Drugs injected into the endolymphatic sac diffuse to the cochlea and labyrinth.

**Background:** Ménière’s therapy has been controversial for several generations of otolaryngologists. The major surgical inventions include intratympanic drug injections, as well as vestibular nerve sections and endolymphatic sac (ES) decompressions. Recently, an argument has been made to combine ES decompression with steroid injection; however, diffusion of steroids from the ES to the cochlea has not previously been demonstrated.

**Objective:** To describe the diffusion of dexamethasone and gadolinium from the ES to the inner ear.

**Design:** Prospective cohort study.

**Participants:** 19 patients with Ménière’s disease recruited during a 1-year period starting in January 2008. All patients had been diagnosed with definite Ménière’s disease according to the American Academy of Otolaryngology criteria. All patients had also failed medical therapy including diuretic, betahistine, and a low-salt diet for at least 6 months.

**Methods:** Before the procedure, the patients underwent audiometry, auditory brainstem response, electrocochleography, electronystagmography, and vestibular-evoked myogenic potentials. Sixteen patients had ES decompression with injection of dexamethasone alone. Three patients had dexamethasone with gadolinium. A total of 0.2 mL of dexamethasone 4 mg/mL was injected over 2 seconds. During the procedure, intraoperative electrocochleography was performed. Serial MRI was performed after injection in those who received gadolinium.

**Interventions:** ES decompression with dexamethasone injection.

**Results:** One patient required a vestibular nerve section 2 months after surgery, but the others completed follow-up visits out to 1 year. In all but 2 patients, the electrocochleography changed about 10 minutes after injection. These changes reverted to normal within 60 minutes. In the patients who received gadolinium, the initial distribution was from the ES to the vestibule and semicircular canals within 24 hours. After 48 hours, the gadolinium was also seen in the cochlea in 2 of the 3 patients. Pure tone hearing significantly improved from 48 dB to 33 dB after 12 months. The tinnitus handicap inventory also improved significantly, from 35 at baseline to 22. The authors pointed out that vertigo spells were controlled in 95% of the patients.

**Conclusions:** This approach “might reveal new prospects for treating viral, metabolic, autoimmune, and genetic disorders of the cochlea.”

**Reviewer’s Comments:** In many centers, intratympanic dexamethasone would have been attempted before this procedure, which is a less invasive method to deliver steroids to the inner ear. Many of these patients may have been able to achieve a similar result with intratympanic steroids. I believe it would have been more interesting if ES injection were studied only on patients who failed intratympanic steroids since it would answer the question of whether these patients were insensitive to steroids or whether it was just a failure of the steroids to diffuse into the inner ear. I also would have liked to see a better description of the vertigo symptoms before and after this procedure. (Reviewer-Benjamin T. Crane, MD).
Can Intrathecal Fluorescein Help Find Anterior CSF Leaks?

The Utility of Intrathecal Fluorescein in Cerebrospinal Fluid Leak Repair.
Seth R, Rajasekaran K, et al:
Otolaryngol Head Neck Surg 2010; 143 (November): 626-632

The use of intrathecal fluorescein has no significant effect on the rate of finding a cerebrospinal fluid leak or on the postoperative recurrence risk.

Background: Cerebrospinal fluid (CSF) rhinorrhea can be a frustrating problem to treat. The reason for this is often that the leak is difficult to find, and it is hard to know the adequacy of the repair at the time of surgery. Intrathecal fluorescein (IF) is often used during surgery to find CSF leaks.

Objective: To describe one institution’s experience with IF during endoscopic anterior CSF leak repair.

Design: Retrospective case review.

Participants: 103 patients who underwent endoscopic CSF leak repair between 1999 and 2009.

Methods: The diagnosis of CSF leak was based on a history of watery rhinorrhea, a clinical exam suggestive of skull base dehiscence, or a defect seen on imagining. Patients who received IF were given a 10-mg dose over 30 minutes at the start of the case. Follow-up was performed after 1 week, 4 to 6 weeks, and 3 to 4 months.

Interventions: Endoscopic repair of CSF leak with or without fluorescein.

Results: IF was used in 46% of cases, most commonly if there was a spontaneous CSF leak. It was used only rarely in leaks caused by tumors. The rate of CSF leak identification was >90% in cases in which fluorescein was used and in cases in which it was not used. The use of fluorescein did not significantly increase the chance of CSF visualization. Recurrence rates were 17% in those who received IF and 9% in those who did not receive it, but these differences were not significant. Of those given IF, the fluorescein was visualized in 66% (true positive). Clear CSF without fluorescein or a false-negative result was found in 23% of cases. In the remaining 11% of cases, no CSF or fluorescein was seen (true negative). The sensitivity of IF was 74%, and the false-negative rate was 26%. Age, body mass index, and history of meningitis did not have any effect on the value of IF. Whether fluorescein was visualized during the case also did not significantly affect recurrence.

Conclusions: IF had no significant effect on the rate of finding CSF leaks or the rate of recurrence after surgery.

Reviewer’s Comments: These data argue that IF has little value in the diagnosis or treatment of anterior CSF leaks, as the authors were not able to show any effect on the rate of finding leaks or the durability of repair. However, these results do not take into account that the patients were not randomized to IF use, and that patients with the more difficult leaks were more likely to have received IF. (Reviewer-Benjamin T. Crane, MD).

Keywords: CSF Leak, Endoscopic Sinus Surgery, Encephalocele, Rhinorrhea

Print Tag: Refer to original journal article
The presence of sinus mucosal biofilm may be directly correlated with the likelihood of failure of endoscopic sinus surgery.

**Background:** There is increasing evidence regarding the presence of bacterial biofilm in chronic rhinosinusitis. However, the role of biofilm has yet to be completely understood.

**Objective:** To examine the association between biofilm and residual mucosal inflammation in patients after endoscopic sinus surgery (ESS).

**Participants/Methods:** 24 patients with chronic rhinosinusitis resistant to a medical regimen who subsequently underwent ESS were enrolled in the study. Ethmoid sinus tissue was collected intraoperatively and analyzed for the presence of biofilm through H&E stain, confocal scanning laser microscopy, and fluorescent in situ hybridization. The extent of biofilm formation was classified as extensive (>50% surface area) or present (<50% surface area). The surgeon was blinded to the status of biofilm findings until the follow-up was complete. The follow-up period ranged from 3 to 30 months.

**Results:** 15 patients (62.5%) were found to be biofilm positive. Of these patients, 7 were found to have extensive biofilm formation. Biofilm status was highly predictive of persistent mucosal inflammation after surgery, with 8 of 15 biofilm-positive patients having persistent inflammation (53%) versus none of the biofilm-negative patients ($P = 0.009$). No significant correlation was found between the extent of biofilm formation and residual inflammation. The presence of biofilm was not correlated with prior ESS, nasal allergies, nasal eosinophilia, polyps, or the presence of fungal elements.

**Conclusions:** Persistent mucosal inflammation after ESS was strongly associated with the presence of biofilm in this pilot study.

**Reviewer’s Comments:** The exact role of biofilm in various otolaryngologic disease processes has yet to be elucidated. However, it is likely that the presence of biofilm affects response to treatments, given biofilm’s known antibacterial resistance. Until better treatment for biofilm is available, it is likely that prolonged follow-up of persistent mucosal inflammation may reveal failure of ESS in many biofilm-positive patients based on the findings in this study. However, this sample size was small, and it is also likely that there were other confounding factors to persistent inflammation in these patients. Further clinical investigations will be necessary. (Reviewer-Tang Ho, MD).

**Keywords:** Biofilm, Endoscopic Sinus Surgery

**Print Tag:** Refer to original journal article
Although experience does not affect ratings of voice severity, different listeners may use different techniques to come to those conclusions.

**Objective:** To determine the impact of listener experience on judgments of overall voice severity (OS) and vocal effort (VE), and to examine the relationship between auditory perceptual judgments and voice handicap.

**Design:** Prospective exploratory analysis.

**Participants:** Voice recordings were provided by 20 individuals with dysphonia and 4 with normal voice. Perceptual voice judgments were made by 20 inexperienced listeners and 10 experienced listeners.

**Methods:** Speech samples were recorded and reviewed by participants, experienced judges, and inexperienced judges. Samples were ranked using 100-mm visual analog scales regarding overall severity and perceived effort.

**Results:** No differences in the ratings of OS or VE were found between groups. All judgments of voice were moderate predictors of voice handicap, particularly patient-perceived VE and clinician-rated OS.

**Conclusions:** Individuals with dysphonia appear to judge their own voice using different strategies; however, there is no systematic impact of listener experience on voice ratings.

**Reviewer's Comments:** Auditory-perceptual judgment of voice is among the mainstay tools of the voice clinician. These judgments may be made by the physician or voice therapist and are often elicited from the patient. Understanding the differences in how individuals make such judgments and how comparable those judgments may be depending on experience level are important considerations. In addition, understanding how these assessments relate to patient-perceived voice handicap can contribute to understanding the best way to use these measures clinically. These authors continue their investigation of acoustic-perceptual assessments in this important paper. One of the most salient findings of this paper is that judgments of vocal effort and overall severity were less consistent between patients and other raters. This suggests that when patients make judgments, they are using a different set of criteria, which may include non-auditory perceptual data. As a patient, it is difficult to parse out the acoustic signal from the impact it has on daily functioning. As a result, patient reports of voice severity may not match the judgment of the clinician. However, this series also demonstrated a strong correlation between a patient's reported voice handicap and the clinician-judged overall severity. This reflects the importance of considering both clinician judgments of overall severity and vocal effort and patient reports when making inferences on the severity of the voice disorder. In this series, experience with disordered voices did not influence rankings of voice severity. This is consistent with other data regarding acoustic-perceptual judgments. What this study does not analyze (and what would be of great interest for future studies) is the impact of experience on judgments of specific voice parameters such as strain, breathiness, or weakness. One might anticipate that the inexperienced listener might have a more difficult time parsing out why the voice is abnormal than they have identifying an abnormal voice. (Reviewer-Heather Starmer, MA, CCC-SLP).

**Keywords:** Perceptual Voice Judgments, Dysphonia, Listener Experience

**Print Tag:** Refer to original journal article
Background: Vocal cord paralysis due to injury to the recurrent laryngeal nerve (RLN) is a common problem with several management options. These options can be broadly classified as medialization (eg, focal fold injection, thyroplasty, and arytenoid adduction) and reinnervation.

Objective: To review the literature for outcome data on reinnervation for unilateral RLN paralysis.

Design: Literature review.

Participants: 14 published papers on human laryngeal reinnervation, which included a total of 329 patients at a mean age of 51 years.

Methods: An electronic search of the published literature was performed, which revealed 686 articles; of these, all but 20 articles were eliminated because they were animal studies, were review articles, or did not adequately address reinnervation. An additional 10 articles were excluded due to lack of adult participants, preoperative data, or the use of duplicate patients. Four additional articles were included that were cited in the remaining 10, leaving 14 published reports in the final review.

Interventions: RLN reinnervation.

Results: Of the 329 patients included in the 14 papers reviewed, only half had both preoperative and postoperative data available. The median postoperative follow-up was 10 months, with signs of reinnervation occurring at a mean of 4 months. The most common cause of paralysis was RLN injury during thyroidectomy. The most studied procedure was ansa cervicalis-to-RLN neurorrhaphy followed by primary RLN anastomosis. Mean phonation time was improved after reinnervation in all 5 studies that reported it, and in 2 studies, the effect was statistically significant. Jitter and shimmer were measured in 4 studies and showed improvement. The most common visual technique used was measurement of the glottic gap, which was improved in all 6 studies that reported it. Perceptual assessment of voice quality measured by either an expert or the patient was improved in all studies that reported it regardless of the grading system used. When electromyography was performed, it was interpreted as evidence of reinnervation. Only one study looked at aspiration but found it to be improved after reinnervation.

Conclusions: The consensus of studies on reinnervation is that it is an effective treatment for vocal fold paralysis, but the quality of studies on this subject is poor.

Reviewer's Comments: Unfortunately, all of the studies on human laryngeal reinnervation have serious weaknesses. A major weakness is that the technique is almost always combined with a temporary medialization procedure. This combined with the effect of time, the potential placebo effects, and potential biases make it difficult to determine the benefit of the reinnervation alone. This field has a need for more prospective studies with controls and standardized techniques of measuring the outcome. (Reviewer-Benjamin T. Crane, MD).

Keywords: Hoarseness, Dysphagia, Thyroidectomy, Unilateral Vocal Cord Paralysis

Print Tag: Refer to original journal article
What Is Role of H. pylori in LPRD?

Treatment of Clinically Diagnosed Laryngopharyngeal Reflux Disease.
Youssef TF, Ahmed MR:


Triple therapy yields a high cure rate in the treatment of laryngopharyngeal reflux disease with *Helicobacter pylori* infection.

**Background:** Laryngopharyngeal reflux disease (LPRD) is thought to be associated with a number of nonspecific otolaryngologic signs and symptoms.

**Objective:** To determine the prevalence of *Helicobacter pylori* (HP) infection in patients with LPRD, and to determine the clinical efficacy of 2 treatment regimens in LPRD patients with HP infection.

**Design:** Randomized, controlled clinical trial.

**Methods/Participants:** The study was performed at a tertiary academic medical center. A total of 212 patients with clinical symptoms of LPRD confirmed by laryngoscopy and pH-probe monitor were enrolled and underwent HP surface antigen (HPSA) testing. Patients negative for HPSA were treated with esomeprazole alone. Those testing positive for HPSA were randomized into the proton pump inhibitor (PPI) monotherapy group versus triple therapy including esomeprazole, amoxicillin, and clarithromycin.

**Results:** The mean age of the study population was 32.4 years. Cough was the most common presenting symptom (49%), followed by globus sensation (46%). Post-cricoid inflammation was the main laryngoscopic finding (54%). HPSA test results were positive in 57% of patients. Those with negative HPSA were treated with esomeprazole monotherapy, and 97% of patients reported significant improvement in LPRD symptoms. Patients with positive HPSA were randomized into 2 treatment groups. In the PPI monotherapy group, 40% of patients reported significant improvement, whereas 90% of the group treated with triple therapy reported significant improvement in symptoms.

**Conclusions:** HP infection was seen in 57% of patients with LPRD. Triple therapy demonstrated a higher cure rate of LPRD in those who tested positive for HPSA.

**Reviewer's Comments:** LPRD presents a diagnostic dilemma given the lack of concrete guidelines for diagnosis and management. Although a fair amount of evidence exists for the relationship between HP and gastroesophageal disease, its contribution to LPRD is less well defined. The 57% HP infection rate is certainly higher than that observed in the general population, which is said to be around 30%. In patients with LPRD unresponsive to PPI monotherapy alone, HPSA testing and treatment may be considered. Although this could be due to a study population bias, the study presents compelling data for further clinical investigation in LPRD. (Reviewer-Tang Ho, MD).

Keywords: Laryngopharyngeal Reflux Disease, *H. pylori*, Proton Pump Inhibitor

Print Tag: Refer to original journal article
The delayed failure rate is significantly higher with the heat-crimped SMart prosthesis than with the manually crimped de la Cruz prosthesis.

**Background:** Stapedotomy surgery has gone through several iterations. More recent advances have included use of the laser and head-crimped nitinol wire prostheses. However, there have been some recent claims that the nitinol crimp does not maintain its grip on the incus, and loosening of this junction can be a cause of delayed hearing loss.

**Objective:** To compare the rate of revision between the heat-activated SMart prosthesis and the manually crimped de la Cruz (DLC) prosthesis.

**Design:** Retrospective chart review.

**Participants:** 335 patients who underwent a primary stapedotomy at the authors' institution between June 2003 and September 2009.

**Methods:** During the study, patients underwent stapedotomy with either the DLC or SMart prosthesis. Failure was defined as the need for revision surgery. Failures that did not undergo revision surgery were not included. Revision surgery was offered if the Rinne reversed with a 512 Hz fork, if there was an air bone gap of at least ≥25 dB, and if the patient was willing to undergo revision surgery. The procedures were all performed by 3 surgeons.

**Results:** The SMart piston was used in 57% of cases, and the DLC was used in 43%. The revision rate was 11% with the SMart and 4% with the DLC; this difference was statistically significant ($P < 0.05$) using the chi-squared test. Of the 21 SMart pistons that required revision, 14 were due to delayed failure. In the DLC group, 6 cases were due to late failure. The rate of late failures was also significantly higher with the SMart piston. In the SMart group, the time to revision surgery averaged 17 months, with a range of 4 to 44 months. In SMart patients with delayed hearing loss, 79% had a piston displaced laterally off the incus.

**Conclusions:** The heat-crimped SMart piston has a significantly higher delayed and overall failure rate than the manually crimped DLC.

**Reviewer's Comments:** Because this was a retrospective study, the choice of prostheses was not random but was likely related to surgeon preference and, in some cases, the anatomy. In fact, one surgeon stopped using the SMart prosthesis during the study. Thus, these results may reflect not only differences in the prosthesis used, but also differences in techniques between surgeons. It would also be interesting to know if manually crimping the SMart prosthesis or placing a piece of tissue over the incus, both of which are frequently done, decreased the rate of delayed complications. However, this paper and other more informal reports are casting doubt on the long-term efficacy of the SMart prosthesis. (Reviewer-Benjamin T. Crane, MD).

**Keywords:** Stapedotomy, Conductive Hearing Loss, Revision Surgery

**Print Tag:** Refer to original journal article
Cochlear Implants -- A New Treatment for Tinnitus

Cochlear Implantation in Unilateral Deaf Subjects Associated With Ipsilateral Tinnitus.

Buechner A, Brendel M, et al:

Otol Neurotol 2010; 31 (December): 1381-1385

There was a small improvement in tinnitus in some of the patients in this study who were implanted with a cochlear implant who had normal hearing in the contralateral ear.

**Background:** Tinnitus therapy has been largely based on auditory perception such as masking or retraining therapy. This can make tinnitus difficult to treat when it occurs in a deaf ear.

**Objective:** To describe the effect of a cochlear implant (CI) for hearing and for tinnitus in patients with unilateral tinnitus in a deaf ear and a contralateral normal hearing ear.

**Design:** Prospective case series.

**Participants:** 5 subjects between the ages of 42 and 56 years who had single-sided deafness and tinnitus for 1.5 to 5 years.

**Methods:** Before implantation, patients kept a tinnitus diary in which they rated their tinnitus on a scale from 0 to 10 (lower numbers indicating worse tinnitus). Patients received implants in their deaf ear. Patients were followed up for 1 year afterward with a monthly assessment of auditory function and tinnitus severity.

**Interventions:** Unilateral cochlear implantation using an Advanced Bionics HiRes90K device.

**Results:** 3 of the 5 patients were able to tolerate all day use of their CI. After 12 months of CI use, the Hochmaier-Schulz-Moser sentence test was 9.4%, which is well below that achieved by most bilaterally deaf CI users. Three patients were able to achieve open set speech understanding using the CI alone. Using the Oldenberger Sentence test with noise to the normal ear, there was a slight improvement with CI plus hearing compared to hearing in the normal ear alone, but this difference disappeared after 12 months. Two patients had near-complete tinnitus suppression during CI use, but tinnitus returned when the CI was turned off. The tinnitus improvement reported in the diaries was small and was <1 point on the 10-point scale in the average patient.

**Conclusions:** CI offers a small benefit to tinnitus in some patients with unilateral deafness.

**Reviewer's Comments:** CIs are not approved by the Food and Drug Administration for single-sided deafness in the United States, and this study seems to indicate there is minimal hearing benefit in this situation. However, these patients primarily had tinnitus complaints, and tinnitus can be a severely disabling in a small subset of patients. Some of these patients are desperate for a new therapy and would be willing to undergo CI. However, this paper indicates that the effect on tinnitus suppression is small and does not always occur. It is not clear how these patients were selected and what other therapies they might have tried. This therapy would be more exciting if there were a way to identify patients who would most benefit from it. (Reviewer-Benjamin T. Crane, MD).

**Keywords:** Tinnitus, Hearing Loss, Single-Sided Deafness

**Print Tag:** Refer to original journal article
Prior studies of middle ear implants are of moderate to poor quality, with no randomized controlled trials; however, the devices offer better patient satisfaction and similar hearing benefit compared to conventional hearing aids.

**Background:** Conventional hearing aids (CHA) are very commonly used, but offer several disadvantages including cosmesis, risk of otitis externa, contact allergies, feedback, and occlusion effect. Middle ear implants (MEI) offer an alternative that avoids many of these problems. The only Food and Drug Administration (FDA)-approved device available in the United States is the Vibrant Sound Bridge™, but there is a wider selection of devices available in Europe.

**Objective:** To review the literature on MEI. A total of 644 publications were found with potential relevance, but only 17 met the authors' criteria and were reviewed. Of these, 6 articles included <10 patients.

**Methods:** Articles were identified via a search of electronic databases. Studies had to include adult patients with sensorineural hearing loss and the outcome had to be compared with a CHA. Because of differences in methodology, an outcome measurement meta-analysis was not possible.

**Interventions:** MEI using 6 different devices, although the Vibrant Sound Bridge was by far the most common.

**Results:** Gain achieved by MEI was the same or better than that of the CHA in 6 studies. Speech perception in quiet was good with both MEI and CHA, but all studies reported hearing in noise was the same or better with the MEI. Patient satisfaction was better with the MEI than with the CHA across studies. The MEI was safe, with complications rarely reported; a loss of residual unaided hearing was reported in only 2 studies. Follow-up was <1 year in most studies, so long-term benefit and reliability is unknown.

**Conclusions:** The quality of MEI studies is moderate to poor, but there is consensus that the patients who get MEI are more satisfied than they were with CHA.

**Reviewer's Comments:** Patient satisfaction is likely higher with MEI than the CHA in these studies because there is a selection bias, and only patients who were not satisfied with CHA went on to MEI. I would also like to see long-term follow-up data prior to recommending MEI devices to patients, as prosthetic devices are prone to delayed complications, and it is not clear how many of these devices will be supported by their manufacturer into the future. Many of these studies were funded by their manufacturer, which likely caused a bias toward more positive outcomes. (Reviewer-Benjamin T. Crane, MD).

Keywords: Hearing Loss, Hearing Aid, Middle Ear Implant, Prosthetic Device

Print Tag: Refer to original journal article
A Middle Fossa Approach May Save Hearing, but for How Long?

Late Failure Rate of Hearing Preservation After Middle Fossa Approach for Resection of Vestibular Schwannoma.

Hilton CW, Haines SJ, et al:

Otol Neurotol 2011; 32 (January): 132-135

The overall hearing preservation rate after middle fossa resection is 65%, with 11% of these patients degrading to non-serviceable hearing in the years after the resection.

**Background:** The ideal treatment for vestibular schwannomas (VS) remains controversial, with surgery, radiation, and conservative treatment all having advocates. In patients with serviceable hearing and small tumors, a common goal is hearing preservation. The middle fossa approach (MFA) to resection has been advocated for hearing preservation for small tumors in the internal auditory canal.

**Objective:** To describe the long-term hearing results after the MFA to VS.

**Design:** Retrospective review.

**Participants:** 486 patients who had surgical treatment of VS between 1989 and 2009 were included. Twenty percent of these patients underwent an MFA. The mean age at the time of surgery was 45 years.

**Methods:** For the MFA to be used at this institution, patients had to have preoperative hearing better than 50 dB with 50% speech discrimination and tumors had to be <2 cm. Postoperative audiograms were performed after 3 months and then yearly after that. Magnetic resonance imaging (MRI) was also performed yearly. Hearing outcomes were classified as serviceable if hearing was better than 50 dB and 50% speech discrimination.

**Results:** The mean follow up was 4 years. The frequency that the MFA was used during the study period increased from 11% in the initial 5 years to 40% in the final 5 years of the study. The initial audiogram after surgery revealed 65% maintained serviceable hearing. Of the 44 patients with initial hearing preservation, 11% degraded to non-serviceable, which occurred at a mean duration of 3.5 years (range, 2 to 5 years). Kaplan-Meier estimated the longer term hearing preservation rate after 10 years at 72%. Tumor recurrences were documented in 5 patients, 2 of whom had hearing worsen into the non-serviceable range. Twenty percent of patients whose hearing was initially classified as non-serviceable improved to serviceable hearing. However, further analysis revealed that this cohort of patients was significantly more likely to have their initial audiogram sooner during the postoperative period. This underscores waiting a couple of months after surgery for the audiogram for a stable hearing result.

**Conclusions:** 65% of those who undergo MFA for VS have serviceable hearing after surgery, and this hearing is maintained in almost 90%.

**Reviewer’s Comments:** It is difficult to compare these results using the MFA for VS to other treatment modalities such as radiation because these groups of patients are likely to differ with respect to age and medical comorbidities. However, these results compare very favorably to radiation series with multi-year follow-up studies. (Reviewer-Benjamin T. Crane, MD).

**Keywords:** Acoustic Neuroma, Vestibular Schwannoma, Hearing Loss, Middle Fossa Approach

**Print Tag:** Refer to original journal article
Compared with white children with frequent ear infections, black and Hispanic children are more likely to be below the poverty line and be under insured.

**Background:** Frequent ear infections (FEI), defined as at least 3 ear infections per year, are a common problem in children, with potentially serious consequences including hearing loss and cholesteatoma.

**Objective:** To determine the effects of racial and ethnic disparities on access to care for children with FEI.

**Design:** Cross-sectional analysis of a national database.

**Participants:** 4.65 ± 0.08 million children <18 years of age who reported having FEI.

**Methods:** The United States National Health Interview Survey (NHIS) was analyzed from 1997 to 2006. The analysis was limited to children <18 years of age. One question on this survey was, "During the past 12 months, has your child had 3 or more ear infections?" Demographic data and insurance status were also reviewed.

**Results:** Within the study population of children with FEI, 52.5% were male, and the racial breakdown was 68% white, 17% Hispanic, and 12% black. Black and Hispanic children with FEI were significantly more likely to be below the poverty line, tended to have less access to medical insurance, a higher rate of emergency room visits, and a lower rate of specialist visits. After adjusting for demographic variables likely associated with FEI and access to medical care including race, insurance coverage, age, and gender with multivariable logistical regression, there was no correlation between race and ability to afford medical care, although black and Hispanic children were less likely to be able to afford prescriptions.

**Conclusions:** There are racial and ethnic disparities in the ability to afford prescriptions as well as insurance status among children with FEI.

**Reviewer's Comments:** It is difficult to interpret these data since we do not know what constitutes an ear infection. Since it was reported by the parents, it likely includes otitis media, otitis externa, and other causes of ear pain. It is also difficult to separate the effects of race and ethnicity from other factors like poverty and access to care. Severity of disease among those who have FEI is not addressed, and we know nothing about hearing loss or progression to cholesteatoma. This study demonstrates that the ability to afford medical care was similar across racial/ethnic lines, but there were disparities in specialist visits and the ability to afford medications. I believe it is likely that medications and specialist visits are overused in more affluent children. Thus, it is unclear if FEI are being managed more appropriately in one ethnic or racial group than another. (Reviewer-Benjamin T. Crane, MD).

**Keywords:** Otitis Media, Eustachian Tube Dysfunction, Race

**Print Tag:** Refer to original journal article
Total parotidectomy defects can be satisfactorily reconstructed with anterolateral thigh free flaps.

**Objective/Background:** The abnormal facial contour caused by parotidectomy, particularly the larger defects produced by total parotidectomy, is often overlooked. Due to the significant amount of tissue loss, more extensive reconstruction may be necessary to achieve a satisfactory cosmetic result. The authors present a method of reconstructing such defects with free tissue transfer.

**Methods:** A retrospective analysis of buried free flaps utilized in reconstruction of total parotidectomy defects at 2 tertiary-care medical centers from 2002 to 2009 was performed. Patient demographics, flap surgical details, and additional facial reanimation procedures were tabulated. Cosmetic outcomes were evaluated based on both patient and physician satisfaction.

**Results:** 18 patients were included in the study. Their mean age was 57.4 years, 61% were males, and the mean follow-up period was 14.4 months. All patients underwent total parotidectomy, and 15 patients had malignant lesions. Eleven patients (61%) required facial nerve resection due to tumor involvement. Anterolateral thigh flap was the most utilized flap in 13 patients (72%), followed by radial forearm free flap in 4 patients. Flap survival was 100%, with 5.6% flap-related complications. Adjunctive facial reanimation procedures were performed in 8 patients (44%). Patients and surgeons reported satisfaction with the cosmetic outcome.

**Conclusions:** Total parotidectomy defect can be safely and effectively reconstructed with free flaps while not precluding adjunctive facial reanimation procedures.

**Reviewer's Comments:** The use of microvascular reconstruction techniques for parotidectomy defects is not widespread because of concerns regarding the ability to monitor recurrence and the added morbidity. However, other reconstruction options often do not achieve satisfactory cosmetic improvement, particularly in total parotidectomy defects. Although this study has shown that such reconstruction can be done safely and effectively at selected centers in selected patients, it unfortunately did not provide any objective assessment of the cosmetic outcome. To justify the added morbidity associated with the procedure, additional investigations, including such objective measures, will likely be necessary. (Reviewer-Tang Ho, MD).

**Keywords:** Parotidectomy, Anterolateral Thigh Free Flap, Microvascular Reconstruction

**Print Tag:** Refer to original journal article
When It Comes to Inner Ear Trauma, Is the Pen Mightier Than the Sword?

A Case of Poor Penmanship: Foreign Body in the Vestibule.

Shuman AG, Telian SA:

Otol Neurotol 2010; December 9 (): epub ahead of print

This unusual case highlights the potential importance of imaging in the diagnosis of inner ear disorders.

**Background:** The association of hearing loss and the loss of vestibular function is the observation on which Prosper Ménière built his fame. Although Ménière's disease is a relatively common cause of vertigo, it is also a diagnosis of exclusion that has normal findings on imaging studies.

**Objective:** To describe an unusual case of a foreign body in the vestibule.

**Design:** Case report involving a 60-year-old man with schizophrenia.

**Methods:** The workup included examination, audiogram, and CT.

**Interventions:** CT and middle ear exploration.

**Results:** The patient presented 3 weeks after stabbing a pen into his external auditory canal. The immediate consequences were pain, hearing loss, and vertigo. The pain and vertigo resolved over the following 2 weeks, but the patient continued to have unilateral hearing loss. Physical examination revealed an intact mobile tympanic membrane. He did not have spontaneous nystagmus, but did have a positive head thrust test. Facial nerve function and tympanograms were normal. CT revealed an object extending through the oval window into the vestibule, but there was no air in the vestibule. Surgical exploration of the middle ear was performed. The findings during surgery were an intact incus and granulation tissue involving the oval window. A metal pen tip was found and removed. Subsequently, the vestibule was packed with gentamicin-soaked gelfoam, and a soft tissue graft was placed. The patient recovered without further vertigo episodes.

**Conclusions:** This extremely unusual case demonstrates the importance of imaging in the workup of vestibular and hearing loss symptoms when trauma is involved.

**Reviewer's Comments:** Given the intact tympanic membrane and that the patient was likely not a good historian, it is easy to imagine how this diagnosis might have been missed. This is the first known case of a foreign body causing damage to the inner ear when the examination of the external ear is essentially normal. It brings up the importance of imaging in cases of hearing loss and vertigo. (Reviewer-Benjamin T. Crane, MD).

Keywords: Foreign Body, Vestibular, Hearing Loss, Vertigo

Print Tag: Refer to original journal article
CT is cheaper and faster and may be the best choice for the workup of cases of sensorineural and mixed hearing loss in children, while MRI should be considered for auditory neuropathy.

**Background:** CT and MRI have revolutionized the diagnosis of hearing loss. Each modality has advantages and disadvantages, so the most appropriate and cost-effective option remains an area of controversy.

**Objective:** To review the literature and determine the best imaging modality for workup of pediatric sensorineural hearing loss.

**Design:** Literature review and expert opinion.

**Methods:** The literature was reviewed to determine best practices.

**Results:** In pediatric patients with asymmetric hearing loss, CT revealed an abnormality in 41% and MRI was abnormal in 30%. In patients with both CT and MRI, only 1 modality found an abnormality in 31%, and in these cases, CT was more frequently the abnormal study. In cases of auditory neuropathy spectrum disorder (ANSD), 64% of MRIs had at least 1 abnormality, with abnormalities in the brain being most common. Fifty-five percent of CTs had an abnormality. MRI is also thought to be the superior study for evaluation of the eighth cranial nerve. When evaluating patients with a history of meningitis, the early stages of fibrosis in the cochlea are more easily seen on MRI. Both CT and MRI have been advocated for workup of pediatric sensorineural hearing loss by some authors.

**Conclusions:** CT is able to visualize many abnormalities that lead to sensorineural hearing loss, the cost is relatively low, and the procedure time is short. Thus CT is likely the best initial study for most pediatric sensorineural hearing loss situations. If central or auditory nerve pathology is suspected (ie, cases of ANSD), MRI should be considered as the initial study.

**Reviewer’s Comments:** The decision to order a CT or MRI as an initial workup for a child with sensorineural hearing loss is one we face often. This paper provides a good guide, although this is a dynamic area. With MRI acquisition times and costs decreasing, I would not be surprised if recommendations change in a few years. When I see these patients, the management decision is often whether a cochlear implant should be placed and if so, to which ear. To make this decision, I find either study is adequate in most cases. (Reviewer-Benjamin T. Crane, MD).

Keywords: Hearing Loss, MRI, CT, Auditory Neuropathy

Print Tag: Refer to original journal article
Response to medical treatment in patients with post-traumatic migraine-associated dizziness is correlated with performance on standard vestibular tests.

**Background:** Migraine-associated dizziness is an extremely common cause of dizziness that can be frustrating to treat. This type of dizziness can frequently be triggered by trauma in which case it is known as post-traumatic migraine-associated dizziness (PTMAD). The ideal strategy for diagnosis and treatment of these patients remains controversial.

**Objective:** To characterize patients with PTMAD and determine if prognosis is associated with any medical interventions or vestibular tests.

**Design:** Retrospective chart review.

**Participants:** 83 patients given the diagnosis of PTMAD were included. Most patients were male, with a mean age of 24 years.

**Methods:** Electronic medical records of patients at the Naval Medical Center in San Diego diagnosed with migraine headache and dizziness and who had a history of trauma were reviewed. Patients underwent complete examination including Dix-Hallpike, dynamic visual acuity (DVA), dynamic posturography (DP), and dynamic gait index (DGI). Headache symptoms were classified as better, same, or worse. Prophylactic migraine medication was also recorded.

**Interventions:** Prophylactic migraine medication, including verapamil and topiramate, was given.

**Results:** 89% of patients were prescribed a prophylactic migraine headache medication, and 58% had their medication changed to another medication an average of 3 months later. Patients were more likely to change medications if their headaches were getting worse than those who had no change or who were getting better. Patients whose headaches responded to medications and those whose headache did not (nonresponders) were examined with regard to their vestibular testing. There was no association with DGI prior to treatment, but after treatment, DGI was significantly higher in patients who responded. Similarly, DP and DVA did not predict responders, but the responder group had better performance after treatment.

**Conclusions:** Improvement in headache symptoms in PTMAD was correlated with improvement in several standardized vestibular tests.

**Reviewer’s Comments:** Most otolaryngologists who treat patients in the civilian population rarely see patients with PTMAD, but the symptoms in this patient population are very similar to MAV, which is extremely common. I would be interested to know if the findings in this paper could be applied to the MAV population. In the MAV patients I see, the correlation between headache severity and vertigo symptoms is not a strong one. Since this was a retrospective study, it is hard to know if the treatment was targeted at headaches or vertigo symptoms since the medications they used (verapamil and topiramate) can be used for either. (Reviewer-Benjamin T. Crane, MD).

**Keywords:** Dizziness, Migraine, Vestibular Testing, Blast Trauma, Topiramate, Verapamil

**Print Tag:** Refer to original journal article
Demographics Affect Tx of Allergic Fungal Sinusitis

Epidemiologic Factors Affect Surgical Outcomes in Allergic Fungal Sinusitis.
Champagne JP, Antisdel JL, et al:

Laryngoscope 2010; 120 (November): 2322-2324

Epidemiologic factors play an important role in the presentation and progression of allergic fungal rhinosinusitis.

**Background:** Allergic fungal sinusitis (AFS) is a challenging clinical process to diagnose and manage. Previous studies have shown that various epidemiologic factors may play a role in the presentation and natural course of this disease.

**Objective:** To evaluate differences in demographic factors that may play a role in the presentation and postoperative outcomes in a population diagnosed with AFS.

**Design:** Prospective cohort study.

**Participants:** 38 patients who underwent endoscopic sinus surgery (ESS) for AFS at a single tertiary care medical center.

**Methods:** Patients with confirmed AFS underwent ESS. All patients completed pre- and postoperative Sinonasal Outcome Test (SNOT)-20 questionnaires. All patients were objectively graded using Lund-Kennedy nasal endoscopy and Lund-Mackay CT scan scoring systems. Comparisons between endoscopy and SNOT-20 scores were evaluated preoperatively and at 6 and 12 months postoperatively. Demographic differences were then evaluated by univariate and multivariate analysis.

**Results:** Preoperatively, African-American patients presented with higher Lund-Mackay (17.64 vs 11.36) and Lund-Kennedy scores (17.75 vs 12.93) than Caucasian patients. No differences in SNOT-20 scores were noted when compared by race. Postoperative symptom and endoscopy scores improved in both groups, but there were no significant differences in improvement ratio between African Americans and Caucasians. When compared by gender, preoperative Lund-Kennedy and Lund-Mackay scores were similar for males and females. There was a significantly greater improvement in endoscopy scores for females compared to males. Preoperative SNOT-20 scores were higher for women than men (18.77 vs 13.00). Women showed significantly greater improvement in SNOT-20 scores 12 months after surgery. No difference was noted at the 6-month time point.

**Conclusions:** Variations in AFS presentation and response to treatment exist between different patient groups. Racial and gender differences should be taken into account when counseling patients and tailoring effective treatment regimens.

**Reviewer’s Comments:** AFS is a challenging disease that remains difficult to treat in many patient populations. Understanding demographic differences in disease presentation and natural history can help clinicians more effectively diagnose and treat their patients. The authors of the current study compared objective and subjective evaluations of AFS both before and after ESS. Interestingly, African-American patients presented with worse disease but responded well to treatment. The reason for this disparity is unclear, but could be due to differences in access to health care, socioeconomic status, or perhaps to a genetic or environmental predisposition to the disease. By objective measurement, women presented with milder disease, but were more symptomatic when evaluated by a subjective questionnaire. Possible explanations include a greater sensitivity to nasal and sinus symptoms or a greater propensity to seek early medical care. These notable demographic differences in diagnosis and disease progression should assist clinicians in counseling patients with AFS. (Reviewer-Justin H. Turner, MD, PhD).

Keywords: Allergic Fungal Sinusitis, Endoscopic Sinus Surgery, Rhinosinusitis, Outcomes

Print Tag: Refer to original journal article
Improvements in quality of life after endoscopic sinus surgery are stable between 6 and 20 months after surgery.

**Background:** An improvement in quality-of-life (QOL) outcomes after endoscopic sinus surgery (ESS) has been verified by several investigators. However, the time interval for evaluating improvements in QOL has varied between studies.

**Objective:** To determine the time interval during which QOL outcomes stabilize after ESS.

**Design:** Multi-institutional, longitudinal, cohort study.

**Participants:** 127 patients were recruited from 3 medical centers. All provided responses to QOL questionnaires over a 20-month period following ESS.

**Methods:** Patients were asked to provide responses to the Rhinosinusitis Disability Index (RSDI) and the Chronic Sinusitis Survey (CSS) at baseline, 6 months, 12 months, and 20 months after ESS. QOL scores were compared among different follow-up time points, and subgroup analyses were then performed in a similar fashion.

**Results:** Statistically significant improvements in QOL were found between the baseline and 6 month follow-up period for the RSDI and CSS. There were no significant differences in either RSDI or CSS total scores between 6, 12, and 20 months. Likewise, no difference in scores between 6, 12, and 20 months were found when data were divided into subgroups, including gender, presence of polyposis, previous sinus surgery, asthma, aspirin intolerance, allergy, and depression.

**Conclusions:** Improvements in QOL after ESS do not appear to change between 6 and 20 months postoperatively. The 6-month time frame can be considered an adequate primary end point for subsequent clinical trials.

**Reviewer's Comments:** The ability of ESS to improve patient QOL has been well established in previous clinical studies. This large, multi-institutional, longitudinal study establishes that QOL outcomes following ESS are stable at the 6-, 12-, and 20-month follow-up time points. The results of the current study effectively establish follow-up periods beyond 6 months as redundant, a conclusion that should improve the feasibility of subsequent studies. These results also reinforce the effectiveness of ESS in improving QOL of patients with CRS, an effect that is both clinically significant and long lasting. The QOL scores from beyond 20 months would be of interest from a clinical perspective, but are likely of little interest for the purpose of designing clinical trials. (Reviewer-Justin H. Turner, MD, PhD).

**Keywords:** Rhinosinusitis, Sinusitis, Clinical Trials, Outcomes, Endoscopic Sinus Surgery

Print Tag: Refer to original journal article
Occlusive nasal packing increases vagal tone and may result in cardiac complications in certain patient populations.

Background: The use of various nasal packs is often standard procedure in surgeries of the nasal septum and paranasal sinuses. Pulmonary and cardiac complications have been associated with nasal packing and/or acute nasal obstruction, though results have been variable.

Objective: To evaluate the effects of totally occluding nasal packs with and without airway on cardiac and pulmonary function.

Design: Prospective, randomized trial.

Participants: 39 adult patients undergoing septoplasty or septorhinoplasty at a single tertiary care medical center were included.

Methods: Patients were randomized to receive nasal packs with airways or totally occluding nasal packs following septal surgery. Cardiac function was monitored pre- and postoperatively by Holter monitor. Arterial blood gas analysis was performed before surgery and for 24 hours postoperatively. Patients with cardiac, pulmonary, neurologic, or other comorbidities were excluded from the study.

Results: No serious arrhythmias were observed in any patient. Nasal packing of either type resulted in a significant increase in minimum postoperative heart rates and a significant decrease in maximum postoperative heart rates. No significant change in mean heart rate was observed in either group. Heart rate variability as assessed by spectral analysis showed an increase in vagal activity with packing of either type. Application of nasal packs with airway did not have any effect on blood gas parameters. Totally occluding nasal packs caused a significant decrease in pCO₂, but did not affect pO₂, O₂ saturation, or pH.

Conclusions: Nasal pack-induced cardiac effects and complications may be due to increased vagal tone rather than nasal obstruction-associated hypoxia.

Reviewer's Comments: Packing of the nasal cavity or nasopharynx has been associated with occasionally severe cardiac and pulmonary complications. The authors of the current study compared the effects of occluding and nonoccluding nasal packs on arterial blood gas measurements and cardiac function. Few appreciable differences were noted between packs with and without airway. Both types of nasal packing resulted in an increase in vagal tone, likely from a direct stimulatory effect on the nasal cavity mucosa. The authors recommend close monitoring of elderly patients and those with cardiopulmonary comorbidities when nasal packing is used. While this seems reasonable, the current study evaluated only young, healthy patients with no comorbidities, meaning that this conclusion may not be entirely warranted. It remains to be seen whether the increased vagal tone noted in the current study represents a clinically relevant phenomenon. (Reviewer-Justin H. Turner, MD, PhD).

Keywords: Septoplasty, Epistaxis, Nasal Packing

Print Tag: Refer to original journal article
Balance disorders are rare in children, and when present, children typically do not have a chief complaint. These disorders are associated with hearing loss, syncope, and headache.

**Background:** Balance disorders are an extremely common source of physician visits in adults, but the prevalence of these disorders in children has rarely been addressed. In prior studies, the prevalence of these disorders has varied over a huge range from 0.7% to 15%.

**Objective:** To determine the prevalence of vestibular and balance disorders in children.

**Design:** Retrospective review of a medical records database.

**Participants:** The database contained >500,000 patient encounters between 2004 and 2008.

**Methods:** Electronic records from patients (age range, birth to 18 years) were reviewed from a pediatric health system based in Delaware and Florida. Records were searched for diagnoses that were likely related to peripheral or central vestibular disorders.

**Results:** A total of 2,546 patients (0.45%) were diagnosed with a balance disorder. These patients were divided into groups based on origin of the disorder (central, peripheral, or unspecified). Almost 90% of the patients with balance disorders were categorized as "unspecified." Peripheral disorders were present in 6%, and were most commonly benign positional vertigo (BPV). Central causes comprised 4%, with the most common being motion sickness. Only 22% of those diagnosed with a balance disorder had a chief complaint related to balance. Patients with a sensorineural hearing loss were 43 times as likely to have a peripheral vestibular disorder ($P<0.05$). Patients with headache were 16-fold more likely to have a central balance disorder ($P<0.05$), and those with syncope were 21 times more likely to have unspecified dizziness.

**Conclusions:** The prevalence of vestibular disorders in children is small, but not negligible.

**Reviewer’s Comments:** The prevalence of vestibular disorders in children has been a controversial topic because the incidence has been reported over a very wide range. The incidence reported in this study of about 1 in 200 children may be accurate, but studies of this type are only as good as the underlying data, and the incidence depends on how hard you look for vestibular disorders. As this study mentions, most children do not complain of balance disorders even when they are present. It is not clear how carefully these patients were screened for potential disorders. The finding that almost 90% of the diagnoses were "unspecified dizziness" implies that the underlying cause was not investigated carefully. It is likely that many of these were physiologic dizziness, such as motion sickness. (Reviewer-Benjamin T. Crane, MD).

**Keywords:** Vestibular System, Balance, Dizziness
Consider Conversion Disorders in Patients With Hearing Loss

Conversion Disorder: A Missed Diagnosis Leading to Cochlear Reimplantation.
Carlson ML, Archibald DJ, et al:
Otol Neurotol 2010; 32 (January 2011): 36-38

This unusual case demonstrates that conversion disorder should be considered in patients complaining of hearing loss.

**Background:** Cochlear implantation (CI) is an effective method of restoring hearing in patients who would otherwise have few options. Occasionally, we see patients who have doubts about how accurately they are representing their ability to hear. If there is a loss of hearing after CI, the device is usually to blame. In >85% of cases, when device malfunction is suspected, an identifiable cause can be found in the device.

**Objective:** To describe an unusual case of conversion disorder masquerading as CI malfunction.

**Design:** Case report.

**Participants:** A pediatric patient with Waardenburg syndrome who received a CI at age 6 years for profound bilateral sensorineural hearing loss was the subject.

**Methods:** The patient was initially implanted with an Advanced Bionics Clarion 1.2 device.

**Results:** During the 2 years after implantation, the patient reported intermittent device malfunction including abnormal sound and overstimulation. Although testing revealed no faults with the CI, it was replaced with a Nucleus 24 Contour device. Speech perception was excellent for 2 years, but then the patient developed recurrent intermittent problems. A second revision surgery was performed to replace the CI, but even with this third CI, the patient had a recurrence of similar symptoms. The prior device functioned normally on testing after removal. Psychiatric evaluation revealed stress at home including physical abuse and the recent suicide of a caregiver. A diagnosis of conversion disorder was made and patient counseling was initiated. The patient has infrequent relapses.

**Conclusions:** Somatoform disorders are a form of conversion disorder that can present as hearing loss and CI failure.

**Reviewer's Comments:** Recently, at our institutions' CI conference, we were discussing a patient whose objective audio tests were not consistent with the severity of the patient's symptoms. Questions were raised about whether this might be a somatoform disorder. We thought there must undoubtedly have been patients with somatoform disorders with hearing loss that had been treated by CI in the past (although not at our institution, of course) and wondered if a CI helped these patients. However, none of us knew of any cases where this had been published. This case demonstrates that these patients are not helped by CI. One wonders to what degree the decision to place this patient's initial CI might have been based on somatoform symptoms. (Reviewer-Benjamin T. Crane, MD).

**Keywords:** Cochlear Implant, Conversion Disorder, Hearing Loss, Waardenburg Syndrome

**Print Tag:** Refer to original journal article