusion criteria were normal cochlear morphology and high-quality imaging data.

Interventions: High-resolution temporal bone CT images were analysed using OTOPLAN software. All cochlear duct measurements were performed by an experienced radiologist.

Main Outcome Measures: Mean cochlear duct length and its distribution within the Polish population, with analysis of sex-related differences and categorisation into terciles for both sexes.

Results: The mean cochlear length in the total population was 35.51 mm (SD = 1.75; range 27.1–41.2 mm). Although the distribution was approximately normal, statistical testing revealed significant deviations ($p < 0.001$). Female cochleae were significantly shorter than male cochleae (M = 34.96 mm; SD = 1.61 vs. M = 36.00 mm; SD = 1.73; $p < 0.001$). The sex-specific tercile boundaries were as follows: for females, ≤34.4 mm (short), 34.5–35.4 mm (average) and ≥35.5 mm (long); and for males, ≤35.4 mm, 35.5–36.7 mm and ≥36.8 mm.

Conclusions: This study provides the first normative data on cochlear length in the Polish population. These results can serve as a reference for comparative international comparisons and support clinical decision-making in cochlear implant electrode selection and surgical planning.

Professional Practice Gap & Educational Need: Prior to this research, no such data existed for the Polish population. Such data are crucial for optimizing cochlear implant procedures and ensuring that electrodes fit patient anatomy accurately.

Learning Objective: To understand cochlear length variability in the Polish population and recognize its clinical implications for cochlear implant surgery planning.

Desired Result: Improving precision in cochlear implant planning and enhancing postoperative auditory outcomes through population-specific normative measurements.

Level of Evidence - Level III.

Indicate IRB or IACUC: KB.IFPS/12/2024

Cochlear Implant Minimum Speech Test Battery - Version 3 Will Result in Additional Audiometric Candidates: Who Should Receive Priority in the Context of a Constrained Healthcare System?

Samer Salameh, MD; Jacob Sulkers, M.Cl.Sc.; Jordan Hochman, MD

Objective: The revised Minimum Speech Test Battery-Version 3 (MSTB-3) for adult cochlear implant (CI) candidacy prioritizes the Consonant-Nucleus-Consonant (CNC) test. This study aims to evaluate the impact of this change on CI candidacy rates and projected surgical wait-times.

Study Design: Cross-sectional study.

Setting: A Tertiary Cochlear Implant Program in Canada.

Patients: Patients assessed for CI candidacy between January 2019 and December 2023.

Interventions: CI candidacy was re-evaluated employing the MSTB-3 as the criterion for candidacy.

Main Outcome Measures: Revised CI candidacy rates at different applied CNC cutoff scores (30% - 50%) and the projected resultant change in surgical wait-times.

Results: A total of 284 patients were assessed for CI candidacy, of whom 192 patients proceeded with surgery. Of the remaining 92 individuals assessed; 11 (12%) were audiometric candidates who declined implantation, 21 (22.8%) were excluded due to medical ineligibility, and 60 (65.2%) were not audiological candidates based on MSTB-Version 2 criteria. When re-evaluated using MSTB-3, an additional 8, 17, and 24 patients met audiological candidacy criteria at CNC cutoffs of 30%, 40%, and 50%. This represents a 4% to 13% increase in candidates, and a projected 6.5 to 10.9-month increase (27% to 45% increase) in wait-times had these criteria been implemented from 2019 to 2023.

Conclusions: Transitioning criteria to the MSTB-3 could potentially yield a 13% increase in implant candidates which will further strain the health system. We subsequently generate a schema grounded in distributive justice to address patient wait-times.

Learning Objective: To understand how the implementation of the revised Minimum Speech Test Battery–Version 3 (MSTB-3) affects cochlear implant candidacy rates and surgical wait-times within a resource-constrained healthcare system.

Desired Result: Physicians will be able to describe and quantify the impact of transitioning to MSTB-3 criteria on candidate eligibility and implant program resource demands, as well as to recognize the importance of equitable strategies—grounded in distributive justice—to manage increased wait-times.

Level of Evidence – Level III

Indicate IRB or IACUC: University of Manitoba Research Ethics Board approval (HREB #H2015:209)

Updated Incidence of Cochlear Implantation Shows Recent Uptick Among Adult Candidates in the United States

Theresa B. Hennesy, MD; Vinaya Manchaiah, AuD, PhD; Matthew L. Carlson, MD, MBA
Bridget Mosley, MPH; Liza Creel, PhD; Ashley M. Nassiri, MD, MBA

Objectives: The current study provides a 5-year update of the incidence of cochlear implantation among traditional cochlear implant (CI) candidates in the U.S.

Study Design: Deidentified CI data were acquired from prospectively collected patient registries from two CI manufacturers (Cochlear Americas and Advanced Bionics), which supply an estimated 85% of CIs in the U.S.

Setting: U.S. CI centers.

Patients: Adults ≥20 years old who underwent CI between 2015 and 2023.

Interventions: CI.

Main Outcome Measures: Annual incidence of CI among traditional CI candidates, changes in incidence over time.

Results: The study cohort included 69,947 adults ≥20 years old who underwent CI surgery between 2015 and 2023, with a median age of 67 (IQR 56-78). Males accounted for 51% of cases, females 45%, unknown 4%. Unilateral surgery (including bilateral sequential surgery) represented 99.7% of cases. The estimated traditional candidate population (bilateral severe-to-profound hearing loss) in 2023 was 2.8 million adults. When including an estimated 15% market share for Med-EL, the annual number of CIs increased from 6,105 in 2015 to 13,260 in 2023. Overall, the incidence of CI among adult traditional CI candidates increased from 252 CIs per 100,000 person-years in 2015 to 474 in 2023. Incidence increased at a faster rate in the most recent years (27 per 100,000 person years in 2016 vs 73 in 2023).

Conclusions: Though still exhibiting severe under-penetration, the incidence of cochlear implantation among the adult candidate has nearly doubled since 2015. Continuous reporting of national metrics for cochlear implantation is a critical aspect of measuring the overall efficacy of efforts to increase access to care for this patient population.

Learning Objectives:
Describe the rates of cochlear implantation and changes over time within the adult population.
Understand the current rates of unilateral vs. bilateral cochlear implant surgery in adults.
Understand the demographic makeup of the patient population undergoing cochlear implantation.

Desired Result: Physicians, audiologists, and researchers would better understand current incidence of cochlear implantation to better inform efforts to increase access to cochlear implants nationwide.

Level of Evidence: III

Indicate IRB or IACUC: Exempt

Cochlear Implant Underutilization: A Single-Center Analysis of 106,134 Patients

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Allyson Sisler-Dinwiddie, AuD; Tayler Sparrow, AuD; Noelle Steele, AuD; Brianna Sheckells, AuD; Sara Unrein, AuD
Stephanie Yaras, AuD; Marc Bennett, MD; David Haynes, MD; Aaron Moberly, MD; Matthew O'Malley, MD
Elizabeth Perkins, MD; Kareem Tawfik, MD; Frank Virgin, MD; Christopher Wooten, MD; Taha A. Jan, MD

Objective: 1) To evaluate prevalence of cochlear implant (CI) candidates meeting the 60/60 referral criteria in the better hearing ear versus either ear independently and 2) to assess CI utilization rates at a high-volume tertiary care center.

Study Design: Retrospective Review of Deidentified Audiology Database

Setting: Tertiary Academic Medical Center

Patients: 106,134 patients evaluated by audiologists between 2010 and 2025

Interventions: Diagnostic audiologic testing

Main Outcome Measures: Proportion of patients meeting 60/60 criteria (500, 1000, and 2000 Hz pure tone average ≥ 60 dB HL and unaided word recognition testing ≤ 60%) with their better hearing ear only versus either ear independently. CI utilization rates among patients meeting 60/60 referral criteria under each condition.

Results: Among 87,984 patients with complete audiometric data, 1,282 (1.46%) patients met the 60/60 criteria in their better hearing ear. When applied to either ear independently, 5,064 (5.76%) patients qualified - a four-fold increase in candidate identification. This expanded cohort included 2,784 (55%) patients with bilateral symmetric hearing loss, 961 (19%) with single-sided deafness, and 1,319 (26%) with asymmetric hearing loss. CI utilization rates were 23.9% (306/1,282) for the better-ear criteria and 10.4% (525/5,064) for the either-ear criteria patients.

Conclusions: Applying 60/60 criteria to each ear independently identifies a substantially larger population of potential CI candidates, particularly those with asymmetric hearing loss and single-sided deafness who may now qualify under expanded FDA recommendations. Despite above-average CI utilization rates compared to the nationwide average, underutilization of CI exists even at a large tertiary referral center.

Learning Objective: To quantify the gap between CI candidacy and utilization at a high-volume center.

Desired Result: To highlight the need for updated referral guidelines and systematic approaches to address barriers to CI access.

Level of Evidence – Level IV: Historical cohort or case-control studies

Indicate IRB or IACUC: 231252

Emotion and Symptom Content in Patient Narratives of Superior Canal Dehiscence Syndrome: A Thematic and Sentiment-Based Analysis

Akshay Warrier, BA; Liliya Benchetrit, MD; Daniel J. Lee, MD

Objective: To quantify emotional tone and thematic prevalence in patient-authored narratives of superior canal dehiscence syndrome (SCDS) and to explore emotion–topic associations using natural language processing (NLP).

Study Design: Retrospective observational content analysis of social media posts with predefined SCDS-related keywords.

Setting: Online patient forum (Reddit); ambulatory context outside traditional clinical encounters.

Patients: 326 posts authored by individuals self-reporting SCDS symptoms or experiences; eligibility required SCDS keyword match after preprocessing.

Intervention(s): None; computational pipeline only—data scraping, text cleaning, unsupervised machine learning

Main Outcome Measure(s): Distribution of emotions (National Research Council lexicon; 10 categories), topic prevalence from Latent Dirichlet Allocation (LDA), and topic–emotion associations tested by chi-square with standardized residuals.

Results: Six LDA topics emerged: (1) patient–physician interaction, (2) vestibular symptoms & diagnosis, (3) diagnosis journey & imaging, (4) pressure & sound-related symptoms, (5) hearing tests & emotional impact, and (6) SCDS diagnosis. Negative and fear-based emotions predominated, with the greatest negative counts in Topic 1 (N = 70, 26%) and Topic 2 (N = 95, 35%). Although the omnibus chi-square was not significant ($\chi^2(45)=16.19$, $p=0.99998$), standardized residuals revealed distinct patterns: trust (+2.1) and surprise (+1.8) were elevated in Topic 3 (Diagnosis Journey & Imaging), joy (+2.3) in Topic 5 (Hearing Tests & Emotional Impact), with smaller increases in fear and anticipation across topics.

Conclusions: Quantitatively mapping emotional tone and themes in patient narratives, and probing residual-based emotion–topic links despite a nonsignificant omnibus test, provides empirical insight into the lived experience of SCDS. These data can support earlier clinical recognition, more empathic counseling, and development of patient-centered outcome measures tailored to SCDS, while highlighting patient–physician interactions and vestibular symptom discussions as emotionally salient domains.

Learning Objectives

- Quantify the emotional tone and thematic prevalence within patient-authored online narratives of superior canal dehiscence syndrome (SCDS).
- Identify key emotion–topic associations to better understand patients' lived experiences.
- Illustrate how natural language processing (NLP) methods can inform patient-centered research in otology.

Desired Result: Provide an empirically grounded framework for understanding patient-reported experiences of SCDS to guide earlier recognition, improve clinician–patient communication, and inform development of patient-centered outcome measures

Level Of Evidence: Level of evidence does not apply

Indicate IRB or IACUC: Exempt

Safety and Efficacy of Middle Cranial Fossa Repair of Lateral Skull Base Cerebrospinal Fluid Leaks in Elderly Patients

Amanda Wissmann Klage, BS; Douglas J. Totten, MD, MBA; Hunter L. Elms, MD
Charles W. Yates, MD; Rick F. Nelson, MD, PhD; Evan C. Cumpston, MD

Objective: To assess safety and efficacy of middle cranial fossa repair of lateral skull base (LSB) defects in elderly patients

Study Design: Retrospective cohort study

Setting: Tertiary referral center

Patients: Patients aged 65 or older with lateral skull base spontaneous cerebrospinal fluid (sCSF) leaks and tegmen defects undergoing middle cranial fossa repair

Interventions: Middle fossa craniotomy and repair of cerebrospinal fluid leak and tegmen defect.

Main Outcome Measures: Duration of hospital stay, complications, duration of temporal lobe retraction,

Results: 58 patients (34 [59%] female) aged 65 or older underwent 63 middle fossa craniotomies (38 [66%] right-sided) for lateral skull base sCSF leaks. The average age was 70.1 (standard deviation 4.3) years (range: 65-81 years), the average body mass index (BMI) was 36.1 (6.6) and 10 (15.9%) patients had a prior history of meningitis. 38 (66%) patients had a documented history of obstructive sleep apnea. Average hospital length of stay was 2.4 (1.2) days and 90.5% of patients had no postoperative complications. Complications included recurrent leak (2, 3.2%), postoperative intracranial hemorrhage (2, 3.2%, repeat operation in 1 instance), and transient word-finding difficulty (2, 3.2%). Video recordings were reviewed for 8 cases. Of these, two (25%) did not require any usage of a middle fossa retractor. When performed, median duration of retraction was 28 minutes and 28 seconds (range: 19:08-54:45). Pure tone averages improved from an average of 43.7 (11.5) decibels nHL to an average of 29.2 (11.0) decibels nHL ($p<0.0001$) postoperatively.

Conclusions: Middle fossa craniotomy requires relatively limited retraction of the temporal lobe and has a low rate of postoperative complications in the elderly population. MCF provides safe and robust LSB repair.

Learning Objective: Middle cranial fossa repair of the lateral skull base is effective and may be employed with a low risk of complications even in patients aged 65 and older.

Desired Result: Middle cranial fossa repair of the lateral skull base is safe and effective in elderly patients.

Level of Evidence – Level IV

Indicate IRB or IACUC: Indiana University IRB #13133 (approved 10/14/2022)

Outcomes of Cochlear Implantation in Patients with Single-Sided Deafness: A Single-Center Retrospective Analysis

Basir S. Mansoor, BS; Emily Wong, MD; Walter Kutz, MD

Objective: To evaluate the audiologic performance and surgical outcomes of adults with single-sided deafness (SSD) who underwent cochlear implantation (CI) at a tertiary academic center.

Study Design: Single-center retrospective chart review

Setting: Tertiary academic center

Patients: Twenty-eight adults with SSD who received a CI between March 2017 and August 2024.

Interventions: Cochlear implantation for rehabilitation of single-sided deafness.

Main Outcome Measures: Pre- and postoperative audiometric measures including pure-tone average (PTA), speech reception threshold (SRT), word recognition score (WRS), AzBio sentence recognition in quiet, and Consonant–Nucleus–Consonant (CNC) word scores.

Results: The most common etiologies of hearing loss were sudden sensorineural hearing loss (39%) and Meniere's disease (28%). Mean age at implantation was 54.5 ± 11.2 years. Preoperative PTA in the implanted ear averaged 86.3 ± 21.0 dB HL, improving to 28.8 ± 7.5 dB HL at 3 months and remaining stable through ≥24 months (33.8 ± 6.8 dB HL, $p < 0.001$). Median AzBio scores increased from 0% [0–11] preoperatively to 55% [20–82] at 3 months, 74% [61–84] at 12 months, and 72% [42–88] at ≥24 months (all $p<0.01$). CNC word scores improved from 0% [0–0] to 64% [12–80] at 3 months and 60% [43–88] at 12 months. Mean daily CI wear time ranged from 6.6 to 9.3 hours at postoperative time points. While 18% of patients experienced transient postoperative vertigo, dizziness, or imbalance, surgical complications were minimal.

Conclusions: Cochlear implantation in adults with SSD produces significant and durable improvements in hearing thresholds and speech perception, with low complication rates.

Learning Objective: To recognize the clinical benefits and safety of cochlear implantation for adults with single-sided deafness.

Desired Result: Understand that cochlear implantation offers effective, safe auditory rehabilitation for SSD.

Level of Evidence – Level IV

Indicate IRB or IACUC: UTSW - STU 032018-085, approved 4/18/2018

From Barriers to Solutions: Multi-Level Determinants and Optimization of Cochlear Implant Access in Georgia

Darshan Chudasama, MPH; Sneha Chauhan, MD; Rachel Grimes, BS
George Davies, MD; Jack Owen, MD; Sarah Hodge, MD

Objective: To identify statewide and institutional barriers to cochlear implant (CI) access and evaluate targeted interventions to improve care efficiency and equity in Georgia.

Study Design: Mixed-methods study including statewide retrospective analysis and institutional retrospective and prospective cohort review.

Setting: Statewide epidemiologic data and a tertiary community-based academic center.

Patients: Children <18 years with CI procedures (2018–2020, statewide) and all pediatric/adult CI recipients (2018–2024, institutional).

Interventions: Educational outreach, imaging consolidation, audiology staffing expansion, and appointment coordination.

Main Outcome Measures: Statewide CI utilization by demographics, insurance, and geography; institutional referral-to-activation time, throughput, and attrition.

Results: Utilizing the HCUP (Healthcare Cost and Utilization Project) database, we found that pediatric CI utilization in Georgia was <15% of expected incidence, with significant disparities by insurance, income, and geography. Only 9% of implants occurred before age one. Most (88.6%) were performed in metropolitan areas, reflecting rural underrepresentation and workforce shortages. At our institution specifically, referral-to-activation averaged five months and required >5 visits. Following implementation of targeted interventions, throughput modestly improved (19→22 procedures per 6 months despite losing half of surgical workforce), and surgery-to-activation time decreased from 38 to 29 days. With community outreach and educational initiatives, referral AzBio scores rose from 11.2% to 20.2%, and mean PTA thresholds decreased from 80.0 dB to 76.8 dB in one year. Despite these gains, evaluation-to-surgery interval lengthened (66→107 days) as one surgeon left the institution. However, systemic barriers and workforce limitations continued to constrain access.

Conclusions: CI underutilization in Georgia arises from intersecting systemic inequities and institutional inefficiencies. Sustainable improvement requires coordinated, multi-level solutions integrating Medicaid policy reform, rural audiology expansion, standardized referral pathways, and streamlined institutional CI processes.

Learning Objective: Describe multi-level barriers to cochlear implant access and strategies for pathway optimization.

Desired Result: Enhance clinician understanding of systemic and institutional determinants of CI underutilization to inform equitable, patient-centered access improvement.

Level of Evidence: Level III

IRB: IRB # 2107287-8

A Review of Cochlear Implant Care Delivery and Outcomes in a Native American Population

Frances Nowlen, BS; Michael A. Roarke, BS; Marine Prevost, AuD; Ashley Randall, AuD
Jaysen Moreno, AuD; Nancy Flores, AuD; Shawn M. Stevens, MD

Objective: Explore the use of cochlear implant (CI) to treat hearing loss in a Native American (NA) population in the Southwestern USA.

Study Design: Retrospective review.

Setting: Single tertiary care center.

Patients: All patients evaluated for CI from 2021-2025. The investigators teamed with audiologists from a local NA-regional medical center using a shared-care network (SCN) model. Inclusion criteria: adults >18y, one consultation visit with the lead surgeon/PI, and ≥1 subsequent clinical/postop visit.

Interventions: Candidacy workup, surgery, auditory rehab.

Main Outcome Measures: Demographics, surgical conversions, reasons for non-conversion, time to surgery (TTS), AZBIO-Q scores, post-implantation usage rate, and loss to follow up rate.

Results: 519 patients met criteria (NA+all non-NA). To date, 57 Nas have met inclusion criteria. Tribal representation included seven distinct Southwestern communities/reservations. The mean age of NA patients was 66.2 years (range 18-88). Male/female distribution was equal. Mean distance traveled by NA patients was 92miles one way. The NA cohort was more likely to experience a non-conversion due to unexplained LTF (25%) compared to non-NA patients (6.1%; p=0.01). Insurance denial rates did not differ between groups. 32 NA patients have converted to surgery. The surgical conversion rate was significantly lower for NA patients (56%) compared to other non-NA SCN-referred patients (85%; p=0.0002) and non-NA patients as a whole (70.2%; p=0.02). Median TTS for NA patients was 81.5 days (IQR55-180). Mean postop AZBIO-Q scores were lower than for non-NA patients (46 vs 67%; p=0.07). Poor device usage (≤2hours/day) was documented in 16% of NA recipients.

Conclusions: NAs represent an underserved population in the domain of CI care. Some success treating NA patients has been achieved via a SCN model. This is the first known report on CI care in NAs.

Learning Objective: Describe how NA and non-NA populations differ in the delivery of CI care.

Desired Result: Educate providers regarding the delivery of CI care in NA Populations.

Level of Evidence - IV

Indicate IRB or IACUC: PHXU-24-500-074-73-12. St. Joseph's Dignity Health

Post-COVID-19 Pandemic Growth of National Hearing Aid Utilization: A Population-Based Study

Keren Oren, MD; Itai Hazan, MD; Stav Edri Abikasis, MD; Tomer Kerman, MD
Liron Kariv, MSc; Oded Cohen, MD; Oren Ziv, MD

Objective: To investigate the impact of the COVID-19 pandemic on the national demand for hearing aids and assess post-pandemic trends across different age groups.

Study Design: Ecological time-series study.

Setting: A large health organization in Israel with approximately 5 million members.

Patients: 97,149 patients were referred for hearing aid fitting between March 2018 and February 2024. Patients were stratified into three groups: pre-pandemic (2018–2020), pandemic (2020–2022), and post-pandemic (2022–2024).

Interventions: Referrals for hearing aid fitting issued by otolaryngologists.

Main Outcome Measures: Yearly incidence rate of referrals for hearing aid fitting (per 100,000 patients), stratified by age group.

Results: The incidence of hearing aid referrals increased significantly during and after the COVID-19 pandemic compared to the pre-pandemic period. The most notable rise occurred from the second year of the pandemic onward. Younger adults (18–49 years) demonstrated the largest relative increase with an incidence rate ratio (IRR) of 3.16 (95% CI: 2.74–3.65; $p < 0.001$) in the second post-COVID year compared to the pre-pandemic period. Significant increases were also observed in the 50–75 age group (IRR: 2.10, 95% CI: 1.87–2.36; $p < 0.001$) and in patients ≥75 years (IRR: 1.53, 95% CI: 1.35–1.74; $p < 0.001$).

Conclusions: The COVID-19 pandemic was associated with a sustained rise in hearing aid demand, particularly among younger adults. Mask-related communication barriers and heightened awareness of hearing loss likely contributed. The persistence of elevated demand post-pandemic underscores the importance of prioritizing hearing rehabilitation in public health planning, especially in anticipation of future pandemics or widespread masking scenarios.

Learning Objective: To understand how the COVID-19 pandemic and associated masking policies influenced hearing aid utilization across different age groups.

Desired Result: Attendees will gain insight into the broader effects of public health measures on hearing rehabilitation needs and the importance of early intervention strategies.

Level of Evidence: Level III.

IRB: Approved by the institutional Helsinki Committee (Clalit Health Services). Consent to participate was waived due to the retrospective nature of the study.

The Effect of Climate and Meteorological Factors on Meniere's Disease: A Scoping Review of Current Evidence

Sriprachodaya Gaddam, BS; Sonaal Verma, BS; George Wanna, MD
Zachary Schwam, MD; Enrique Perez, MD; Maura Cosetti, MD

Objective: To analyze the current evidence on the influence of climate on Meniere's Disease.

Data sources: A scoping review was performed following PRISMA guidelines. Databases searched included PubMed, ScienceDirect, Web of Science, Scopus, and Embase, covering studies published in English from 1984 through 2025.

Study selection: Studies were included if they directly investigated MD in relation to any climate-based measures: atmospheric pressure, barometric pressure, air pollution, seasonality, ambient particulate matter, or other weather or meteorological variables. Of 230 abstracts screened, 9 studies met the inclusion criteria, comprising 40, 211 patients with diagnosed MD.

Data extraction: Extracted data included study location, design, climate variable assessed, patient population, and key findings. The quality, validity, and comparability of studies were evaluated based on clarity of diagnostic criteria, methods, and outcome measures.

Data synthesis: Findings were synthesized qualitatively due to heterogeneity in the study designs and outcomes reported. Descriptive comparisons were made to identify common meteorological risk factors and proposed pathophysiologic mechanisms linking climate variables to MD onset or exacerbation.

Conclusions: All studies were conducted internationally, with most in East Asia (6/9). Both short-and long-term exposures to ozone, carbon monoxide, and particulate matter were associated with increased risk of MD, likely mediated by oxidative stress, neuroinflammation, and autoimmune pathways. Low atmospheric pressure, high humidity, and elevated temperatures, particularly during summer or typhoon seasons, were correlated with worsening audiovestibular symptoms. Conversely, one study found that hypobaric exposure may modulate MD episodes. MRI-based studies suggest that atmospheric pressure may influence endolymphatic space volume via effects on fluid absorption, ion regulation, and autonomic function. Findings across studies encourage further research into the effect of climate and meteorological factors on MD.

Learning Objective: To understand how climate and meteorological factors affect the onset and progression of MD

Desired Result: Attendees will understand the importance of the investigation of meteorological factors affecting MD for prediction of onset, episodes, and management.

Level of Evidence: Level V

Indicate IRB or IACUC: Exempt.

Evaluation of the Relationship Between Microtia Severity and Jahrsdoerfer Score in Non-Syndromic Patients

Sriprachodaya Gaddam, BS; Corinne R. Stonebraker, BA; Mingyang Gray, MD
Maura Cosetti, MD; Zachary Schwam, MD

Objective: To investigate the relationship between microtia grade and Jahrsdoerfer score in non-syndromic patients with congenital aura atresia (CAA), a previously unestablished association, to assess whether external ear severity can serve as a reliable predictor of middle ear anatomy.

Study Design: Retrospective review

Setting: Tertiary referral center

Patients: Patients with unilateral microtia and non-syndromic CAA who underwent evaluation for microtia and/or atresia repair

Interventions: Non-contrast fine-cut computed tomography of the temporal bone imaging (CTTB)

Main Outcome Measures: Grade of microtia (I-VI) using the Marx classification and the Jarhsdoerfer score.

Results: Twenty patients with unilateral CAA and microtia (average age of 15.7 years, range 7 - 40 years) were evaluated (75% male). The distribution of microtia grades was as follows: Grade 1 (n = 3), Grade 2 (n = 10), Grade 3 (n= 5), Grade 4 (n = 2). Mean Jarhsdoerfer scores based on grade were 8.7 for Grade 1, 5.8 for Grade 2, 6.4 for Grade 3, 6.0 for Grade 4. Ordinal logistic regression model did not find a statistically significant relationship between Jarhsdoerfer score and microtia grade ($\beta = -0.12$, SE = 0.16, Wald = 0.57, $p = 0.449$), indicating that in this cohort, microtia severity was not a significant predictor of Jarhsdoerfer scores.

Conclusions: No significant correlation was found between Marx microtia grade and Jahrsdoerfer score. Surgeons cannot rely solely on the appearance of the ear to estimate surgical candidacy or expected anatomic complexity. Even severe microtia (Grade 3-4) may still have favorable middle ear anatomy for atresia repair. Individualized imaging assessment to guide surgical planning is thus critical. However, further research is encouraged given the small sample size of the study.

Learning Objective: To understand the correlation between external ear severity and middle ear anatomy.

Desired Result: Attendees will understand how the severity of microtia relates to the Jahrsdoerfer score and the implications of this relationship for surgical candidacy and counseling in aural atresia.

Level of Evidence: Level V

Indicate IRB or IACUC: STUDY 21-01768, Icahn School of Medicine at Mount Sinai

Influence of Hearing in the Non-implanted Ear and Age on the Long-term Speech Recognition of Adult Cochlear Implant Users with Asymmetric Hearing Loss

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Matthew M. Dedmon, MD, PhD; A. Morgan Selleck, MD
Nicholas J. Thompson, MD; Margaret T. Dillon, PhD, AuD

Objective: This study analyzed the influence of hearing in the non-implanted ear and age on the long-term speech recognition in noise for adult cochlear implant (CI) users with asymmetric hearing loss (AHL).

Study Design: Prospective, repeated-measures study

Setting: Tertiary academic referral center

Patients: Adults with AHL, defined as normal or mild-to-moderate hearing loss in the better ear and moderate-to-profound hearing loss in the poorer ear.

Interventions: 40 participants were evaluated for the first year after cochlear implantation as part of a clinical trial. Of those, 35 participants (19 female) consented to a long-term outcomes study and were evaluated annually (out to 10 years post-activation).

Main Outcome Measures: Unaided thresholds measured behaviorally were used to calculate a pure-tone average (PTA: 0.5, 1, 2, 4 kHz) at each visit. Sentence recognition in noise was assessed with AzBio sentences in a 10-talker masker with the target from the front and the masker presented 90 degrees toward either ear or co-located with the target. A linear mixed effects model analyzed the effects of PTA for the non-implanted ear, age at surgery, and interval (1 year post-activation and later) on long-term speech recognition benefit.

Results: Speech recognition benefit (spatial release from masking) did not significantly change 1-year post-activation for either condition. Speech recognition benefit was significantly influenced by hearing in the non-implanted ear when the masker was toward the CI ear, and by age at surgery when the masker was toward the non-implanted ear. Six (17%) participants experienced a significant decline in PTA in the non-implanted ear. For those, performance improved with hearing aid fitting adjustments or bilateral cochlear implantation (n=2).

Conclusions: Long-term outcomes for adult CI users with AHL are significantly influenced by hearing in the non-implanted ear and age – though differentially across test configurations. This data supports the recommendation for routine assessment of the non-implanted ear to understand performance over time and when to fit/modify hearing technology (e.g., CI).

Learning Objective: This study aims to better understand how the hearing in the non-implanted ear and age influence long-term outcomes for adult CI users with AHL, which can influence clinical decisions to monitor and address worsening hearing in the non-implanted ear.

Desired Result: Attendees will understand the differential effects of age and hearing in the non-implanted ear on speech recognition benefit in different target-to-masker configurations.

Level of Evidence - Level III

Indicate IRB or IACUC: UNC 10-0473

Hearing Loss Associated with Temporal Bone Fractures

Ankur Gupta, MD; Elizabeth Cash, PhD; Jerry Lin, MD, PhD

Objective: To characterize the prevalence, type, and predictors of hearing loss following temporal bone fracture (TBF) in a modern trauma population.

Study Design: Retrospective chart review

Setting: Level I tertiary academic trauma center.

Patients: All adult patients (≥18 years) with radiographically confirmed TBF between 2014–2021 (n=535).

Interventions: No therapeutic intervention was performed. Data were derived from retrospective chart review, including clinical documentation, high-resolution temporal bone CT imaging, and audiometric testing performed during outpatient follow-up.

Main Outcome Measures: Prevalence and type of hearing loss (conductive, sensorineural, mixed) by mechanism of injury and fracture classification (longitudinal, transverse, mixed; otic capsule sparing vs. involving); association with ossicular chain disruption.

Results: Among 535 patients (599 fractures; mean age 43±17 years; 76.8% male), 22.4% (120/535) reported hearing loss at initial evaluation. Audiometric results were available for 120 patients: 45.0% had conductive hearing loss, 33.3% sensorineural, and 21.7% mixed. Gunshot wounds were significantly more likely to be associated with mixed hearing loss compared with all other mechanisms (Chi^2 9.43, p=0.024). Otic capsule–involving fractures were more likely to present with mixed hearing loss than otic capsule–sparing fractures (Chi^2 13.93, p=0.012). Hemotympanum was independently associated with higher odds of any hearing loss (OR 2.89, 95% CI 1.72–4.86, p <0.01). Radiographically identified ossicular disruption was present in 7/49 (14.3%) CHL patients.

Conclusions: Nearly one in four patients with TBF demonstrated objective hearing loss, with mixed loss predominating among otic capsule–involving and penetrating injuries. Early audiologic assessment and recognition of high-risk fracture patterns may guide timely intervention and counseling.

Learning Objective: Participants will be able to identify risk factors for conductive, sensorineural, and mixed hearing loss following temporal bone fracture and apply these predictors to optimize early diagnosis and management strategies.

Desired Result: Improve early identification and management of hearing loss in patients with temporal bone fracture through risk stratification by fracture type and mechanism of injury.

Level of Evidence: Level III.

Indicate IRB or IACUC: University of Louisville IRB 18.0401, approved March 2024

Electrolyte and Inflammatory Marker Differences in Meniere's Disease: A Multi-Institutional Comparative Analysis

Claire Larson, BS; Huseyin Isildak, MD

Objective: To investigate systemic electrolyte and inflammatory parameter differences in patients with Meniere's Disease (MD) against age- and sex-matched controls through a large multicenter clinical database.

Study Design: Retrospective analysis utilizing TriNetX data.

Setting: Academic and non-academic healthcare institutions.

Patients: The study analyzed a total of 47,285 patients with Meniere's Disease (F:65.2%, M:34.8%) and 8,792,754 patients who represented the general population (F:55.5%, M:44.5%) from 2015 – 2025 between ages 30 and 60. Patients with chronic kidney disease (CKD), acute kidney injury (AKI) were excluded to minimize renal confounding. Patients undergoing loop or thiazide diuretic treatment were also later excluded to minimize confounding.

Interventions: N/A

Main Outcome Measures: This analysis examines serum electrolyte, inflammatory, and lipid composition of both cohorts.

Results: Even after the exclusion of potential confounders, Meniere's Disease (MD) was associated with several electrolyte differences. Potassium levels were significantly lower in MD patients ($d = 0.24$), with mild alterations noted in calcium and magnesium and modest elevations in calcidiol. Sodium levels were comparable between groups overall, though differences reached statistical significance, especially among females. Consequently, the Na/K ratio was slightly elevated in both male and female MD cohorts relative to controls. Leukocyte and neutrophil counts were higher in MD patients ($d \approx 0.3$), whereas ESR and CRP were lower. Rheumatoid factor was slightly higher in female patients ($d \approx 0.1$). Mild lipid profile differences were observed, including small variations in cholesterol and triglyceride levels, though effect sizes were minimal.

Conclusions: These preliminary findings suggest subtle but consistent systemic differences in electrolyte balance and inflammatory biomarkers among patients with Meniere's Disease. The observed reduction in potassium and increased Na/K ratio may support hypotheses linking altered ionic homeostasis to Meniere's Disease pathophysiology. Further analyses are warranted to clarify the mechanistic significance of these findings.

Learning Objective: To explore significant differences in electrolyte, inflammatory, and lipid biomarkers on a population-based level to better understand the metabolic profile and underlying pathophysiology behind Meniere's Disease.

Desired Result: By identifying differences in the serum electrolyte composition of MD, healthcare providers may adjust pharmacologic treatment and prevention strategies to optimize patient outcomes.

Level of Evidence: Level IV

Indicate or IACUC: Exempt.

Comparative Analysis of Sudden Hearing Loss and Sensorineural Hearing Loss: Insights from TrinetX Data

Claire Larson, BS; Huseyin Isildak, MD

Objective: This study aims to investigate differences in demographics, biochemical markers, and comorbidities between patients with sudden hearing loss and those with sensorineural hearing loss (SNHL) within the age range of 30 to 60 years.

Study Design: Retrospective analysis utilizing TrinetX data.

Setting: Academic and non-academic healthcare institutions.

Patients: The study analyzed a total of 203,344 patients with SNHL (F: 49.97%, M: 47.54%) and 25,056 patients with sudden hearing loss (F: 50.73%, M: 47.51%).

Interventions: N/A

Main Outcome Measures: This analysis examines demographic distributions, biochemical test results, and the prevalence of comorbid conditions in both cohorts.

Results: A significant difference in ethnicity was observed, with Asian patients constituting 3.82% in the SNHL cohort compared to 8.61% in the sudden hearing loss cohort ($p < 0.001$). Biochemical markers, including Natriuretic Peptide B ($p < 0.001$), Natriuretic Peptide B Prohormone N-Terminal ($p < 0.001$), Parathyrin ($p = 0.045$), Hepatitis B virus surface antibody ($p < 0.001$), and Oxygen Saturation ($p = 0.027$), demonstrated significant differences between the groups. Conversely, no significant differences were identified for biomarkers such as Troponin I and Thyrotropin or comorbidities including musculoskeletal diseases and hypertension ($p \approx 0.24$ and $p \approx 0.10$, respectively). No significant cerebrovascular diseases in the groups was noted.

Conclusions: Significant differences in biochemical markers such as Natriuretic Peptide B and Natriuretic Peptide B Prohormone N-Terminal indicate varying cardiovascular related markers. Oxygen Saturation was also low in the sudden HL group. Hepatitis B virus surface antibody was high in sudden HL patients. Monitoring these biomarkers could enhance risk assessment and management strategies in the patients.

Learning Objective: To identify key differences in demographics and biochemical markers between sudden hearing loss and SNHL patients and explore associated comorbidities that may be clinically meaningful.

Desired Result: By recognizing the significant biochemical markers and demographic differences, healthcare providers can develop tailored monitoring and intervention strategies, potentially improving patient outcomes.

Level of Evidence: Level IV

Indicate IRB or IACUC: Exempt.

Cochlear Implantation in Elderly U.S. Military Veterans: Safety, Efficacy, and Electrode Selection

Douglas J. Totten, MD, MBA; Hunter L. Elms, MD; Karen Libich, AuD; David B. Pisoni, PhD
Evan C. Cumpston, MD; Rick F. Nelson, MD, PhD

Objective: To assess objective and subjective cochlear implant (CI) outcomes in elderly military veterans with respect to age, electrode implanted, and cognitive function

Study Design: Retrospective cohort study

Setting: Tertiary VA Medical Center

Patients: US. Military Veterans receiving cochlear implantation from 2019-2025

Interventions: Cochlear implantation, audiologic rehabilitation.

Main Outcome Measures: Pre-operative and 6-month post-operative AzBio sentence testing and consonant-nucleus-consonant (CNC) word testing, cochlear implant usage, and pre-operative self-assessed gerocognitive evaluation (SAGE) testing, 12-item Speech, Spatial and Qualities of Hearing Scale (SSQ-12).

Results: 110 CIs were implanted from 2019-2025, of which 13 patients were implanted bilaterally and 84 were implanted unilaterally. Average (standard deviation) age at time of implantation was 75.2 (8.2) years with ages ranging from 36 to 91. All patients were male and 98% were white. SAGE Scores showed mild cognitive decline in 12.7% of patients. Average duration of hearing loss was 36.0 (18.1) years with mean amplification use of 21.5 (14.9) years. CI522 was implanted in 15 (14%) ears, CI622 in 70 (65%), CI632 in 14 (13%) and CI624 in 8 (7%). All electrodes showed similar improvement, direct comparison of 600 series electrodes showed that both CI622 and CI632 cohorts demonstrated improvement in AzBio (CI622: 59.0 [26.7], $p<0.0001$; CI632: 57.1 [22.4], $p=0.0005$) and CNC testing (CI622: 54.5 [20.8], $p<0.0001$; CI632: 53.6 [16.7] $p<0.0001$) 6 months postoperatively. SSQ-12 scores improved from an average of 2.7 (1.5) to 4.9 (1.9) ($p<0.0001$). Patients averaged 12.5 (3.1) hours of CI usage daily.

Conclusions: Veterans of all ages, including elderly Veterans with prolonged durations of hearing loss, achieve substantial subjective and objective hearing improvements from CI within 6 months of implantation regardless of electrode type used.

Learning Objective: U.S. Military Veterans have similar hearing outcomes after cochlear implantation with either perimodiolar or lateral wall CI electrodes.

Desired Result: Perimodiolar or lateral wall electrodes provide superior CI outcomes to U.S. Military Veterans

Level of Evidence – Level IV

Indicate IRB or IACUC: Richard L. Roudebush VA Medical Center IRB # 13588 (Approved 11/30/2021)

Predicting Post-Operative Dizziness in Cochlear Implant Patients

Justina R. Varghese, BA; Brandon Bounds, BS; Akshay Prabhakar, BSA; Kayla Powell, MD
Sebastian Guadarrama-Sistos-Vazquez, MD; Kenny Lin, MD; Jeffrey Vrabec, MD

Objective: To determine the factors predicting post-operative dizziness in cochlear implant patients.

Study Design: Retrospective cohort study

Setting: Tertiary care center

Patients: Patients who underwent cochlear implantation with available pre-operative videonystagmography data between February 14th, 2018-March 28th, 2025.

Interventions: Diagnostic; comprehensive vestibular testing

Main Outcome Measures: The primary outcome was the presence of subjective postoperative dizziness.

Results: Among 159 cochlear implant patients, 66 (42%) reported subjective post-operative dizziness. 88 (55%) patients were determined to have vestibular asymmetry on preoperative testing, while 71 (45%) were classified as having symmetric vestibular function. Among patients with vestibular asymmetry, 50% experienced post-operative dizziness, significantly higher than the 31% post-operative dizziness rate in those with symmetric vestibular function ($p = 0.016$). There was no significant association with post-operative dizziness and implantation in better or worse ear, age, intratympanic steroid administration, or uncompensated vestibular function in asymmetric patients.

Conclusions: In our cohort, vestibular asymmetry was found to be a significant predictor of postoperative dizziness in cochlear implant patients and should be taken into consideration during surgical planning. Further studies are necessary to assess factors that may contribute to mitigating post-operative dizziness.

Learning Objective: To explore possible contributors to postoperative dizziness after cochlear implantation.

Desired Result: To increase physician awareness of vestibular asymmetry as a potential predictor of postoperative dizziness in cochlear implant patients to inform surgical decision-making and enhance patient counseling.

Level of Evidence - Level IV

Indicate IRB or IACUC: IRB #38356, Houston Methodist Research Institute

Unilateral and Bilateral Fitting of Flexible, Noninvasive Bone Conduction Hearing Aids

Raaha Kumaresan, BS; Enosh Lim, MS; Mohammad Moghimi, PhD

Hypothesis: Optimized bilateral fitting of flexible, Band-Aid®-like bone conduction hearing aids will significantly improve hearing gain, speech clarity in noisy environments and sound localization compared to unilateral fitting.

Background: Conductive hearing loss is a common cause of hearing loss among the pediatric population. While bone conduction implants require surgical intervention, existing non-surgical alternatives cause stigmatization and discomfort. Therefore, we are developing thin, flexible, Band-Aid®-like pediatric bone conduction hearing aids that generate vibrations onto the epidermis. These hearing aids can be applied unilaterally or bilaterally behind the ear. However, a key problem with unilateral treatment is poor sound localization and difficulty in speech understanding in noisy environments. This study aims to determine and improve the audiological benefit of bilateral fittings, characterized by functional gain and sound localization.

Methods: COMSOL Multiphysics software was used to model the human head and hearing aid(s) and conduct finite element analysis. Clinical studies will compare unilateral and bilateral fitting in patients with congenital conductive hearing loss and individuals with induced conductive hearing loss.

Results: Finite element analysis demonstrated that bilateral treatment increased the maximum transmission of vibrations from the hearing aid to the skull by approximately 4 dB at 1.7 kHz. Additionally, bilateral treatment decreased the diffusion of vibrations throughout skull, localizing the maximum vibrational magnitude to the temporal bone. Furthermore, changing the phase of one hearing aid from 0 to 105° attenuated the vibrations on the same side.

Conclusions: Preliminary results suggest bilateral treatment combined with phase modifications can increase functional gain and improve sound localization. Upcoming clinical studies will further investigate functional gain, directionality, and speech recognition in noisy environments.

Learning Objective: Attendees will be able to (1) assess the impact of unilateral and bilateral fitting on functional gain, speech clarity, and sound localization and (2) understand the audiological benefits of bilateral fitting.

Desired Result: Improved functional gain and sound localization with optimized bilateral fitting

Level of Evidence – Level IV

Indicate IRB or IACUC: IRB under review at Wake Forest University School of Medicine

Understanding the Relationship Between Cochlear Dimensions, Sex, and Body Size in Adults

Sammy Y. Gao, BS; Shaina W. Twardus, BA; David Kayekjian, BS; Rui Li, PhD
Benoit M. Dawant, PhD; Jack H. Noble, PhD; Robert F. Labadie, MD, PhD

Objective: This study evaluated associations between sex, body dimensions (height and weight) and cochlear morphometry to better define demographic and anatomical factors that may inform cochlear implant (CI) planning.

Study Design: Retrospective chart review

Setting: Tertiary academic medical center

Patients: Adult CI candidates who underwent preoperative computed tomography (CT) imaging of the temporal bone

Interventions: CT scans were analyzed using previously published cochlear segmentation software to obtain A-dimension, B-dimension, and cochlear duct length (CDL) as estimated using the simplified Escudé equation.

Main Outcome Measures: Associations between patient age, sex, height, weight, and cochlear dimensions were assessed using Spearman's correlation coefficients.

Results: Preliminary analysis of 150 adults, with plans to expand to 1,000 by the time of presentation, demonstrated positive correlations between height and cochlear dimensions (Spearman's ρ: A=0.25 (p=0.02), B=0.23 (p=0.04), CDL = 0.25 (p=0.02)). Sex was also correlated with cochlear size (ρ=0.26–0.28, p<0.02). In unadjusted linear regressions, height showed small but significant effects on cochlear dimensions (A: β=0.009, p=0.012; B: β=0.006, p=0.015; CDL: β=0.033, p=0.012), while female sex was associated with smaller cochlear dimensions (A: β=–0.23,p=0.003; B: β=–0.15, p=0.004; CDL: β=–0.83, p=0.003). When controlling for height, sex emerged as the strongest predictor, with females demonstrating smaller cochlear dimensions (A: β=–0.18, p=0.047; B: β=–0.12, p=0.046; CDL: β=–0.66, p=0.047). Cohen's d indicated small effect size differences between males and females (0.49–0.50). Cohen's d indicated differences in cochlear dimensions between males and females across all measures with small effect size (0.49–0.50).

Conclusions: Height showed weak positive correlations with cochlear dimensions, but these effects diminished after adjustment for covariates. Sex-related differences were more robust, with females exhibiting smaller cochlear dimensions across all measures.

Learning Objective: To evaluate how sex and body size relate to cochlear dimensions and recognize their relative contributions to cochlear anatomical variability.

Desired Result: Increase clinician awareness that sex-related differences, rather than general body size, may better explain variation in cochlear dimensions, supporting more individualized and anatomically informed surgical planning.

Level of Evidence - III

Indicate IRB or IACUC: Exempt

Cisplatin-Induced Hearing Loss Prevention with Intratympanic Therapy Systematic Review and Meta-Analysis

Zachary A. Kons, MD; Calvin J. Kersbergen, MD, PhD; Deborah Goss
Aaron K. Remenschneider, MD, MPH

Objective: Cisplatin-induced hearing loss (CIHL) is a significant consequence of cisplatin treatment for malignancy. Intratympanic (IT) injections have been trialed to prevent CIHL in humans. To provide clarity on which agents have been studied via IT injection and their efficacy, we performed a systematic review and meta-analysis.

Data Sources: OVID Medline, Embase, Web of Science, and Cochrane Library were queried.

Study Selection: Human studies between 1980-2025 evaluating prevention of CIHL with IT medication delivery which reported at least one hearing-related outcome were included. Studies not involving cisplatin or with interventions not involving IT administration were excluded.

Data Extraction: Databases were searched in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analysis guidelines. Prospective randomized trials were included, and a systematic review was performed for all studies. Demographic and audiometric data were collected from each study. Random-effects models were used to compare across studies, and subgroup analyses were performed for each IT agent.

Data Synthesis: The initial search yielded 1017 articles, which were screened according to criteria. Ten studies were identified, involving 284 patients. Studies included data on IT dexamethasone, N-acetylcysteine (NAC), and sodium thiosulfate (STS). Pooled analysis across all agents and frequencies did not reveal a significant difference in hearing thresholds between treatment and control ears (prediction interval [-3.77, 3.20], negative favors treatment). Subgroup analysis of IT dexamethasone [-1.74, 3.80] and IT NAC [-1.02, 4.64] also did not demonstrate significant differences. STS data were not amenable to pooled analysis; however, one study demonstrated a significant decrease in ASHA-defined ototoxicity (40% vs 85%, p=0.0027).

Conclusions: To date, no IT agent has consistently decreased CIHL, although limited data suggest that IT STS may decrease ototoxicity. More trials are necessary to fully elucidate these effects.
Learning Objective: To understand which intratympanic agents have been studied to prevent CIHL and the effectiveness of each therapy.

Desired Result: Review the available literature to understand which intratympanic agents have been effective for preventing CIHL and guide further research to focus on therapies with encouraging preliminary evidence.

Level of Evidence – Level II, pooled evidence from small randomized controlled trials

Indicate IRB or IACUC: Not applicable.

Association of Anti-resorptive Osteoporosis Medications with Temporal Bone Osteonecrosis

Anthony Thai, MD; Jennifer C. Alyono, MD, MS

Objective: Determine if anti-resorptive osteoporosis therapies are associated with temporal bone osteonecrosis

Study Design: Retrospective case-control study

Setting: Tertiary referral center

Patients: Patients aged > 18 years examined by a neurotologist since 2010 with chronic exposed external auditory canal (EAC) bone were identified. Patients with prior head and neck radiation and canal cholesteatoma (with temporary exposed bony fragments that subsequently healed over with healthy skin) were excluded. Matched controls were identified using propensity score matching with 5:1 ratio, matching on age, sex and race.

Interventions: n/a

Main Outcome Measures: Proportion of patients on anti-resorptive medication

Results: 81 patients with exposed EAC bone were identified. 43 and 33 were excluded due to osteoradionecrosis and canal cholesteatoma, respectively. Five patients with exposed bone were included and matched with 25 controls. Mean age of all patients was 69.8 years, 80.0% were female, and 60.0% were white. Compared to controls, osteonecrosis patients were more likely to have taken denosumab (5 [100%] vs 0 [0%], $p<0.001$). Additionally, 2 (40%) and 1 (20%) osteonecrosis patients were on bisphosphonates and tyrosine kinase inhibitors, respectively, compared to 1 (2.5%) and 0 (0%) for controls. Average time from denosumab initiation to osteonecrosis diagnosis was 51.6 months. All osteonecrosis patients had persistent exposed bone after mean follow up of 15.6 months.

Conclusions: Patients with chronic exposed EAC bone without prior radiation are more likely to have taken denosumab compared to controls. In unexplained, non-healing temporal bone osteonecrosis, clinicians should query whether patients are taking anti-resorptive medications.

Learning Objective: Anti-resorptive medications may be associated with higher risk of temporal bone osteonecrosis.

Desired Result: In patients with unexplained temporal bone osteonecrosis, clinicians should investigate whether patients are taking anti-resorptive therapies.

Level of Evidence - IV

Indicate IRB or IACUC: Stanford School of Medicine, protocol #77794. Approved 11/14/2024

Real-World Vestibular Schwannoma Management: Treatment Trends, Facial Weakness Outcomes, and Disparities in a Large US Network Analysis

Huseyin Isildak, MD

Objective: To characterize treatment trends, facial weakness (FW) outcomes, and demographic disparities in vestibular schwannoma (VS) management using real-world data from a large US patient cohort.

Study Design: Retrospective cohort analysis utilizing the TriNetX US Collaborative Network.

Setting: Multi-institutional US healthcare organizations across 69 Healthcare Organizations (HCOs).

Patients: A total of 72,496 patients diagnosed with VS (ICD-10: D33.3), categorized by management strategy: observation (n=63,500), stereotactic radiosurgery (SRS; n=3,073), surgical resection (n=5,910; including middle fossa [n=1,079], translabyrinthine [n=2,756], posterior fossa [n=2,438]), and combined SRS+surgery subgroups.

Interventions: N/A

Main Outcome Measures: Demographic profiles (age, sex, race), treatment modality utilization, FW incidence (ICD-10: R29.810), and historical (2022–2025) and predicted (2025–2026) treatment trends based on patient arrival rates across 44 HCOs.

Results: The cohort showed a mean age of 66 years (SD 17), slight female predominance (54.35%), and underrepresentation of Black (5.67%) and Asian (5.26%) patients relative to White patients (70.51%). Observation was predominant (87.6%), followed by surgery (65.3% of treated cases) and SRS (34.7%). FW rates were 4.7% (observation), 9.1% (SRS), and 24.4% (surgery overall; middle fossa 21.6%, translabyrinthine 24.7%, posterior fossa 26.1%). Combined SRS+surgery subgroups had higher FW (23.1–33.3%). Historical monthly volumes (2022–2025) were stable for SRS (20.1 patients) and middle fossa (5.4), with declining translabyrinthine (17.3) and increasing posterior fossa (21.4); predicted trends (2025–2026) showed slight overall decline but continued posterior fossa rise (26.0).

Conclusions: Observation remains the dominant VS strategy, with surgery carrying the highest FW risk and evolving preferences toward posterior fossa approaches. Racial disparities in treatment access persist, underscoring the need for targeted interventions to improve equity in care.

Learning Objective: To identify key treatment trends, FW risks across modalities, and demographic disparities in VS management to guide personalized clinical strategies.

Desired Result: Improved understanding of real-world VS management practices will foster equitable treatment decisions, enhance awareness of facial weakness risks across modalities, and support optimized, patient-centered care strategies.

Level of Evidence: Level IV

Indicate IRB or IACUC: Exempt.

Prospective Trial on Robotic vs Manual Insertion of Cochlear Implantation and Hearing Preservation Rates

Mikayla Huestis, MD; Ilana Yellin, MD; Nathan Jacob, BS; Michael Seidman, MD

Objective: Determine if IotaSoft Robot use improves rate of low frequency hearing preservation as compared to the standard of manual insertion for cochlear implantation.

Study Design: Prospective randomized-controlled trial comparing robotic insertion to manual insertion of electrode array.

Setting: Single tertiary center, single surgeon experience

Patients: Cochlear implant candidates with LFPTA (125 Hz, 250 Hz, 500 Hz) <80 dB

Interventions: During cochlear implantation for electrode insertion, patients were randomized to robotic or manual insertion of the electrode array.

Main Outcome Measures: ΔLFPTA and aided speech testing at 3-month postoperative visit

Results: 32 patients with available 3-month postoperative data were included in initial review.

Conclusions: Hearing preservation is equivalent with robotic and manual insertion.

Learning Objective: Evaluate if clinical use of IotaSoft Robot impacts hearing preservation outcomes.

Desired Result: Demonstrate clinical superiority of robotic insertion to standard of care with manual insertion.

Level of Evidence – Level II

Indicate IRB or IACUC: Advent Health Celebration, IRB 2269273

Design and Validation of an Augmented Reality Temporal Bone Surgical Training Tool with Virtual On-lay of Anatomic Structures onto 3D Printed Temporal Bone

Dorsa Zabihi-Pour, MD; Josee Rosset, BSc; Terry Li, PhD
Bertram Unger, MD, PhD; Jordan Hochman, MD

Objective: To develop and evaluate the effectiveness of an augmented virtual reality simulation in Temporal Bone surgical training.

Study Design: Prospective cohort study and content validation of augmented reality in education.

Setting: Canadian Teaching Hospital.

Interventions: Employ previously validated 3D printed temporal bone model with custom superimposed virtual on-lay of internal anatomy with use of augmented reality glasses (HoloLens 2, Microsoft Corp). Micro-CT data was acquired and anatomical structures segmented. The tracking code was based on open-source HoloLens 2 infrared software and employed the Research Mode sensors and OpenCV-based processing to localize reflective markers and align virtual anatomy with the physical model. Using infrared fiducial alignment, the sigmoid sinus, facial nerve, dural plates and otic capsule contents were projected onto an anatomically identical printed model.
10 otolaryngology residents evaluated relative value, workload and confidence with use of the virtual anatomical overlay. Each participant completed four temporal bone dissections, randomizing use of the virtual on lay. Ultimately end-product dissection was blindly graded by two Otologic surgeons with Welling and Canada-West scales, contrasting performance.

Results: Residents found the augmented reality to be valuable for appreciation of relative anatomy and confidence but at the cost of significant cognitive load. Issues with registration of virtual anatomy during motion of the physical model were common. Performance on validated dissection scales was equivocal with and without use of augmented reality. No difference was observed between intermediate and senior cohort scores.

Conclusions: Participants found the platform to be beneficial. Augmented reality represents an opportunity in both education and actual surgery. This is an early attempt to provide increasing information to learners to improve education.

Learning Objective:
To determine whether augmented reality can improve technical skill and spatial understanding in mastoidectomy training.

Desired Result:
Enhanced accuracy, confidence, and safety in resident temporal bone dissection.

Level of Evidence: III

Indicate IRB or IACUC: Ethics # HS26138 (B2023:089) University of Manitoba.

Prevalence of Congenital Hearing Loss and Timing of Identification in the US: A Commercially Insured Birth Cohort

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Judith C. Maro, PhD; Sonja A. Rasmussen, MD, MS
Almut G. Winterstein, RPh, PhD; Patrick J. Antonelli, MD, MS

Objective: To evaluate the prevalence of congenital hearing loss (cHL) and timing to cHL identification.

Study Design: Retrospective birth cohort study.

Setting: Merative™ MarketScan® commercial claims database (2005-2023)

Patients: Infants with 5 years of continuous enrollment after birth (2005-2018)

Interventions: None

Main Outcome Measures: Prevalence of cHL and time to cHL identification. We used International Classification of Diagnoses codes and audiometric codes to identify HL in insurance claims data. We assessed time to first HL diagnosis and second confirmatory diagnoses following audiometric testing. We excluded conductive hearing loss and unspecified HL diagnoses associated with otitis media or tympanostomy tubes in the year before first HL diagnosis and 6 months before confirmatory diagnosis.

Results: We included 502,274 infants. Compared to infants with an initial diagnosis in the first year of life, the prevalence of cHL more than doubled when the window for confirmatory diagnoses was expanded from 1 to 5 years (0.18% to 0.39%). When relaxing the requirement for the first diagnosis to be in the first year of life, prevalences doubled again (0.73%). After a peak in early infancy, the distribution of first diagnoses across follow-up remained constant up to age 5. The median time to initial diagnosis was 313 days (interquartile range 37-855) and to audiometry was 590 days (184-1135). The median time between initial and confirmatory diagnosis was 290 days (98-653) and median age at confirmatory diagnosis 982 days (400-1476).

Conclusions: We found a marked increase in the prevalence of cHL with longer windows for confirmatory diagnosis and significant delays between initial and confirmatory diagnosis, extending out to age 5.

Learning Objective: To describe the prevalence of cHL using a large insurance claims database.

Desired Result: Clinicians should remain vigilant in monitoring infants and young children for cHL, well beyond 1 year, potentially leading to earlier referrals for confirmatory testing and intervention.

Level of Evidence: Level III (Cohort and case-control studies)

Indicate IRB or IACUC: Exempt.

Understanding Undiagnosed Hearing Loss in Children: NHANES 2017–2020 Analysis

Kiran Ganga, BS; Nihan Z. Ercanli, BS; Valentina Fernandez-Rodriguez, BA
Sean R. Wise, MD; James Saunders, MD, MS

Objective: To evaluate the similarities between perceived hearing loss and objectively measured audiometric outcomes among U.S. children aged 6–16 years using data from the National Health and Nutrition Examination Survey (NHANES) 2017–March 2020 cycle.

Study Design: Cross-sectional analysis of national survey data.

Setting: National Health and Nutrition Examination Survey (NHANES) 2017–March 2020.

Patients: Children aged 6–16 years (n=2617) who underwent audiometric testing and for whom parent-reported perception of hearing status was available. Participants with incomplete audiometric data were excluded.

Interventions: Not applicable

Main Outcome Measures: Prevalence of objectively measured hearing loss (PTA > 20 dB in either ear), parent-reported perception of hearing loss, and concordance between perceived and measured hearing loss.

Results: Among participants with a pure tone average (PTA) > 20 dB in either ear, 71.1% of parents did *not* perceive their children having hearing loss, indicating a substantial burden of undiagnosed or unrecognized hearing loss. Spearman correlations demonstrated a very weak positive association between PTA and perceived hearing loss (Left ear: $\rho = 0.112$, Right ear: $\rho = 0.124$, both $p < 0.001$). Both the Mann–Whitney U test and Kruskal–Wallis test indicated significantly higher PTA values among parents who reported hearing loss in their children compared to those without perceived loss ($p < 0.001$). Lower income and male participants were found to have significantly worse hearing outcomes, while older age was associated with better hearing ($p<0.05$ for listed variables).

Conclusions: There is an observed difference between parent-perceived and audiometrically measured hearing loss in U.S. children, with the majority of parents unaware of deficits. Our findings highlight how parent-reported hearing loss underestimates true pediatric hearing loss and emphasizes the need for more standardized, accessible audiometric screening throughout childhood.

Learning Objective: To understand the discordance between perceived and objectively measured hearing loss in children.

Desired Result: To inform early intervention practices and inform pediatric screening policies supporting periodic audiometric testing.

Level of Evidence - Level III

Indicate IRB or IACUC: Exempt, analysis of publicly available, de-identified NHANES dataset.

Microsurgery vs Radiation in Cerebellopontine Angle Tumors: Insights from All of Us

Kristie N. Nonyelu, MS; Bijun Sai Kannadath, MBBS, MS

Objective: To compare complication rates between microsurgery and radiation therapy for cerebellopontine angle (CPA) tumors using data from the All of Us Research Program.

Study Design: Retrospective cohort study.

Setting: National database analysis using the All of Us Research Program.

Patients: Individuals diagnosed with cerebellopontine angle tumors identified through diagnostic and procedure codes.

Interventions: Microsurgery and radiation therapy (RT), including stereotactic radiosurgery (SRS) and fractionated external-beam radiotherapy.

Main Outcome Measure(s): Occurrence of treatment-related complications.

Results: A total of 705 patients were identified (microsurgery n=217; RT n=488). Complications occurred in 103/217 (47.5%) following microsurgery and 293/488 (60.0%) following RT. Chi-square analysis demonstrated a significant association between treatment type and complications (χ^2 (1) =9.649, p=0.0019). Microsurgery was associated with lower odds of complications compared with RT (OR 0.60, 95% CI 0.44\u20130.83). Further analyses will assess temporal trends and covariates influencing outcomes.

Conclusions: In this national cohort, microsurgery for CPA tumors was associated with fewer complications than radiation therapy. These findings underscore the value of nerve-preserving microsurgical approaches and highlight the utility of large-scale clinical datasets for evaluating treatment outcomes.

Learning Objectives:

1. Identify differences in complication rates between microsurgery and radiation therapy for CPA tumors.
2. Apply modality-specific complication data to improve surgical decision-making and patient counseling.

Desired Results: Enhance physician knowledge and competence regarding treatment-specific risks in CPA tumor management, promoting data-driven selection of optimal therapeutic approaches.

Level of Evidence: Level V

IRB: Exempt

Preoperative Hypoalbuminemia Predicts Adverse Outcomes in Middle Ear and Mastoid Repair Surgery

Marco A. Campioli, BA; James A. Widner, BS; Kaitlyn A. Brooks, MD; Nathan R. Lindquist, MD

Objective: To evaluate preoperative hypoalbuminemia as a predictor for postoperative complications in middle ear and mastoid surgery in a large network database.

Study Design: Retrospective cohort study

Setting: Academic and community hospitals contributing to the TriNetX network database.

Patients: Patients undergoing middle ear and/or mastoid surgery, stratified into hypoalbuminemia (n=775) and normoalbuminemia (n=7,858) cohorts. Propensity score matching yielded two balanced cohorts of 748 patients each.

Interventions: Middle ear and mastoid reconstructive surgery

Main Outcome Measures: Postoperative complications within 90 days including infectious, surgical, and hospitalization outcomes. Logistic regression within TriNetX was used to generate propensity scores for matching. Odds ratios were calculated to compare risks between cohorts, with 95% CIs derived using the logarithmic method.

Results: Following propensity score matching, patients with hypoalbuminemia faced significantly higher rates of pneumonia (OR 1.93, 95% CI 1.08–3.45), acute kidney failure (OR 1.79, 95% CI 1.19–2.69), venous thromboembolism (OR 2.04, 95% CI 1.09–3.83), sepsis (OR 2.39, 95% CI 1.40–4.07), mastoiditis (OR 2.11, 95% CI 1.44–3.07), malignant otitis externa (OR 2.39, 95% CI 1.20–4.73), hospitalization (OR 2.52, 95% CI 1.98–3.21), and critical care service utilization (OR 2.85, 95% CI 1.75–4.65). No significant differences were observed for otitis media, acute otitis externa, emergency department visit, or surgical site infections.

Conclusions: Pre-operative hypoalbuminemia within 30 days is a strong predictor of adverse postoperative outcomes in middle ear and mastoid surgery, highlighting its potential as a prognostic biomarker and possible target for medical optimization prior to surgery. Prospective studies are necessary to determine if pre-operative optimization of hypoalbuminemia improves post-operative outcomes.

Learning Objective: To understand hypoalbuminemia as a modifiable risk factor and ascertain the important negative outcomes after middle ear and mastoid surgery.

Desired Result: Surgeons and physicians will use these clinical results to increase testing of pre-operative albumin prior to middle ear and mastoid surgery and implement protocols to optimize surgical candidates' nutritional and medical status.

Level of Evidence – Level III

Indicate IRB or IACUC: Exempt

Determinants of Hearing-Related Quality of Life in Infants and Toddlers Who Are Deaf or Hard of Hearing

Nika Darvish, BA; Joy Kearns, MS, CCC-SL; Jihyun Stephans, BS; Dylan Chan, MD, PhD

Objective: Families of infants and toddlers who are deaf or hard of hearing (D/HH) face complex emotional and developmental challenges during a critical period of language and social development. This study aims to characterize factors that influence hearing-related quality of life (QOL) among families navigating congenital hearing loss.

Setting: Hospital-based tertiary and quaternary pediatric referral centers

Study Design: Prospective cohort study

Patients: 96 D/HH children, mean age 13 months [range:1-29]

Interventions: This is a secondary analysis of a randomized clinical trial (NCT04928209). Pure tone average (PTA) in the better ear, early intervention timing (Individualized Family Service Plan [IFSP] by six months of age), paternal education level (high school/GED or higher), and Social Vulnerability Index (SVI) were measured.

Main Outcome Measures: Validated Hearing-Related Infant/Toddler and Parent QOL (HIP-QL) questionnaire encompassing four domains addressing QOL for children who are D/HH, 0-42 months old (auditory/communication behavior, temperament) and their caregiver (management, parent-directed factors)

Results: Multivariable linear regression identified several significant predictors of hearing-related QOL. Higher paternal education ($\beta = 5.26$, SE = 2.35, $p = 0.027$) and earlier intervention ($\beta = 4.87$, SE = 2.10, $p = 0.023$) were associated with higher HIP-QL scores, while worse hearing predicted lower scores ($\beta = –0.085$, SE = 0.028, $p = 0.003$). The overall model explained 17% of the variance in HIP-QL scores ($R^2 = 0.17$, $F(3,92) = 7.57$, $p < 0.001$). There was no significant correlation between SVI and HIP-QL scores ($r = –0.004$, $p = 0.97$).

Conclusions: Early IFSP initiation, higher paternal education, and better unaided hearing were independently associated with higher hearing-related QOL. Multi-modal care, including timely Early Intervention services, accessible parental education, and optimal access to sound, are all needed to support D/HH children and their families.

Learning Objective: To identify clinical and socio-demographic factors associated with hearing-related quality of life among D/HH children and their families.

Desired Result: The lack of association between social vulnerability and hearing-related QOL suggests that proximal, family-level determinants may buffer against broader socioeconomic disadvantage during early development. Interventions that support timely service initiation and parental capacity-building should be emphasized in order to optimize outcomes for D/HH children and their families.

Level of Evidence - III

Indicate IRB or IACUC: [UCSF IRB#19-28356]

Determining Characteristic Latency Patterns on Auditory Brainstem Response in Autistic Individuals

Quentin C. Durfee, BS; Ziad Obideen, BS; Hänel J. Eberly, MD
Tonya S. King, PhD; Varun S. Patel, MD

Objective: Multiple retrospective studies have looked at the association between wave latencies on auditory brainstem responses (ABR) for children with autism spectrum disorder (ASD). However, there is still no definitive association with some studies showing prolonged wave latencies in children with ASD. The goal of our study was to determine how wave latencies found on ABR in children diagnosed with autism spectrum disorder (ASD) compared to those of neurotypical children.

Study Design: Retrospective cohort study.

Setting: Tertiary Academic Center.

Patients: ASD and neurotypical children who underwent ABR with numerical measured wave I, III, and V latencies between 01/2021 and 01/2023.

Interventions: Therapeutic

Main Outcome Measures: Measure whether there is a statistical difference between wave latencies between neurotypical children versus children with ASD.

Results: There was a statistically significant difference among the 2 cohorts with respect to wave I of the ABR (p=0.033), which is driven by the comparison between ASD (n = 22; mean 1.42, 95%CI 1.35-1.50) and neurotypical (n = 19; mean 1.57, 95%CI 1.49-1.65), p=0.010. There was a statistically significant difference between the 2 cohorts for wave III (p=0.002), driven by the comparison between ASD (3.94, 95%CI 3.83-4.04) and neurotypical (4.20, 95%CI 4.09-4.31), p<0.001. Similarly, a statistically significant difference was seen between the 3 cohorts for Wave V (p=0.004), driven by the comparison between ASD (6.11, 95%CI 5.96-6.27) and neurotypical (6.51, 95%CI 6.35-6.68), p=0.001. Differences between interpeak latencies I-III, III-V, and I-V were not statistically significant between cohorts.

Conclusions: Patients with ASD showed differing wave latencies compared to controls for waves I, III, and V. Differences between interpeak latencies I-III, III-V, and I-V were not statistically significant between groups. Although differences in wave latencies I, III, and V were statistically significant, the clinical significance is still unclear. Future studies should consider a larger cohort and look at wave latencies and peak amplitudes to better assess the role of ABR in evaluating differences between ASD and neurotypical children.

Learning Objective: To evaluate the utility of ABR for early detection and intervention in children with ASD.

Desired Result: Improved diagnostic protocols and reduced time to intervention for children with ASD.

Level of Evidence – Level III

Indicate IRB or IACUC: STUDY00023052, The Pennsylvania State University Institutional Review Board

Charting the Path to Competency in Stapedotomy: A Systematic Review of Learning Curves

Sophia Chehade, BS; Peter Malik, MS; Tamara Mijovic, MD
Marc A. Tewfik, MD; Lily HP Nguyen, MD

Objective: To synthesize the current evidence on learning curves in stapedotomy and stapedectomy, comparing operating room (OR) and simulation-based training studies, and to identify methodological trends, competency thresholds, and factors influencing surgical proficiency.

Data sources: Systematic searches of Ovid Medline, Ovid Embase, Web of Science, CINAHL, the Cochrane Database of Systematic Reviews, and CENTRAL were conducted. English-language studies published between 1991 and 2023 were included.

Study selection: Eligible studies analyzed the learning curve of microscopic or endoscopic stapedotomy or stapedectomy in the OR or through simulation models (animal, cadaveric, 3D-printed, or virtual). Reviews, commentaries, and purely technical reports without a learning curve assessment were excluded.

Data extraction: 1,388 studies were screened by two independent reviewers in accordance with PRISMA guidelines. Fifteen studies met inclusion criteria (11 OR, 4 simulation). Extracted data included study design, population characteristics, analytic methods, learning curve outcomes, and competency thresholds. Quality and comparability were assessed descriptively given study heterogeneity.

Data synthesis: OR studies reported wide variability in thresholds for proficiency (20–80 cases). Definitions of competency included air-bone gap (ABG) closure, operative time, and complication rates. Some described phased curves (ascending, plateau, maintenance) requiring ongoing annual case volumes (>7/year) to sustain competence. Simulation studies demonstrated earlier plateauing (7–10 trials), most often evaluated using OSATS scores or operative time. Step-specific analyses identified fenestration and prosthesis insertion as the most technically challenging substeps.

Conclusions: The stapedotomy learning curve is multifaceted and non-linear, varying by analytic method, surgical step, and training environment. Simulation enables early skill acquisition but cannot substitute for patient-based experience. Future work should standardize outcome measures, incorporate step-specific evaluation, and address maintenance of competence among low-volume surgeons.

Learning Objective: To understand how learning curves in stapedotomy and stapedectomy are measured, the number of cases or trials required to reach proficiency, and how simulation and step-based assessment can inform surgical training.

Desired Result: To enable educators and trainees to recognize phase-specific challenges in the stapedotomy learning curve and to optimize training curricula using validated metrics and simulation before transitioning to the OR.

Level of Evidence: Level III

Indicate IRB or IACUC: Exempt

Effectiveness of Intratympanic, Oral, or Combined Steroid Therapy in Adults with Sudden Sensorineural Hearing Loss: An Umbrella Review

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Objective: To compare the treatment efficacy and adverse effect profiles of intratympanic (IST), systemic (SST), and combined (CST) steroid therapy for sudden sensorineural hearing loss (SSNHL).

Data Sources: A medical librarian conducted a literature search using OVID, Scopus, and CINAHL, employing MeSH terms and text words related to the population, interventions, and comparators. Searches were restricted to systematic reviews and meta-analyses published in English over the past 10 years. Reference lists of included studies were screened, and searches were re-run prior to final analysis.

Study Selection: Eligible studies included systematic reviews and meta-analyses of adult patients with idiopathic SSNHL treated with IST, SST, or CST as primary therapy. Excluded were studies limited to pediatric populations, adjunct non-steroidal therapies, or alternative steroid routes. Ten studies met inclusion criteria: seven compared IST vs SST, six CST vs SST, and two IST vs CST.

Data Extraction: Extracted data included study characteristics, treatment arms, primary RCTs, effect sizes for pure-tone audiometry (PTA) gain (dB), recovery rates, adverse events, and variance estimates. Study quality was assessed using AMSTAR-2.

Data Synthesis: Meta-analysis was not performed due to overlap among primary RCTs; results were synthesized narratively. Of seven IST vs SST comparisons, five found no difference in PTA gain, two showed small advantages for IST (SMD 0.83; MD –5.93 dB), and none found significant recovery differences. Among six CST vs SST studies, results were mixed: several suggested higher odds of complete recovery with CST, though PTA effects were inconsistent. Two IST vs CST studies found no significant differences.

Conclusions: Current evidence indicates no clinically meaningful difference between IST and SST, with CST potentially offering a modest recovery benefit. Distinct adverse effect profiles support individualized therapy selection.

Learning Objective: Understand the comparative efficacy and adverse effects of intratympanic, systemic, and combined steroid therapies for SSNHL.

Desired Result: Learners can identify evidence-based differences and apply them to individualized treatment decisions

Level of Evidence – Level I

Indicate IRB or IACUC: Exempt

The Clinical Impact of Sociodemographic and Clinical Factors for Pediatric and Adult Patients with OSIA Implants

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Objective: Evaluate the relationship between sociodemographic and clinical factors on follow-up rates and outcomes for OSIA implants.

Study Design: Retrospective chart review

Setting: Tertiary referral center

Patients: Pediatric (n=23) and adult (n=36) patients who received OSIA implants between 2020-2025.

Interventions: Collection of sociodemographic data (gender, insurance, median income, ethnicity, language) and clinical data (type/etiology of hearing loss, otologic surgery history, incision, implant type (OSI200/OSI300))

Main Outcome Measures: Number of attended and missed follow-ups, post-surgical complications (infection, extrusion, vertigo), processor retention/utilization, time to surgery (TTS), and time to OSIA activation (TTA).

Results: Median TTS of 5 months (mean 22.7 mo.) and median TTA of 46 days (mean 53.5 days). Average number of otology and audiology appointments were 2.6 and 2.3, respectively. Medicaid patients had longer TA (59.64 ± 39.81 days) compared to those with private/Medicare (43.8 ± 13.1 days) (p=0.032). Middle-high income groups ordered fewer replacements (p=0.024) and shorter TS (9.17± 12.38 months) than low-income groups (24.21 ± 34.1 months) (p=0.044). Patients with congenital hearing loss attended more otology follow-ups (p=0.0032). Those with conductive hearing loss missed fewer appointments (p=0.046). We recorded all post-surgical complications, of these 3 cases required device removal. All device removals were related to infection or occurred in patients with craniofacial abnormalities and devascularization from prior surgery. Horizontal post-auricular incisions had fewer complications (p=0.0078). Skin thinning, prior surgery, and device type did not significantly change post-surgical outcomes.

Conclusions: Patients with Medicaid and low-income levels had longer TTA and increased need for additional device parts, respectively. Surgical outcomes were favorable across groups, with incision type, but not device type or history of prior surgery, influencing complication rates.

Learning Objective: To inform providers of sociodemographic factors associated with follow up, time to surgery and activation as well as the clinical predictors of surgical complications.

Desired Result: Reduce disparities in OSIA care with early identification of at-risk populations and targeted interventions to optimize long-term outcomes.

Level of Evidence - Level IV

Indicate IRB or IACUC: Reviewed and exempt IRB number (24-0181)

Diverse Perspectives on Psychosocial Impact of Cochlear Implants on Pediatric Patients

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Objective: Child cochlear implantation (CI) rates are increasing, with significant impacts on hearing and the broader psychosocial domain of life. However, there is little that currently explores how cochlear implantation affects the psychosocial well-being of children from both the perspectives of the child CI user and their family. This review aimed to (1) describe the existing literature on the psychosocial impact of cochlear implantation on children from both viewpoints and (2) evaluate the range of reported impacts to highlight areas requiring further investigation.

Data Sources: A systematic search of Ovid, CINAHL, and Scopus databases was conducted for articles published between January 1, 2005, and January 1, 2025.

Study Selection: Eligibility was assessed independently by two reviewers, with a third consulted to resolve disagreements. Studies were included if they involved CI recipients under age 18 and explored psychosocial outcomes from the perspective of the child or their family. Studies focusing on adults or published before 2005 were excluded.

Results: Of the 310 articles identified, 22 met the inclusion criteria. The most frequently reported psychosocial improvements from the child's perspective were conversational access (100%) and everyday hearing (100%). Families reported improvements in the child's quality of life (100%), everyday hearing (100%), social activity (95%), and independence (90%). Four studies included the child's perspective, while 21 included that of the family. Some discrepancies emerged between family and child reports. Notably, children often reported more neutral psychosocial outcomes compared to their families' more positive views.

Conclusions: This review highlights a gap in research focusing on the child's direct experience. Future studies should prioritize the child's perspective to better understand the full psychosocial impact of cochlear implantation.

Learning Objective: To search the existing literature of the psychosocial impact of cochlear implantation on children and evaluate the various impacts of CI on children from both their own perspective and that of their families. We hope to suggest areas for future research including projects that focus more on the personal experiences of the child CI user and trying to find ways to improve the psychosocial impact of cochlear implantation on children so that their opinions on CI can improve.

Desired Result: Enhanced awareness of the psychosocial impact of CI on children from both their own perspective and that of their families.

Level of Evidence: Level III

Indicate IRB or IACUC: Exempt

Intergenerational Cochlear Implant: Are Parental CI Outcomes Associated with Their Children's CI Outcomes?

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Objective: To evaluate association between parental cochlear implant (CI) speech perception with their child's CI performance in families with hereditary hearing loss.

Study Design: Retrospective cohort study.

Setting: Tertiary academic center.

Patients: Parent-child dyads.

Interventions: Standard of care.

Main Outcome Measures: Word recognition (%) as the primary outcome evaluated ≥2 years post-implantation; Speech Reception Threshold (SRT) and daily device-use hours as secondary outcomes.

Results: Nineteen parent–child dyads were analyzed. Children demonstrated significantly higher speech perception scores compared to their parents (mean HAB: 72.8% ±18.9 vs. 44.4% ±20.8; $p = 0.05$), with a significant within-dyad difference (Wilcoxon signed-rank test, $p = 0.05$). A word recognition score >50% was achieved by 88% of children, compared to only 15.4% of parents. No significant correlation was observed between parent and child HAB scores (Spearman's $\rho = 0.037$; $p = 0.937$). Neither the sequence of implantation nor parental performance level (>50% vs. ≤50%) significantly influenced pediatric outcomes.

Conclusions: While parental CI outcomes did not predict pediatric auditory performance, these findings underscore the key role of parents as primary caregivers in the rehabilitation process. Family counseling should be tailored to the familial structure and support parental engagement and proactive involvement to optimize outcomes.

Learning Objective: Recognize that parental CI outcomes are not reliable predictors of pediatric speech perception and apply this knowledge to family counseling and expectation setting.

Desired Result: Attendees will revise counseling practices to de-emphasize parental performance and prioritize modifiable pediatric factors (age at implantation, adherence).

Level of Evidence - Level III

Indicate IRB: 5076-18-SMC

Risk Factors for Return to Care in Pediatric Patients after Cochlear Implantation in a US Integrated Healthcare System

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Objective: We assessed risk factors for return to care following primary cochlear implantation (CI) in pediatric cases

Study Design: Retrospective cohort study

Setting: Integrated U.S. healthcare system between 2010 and 2021.

Patients: Pediatric (age <18) cases undergoing cochlear implantation

Interventions: Primary cochlear implantation

Main Outcome Measures: Return to care after CI placement for any cause including (7-day), emergency department (90-day), and readmission (90-day).

Results: 431 pediatric patients underwent a primary CI placement. The median age of patients undergoing implantation was 2 (Interquartile range [IQR] (1-7). Return to care was 7-day=4.6%, 90-day ED=10.4%, 90-day RA=2.6%.
In multivariable models, same-day bilateral recipients had higher 7-day odds of return to care (OR=4.27, 95% CI=1.60-11.41, P=0.0038) as did non-White patients (OR=3.34, 95% CI=1.09-10.27, P=0.039) compared to unilateral and White pediatric patients, respectively. The primary reason for returning to care was febrile illness. Non-white patients had 1.6 times the odds of a postoperative 90-day ED visit (OR=1.63, 95% CI=0.86-3.11, P=0.134). No risk factors met the threshold for significance (P<0.05) for pediatric postoperative 90-day readmission.

Conclusions: In a large integrated healthcare system, the return to care rates were low in cochlear implant recipients and those patients who returned to care primarily sought reassurance. These visits may be averted by improved health literacy surrounding a typical post-operative course to avoid undue concern. Additionally, a family-centered approach including post-operative instructions in parent's native language, prescriptions for all medications including those available over the counter, and patient education regarding varying ways to receive care are potential areas for improvement.

Learning Objective: To recognize specific issues for pediatric patients undergoing cochlear implantation.

Desired Result: Utilize evidence-based protocols to maximize patient safety and minimize healthcare costs.

Level of Evidence - III

IRB: Kaiser Permanente Southern California, Predictors of Cochlear Implant Failures and Complications, IRB#13381

Quality of Intraoperative Cochlear Implant Imaging Using Virtual vs. Standard Anti-scatter Grid Protocols

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Objective: Determine whether the utilization of a virtual anti-scatter x-ray protocol provides equivocal or better image quality compared to a physical anti-scatter x-ray grid during intraoperative cochlear implant imaging.

Study Design: Retrospective cohort study.

Setting: Operating room at both tertiary hospital and ambulatory surgery centers.

Patients: Adults aged 18 or older who underwent cochlear implantation at a single institution by a single surgeon over a 3-year period.

Interventions: Virtual anti-scatter protocol utilization in lieu of standard anti-scatter x-ray grid protocol.

Main Outcome Measures: Intraoperative image quality; secondarily examined radiation dose.

Results: 173 cochlear implantation surgeries were reviewed, performed by a single surgeon at a single institution over a 3-year period. Intraoperative x-ray imaging was utilized to verify cochlear implant positioning in all surgeries. There were no statistically significant differences between the two groups regarding race, gender, or age. 85 patients underwent the virtual ("SmartGrid") x-ray imaging protocol, whereas 88 patients underwent the standard anti-scatter grid imaging protocol. There was no significant difference in contrast-to-noise ratio or subjective image quality between protocols. The SmartGrid protocol demonstrated a lower total radiation dose (75kV/6mAs vs. 76kV/63mAs) and superior spatial resolution (52.18 vs. 51.93; $p = 0.021$) compared to the standard anti-scatter protocol.

Conclusions: Utilization of a virtual anti-scatter protocol for intraoperative cochlear implant surgery imaging demonstrates equivocal image quality with superior spatial resolution and reduced radiation dosing as compared to a standard ant-scatter grid protocol.

Learning Objectives: Understand the different anti-scatter protocols for x-ray imaging; compare image quality between virtual and standard anti-scatter protocols.

Desired Result: Virtual anti-scatter grid protocol imaging demonstrates equivocal imaging quality with reduced radiation exposure as compared to standard anti-scatter protocols.

Level of Evidence: III

IRB: Exempt.

Temporoparietal Fascia Flap as a Free-Flap-Sparing Option for Moderate-Sized Ear or Lateral Temporal Bone Defects: A Case Series

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Objective: To evaluate short-term outcomes of pedicled temporoparietal fascia flap (TPFF) reconstruction as an alternative to microvascular free flaps for moderate-sized ear or lateral temporal bone defects.

Study Design: Retrospective case series.

Setting: Tertiary academic referral center.

Patients: Three (3) adults undergoing lateral temporal bone or external auditory canal (EAC) resection for cutaneous malignancy, without parotidectomy or neck dissection.

Interventions: Pedicled TPFF rotated inferiorly to resurface the mastoid or EAC defects, with split-thickness skin graft as indicated; one case included concurrent bone-anchored hearing implant placement.

Main Outcome Measures: Time to epithelialization/mucosalization; wound and donor-site complications (infection, dehiscence, CSF leak); early facial nerve status; ability to accommodate adjunct procedures.

Results: All reconstructions survived without tip necrosis or vascular compromise. Epithelialization was documented at 14 days in one case and the remaining two demonstrated uneventful early healing on follow-up. There were no documented CSF leaks, infections, or dehiscence. Donor site morbidity was entirely absent. Facial nerve function was normal where documented. The TPFF accommodated a concurrent bone-anchored hearing implant without flap compromise. One patient with prior radiation and multiple operations healed without complication.

Conclusions: In moderate ear and lateral temporal bone defects, the pedicled TPFF offers reliable, thin, vascularized coverage with low morbidity, rapid epithelialization, and compatibility with adjunct procedures, and avoids the complexity and resource demands of microvascular free flaps. TPFF should be considered a first-line option for appropriately sized defects, including in previously-treated fields.

Learning Objective:

1. Recognize the indications and anatomical considerations for using the TPFF in reconstruction of moderate ear and lateral temporal bone defects.
2. Compare the advantages and limitations of TPFF reconstruction versus microvascular free flap in terms of operative complexity, morbidity, and healing outcomes.
3. Apply principles from this case series to select appropriate candidates and optimize reconstructive planning, particularly in previously radiated or surgically altered fields.

Desired Result:

1. Improve competence in selecting TPFF for moderate ear and temporal bone defects.
2. Enhance performance in reconstructive planning that preserves hearing and minimizes morbidity.
3. Promote awareness of TPFF as a resource-efficient alternative to free flaps in otologic oncology.

Level of Evidence - Level V (Case Series)

Indicate IRB or IACUC: Exempt