

Abstract selection

The development of communication and language in deaf and severely hard of hearing children: implications for the future. Preisler, G. Department of Psychology, Stockholm University, Sweden. gp@psychology.su.se. *International Journal of Pediatric Otorhinolaryngology* (1999) October 5, Vol. 49 (Suppl 1), pp. S39–43.

Severe hearing impairment is seldom detected in children before the age of six–12 months as parent-infant interaction is similar to that of a normal parent-child interaction. This is probably due to an innate capacity of infants to take information in one sensory modality and translate it into another, called amodal perception. The roots of language are traced to early proto-conversations, as well as to early pretend play. Relationships are viewed as the context in which socialization takes place, basic competences emerge, regulations of emotions develop and communication skills are acquired. If habilitation after diagnosis of a severe hearing impairment primarily is focused on an oral-aural approach, natural patterns of communication between parent and child will gradually disappear, which will have negative implications on the development of these children. If, instead, they are allowed to develop those means of communication that are easy for them to produce and to perceive, positive consequences have been registered on the development of communication and language, as well as on their socio-emotional and cognitive development. When these children have been given opportunities to become bilingual with a signed and a written and/or spoken language, it has enabled them to attend higher education, to have a qualified job and thereby a good life in the future.

The surgical management of the pars tensa retraction pocket in the child – results following simple excision and ventilation tube insertion. Blaney, S. P., Tierney, P., Bowdler, D. A. Department of Otorhinolaryngology, Royal Sussex County Hospital, Brighton, UK. *International Journal of Pediatric Otorhinolaryngology* (1999) October 25, Vol. 50 (2), pp. 133–7.

Retraction pockets of the pars tensa formed due to poor mesotympanic ventilation can result in chronic infection, ossicular damage and even acquired cholesteatoma. A diversity in opinion exists as to the best surgical treatment of an established retraction pocket. This paper presents a consecutive prospective series of 39 ears managed over the last four years by means of simple excision and insertion of a middle ear ventilation tube. The retraction pockets were graded according to Sade's 1979 classification. There were 23 grade II and sixteen grade III retractions. All 39 pockets were successfully excised. Thirty-four of the perforations healed, with the remaining five failing to heal at the time of analysis. In 13 cases the pockets recurred, but in five of these cases the recurrence is minimal and has required no further surgical intervention. Of the eight remaining significant recurrences, four have undergone a repeat procedure with no further recurrence in three cases. Following initial surgery, 67 per cent of the ears operated upon had either minimal or no recurrence. Following further surgery this figure increased to 75 per cent. The air conduction threshold improved by an average of 13 decibels in those ears that healed with no recurrence.

The heritability of otitis media: a twin and triplet study (see comments). Casselbrant, M. L., Mandel, E. M., Fall, P. A., Rockette, H. E., Kurs-Lasky, M., Bluestone, C. D., Ferrell, R. E. Department of Otolaryngology, University of Pittsburgh School of Medicine, Children's Hospital of Pittsburgh, PA 15213, USA. casselm@chplink.chp.edu. *JAMA* (1999) December 8, Vol. 282 (22), pp. 2125–30. Comment in: *JAMA* (1999) December 8, 282 (22):2167–9.

CONTEXT: Anatomical, physiological, and epidemiological data indicate that there may be a significant genetic component to prolonged time with and recurrent episodes of otitis media in children. OBJECTIVE: To determine the genetic component of

time with and episodes of middle ear effusion and acute otitis media (AOM) during the first two years of life. DESIGN: Prospective twin and triplet cohort study with enrollment from 1982 through 1995. SETTING: Otitis Media Research Center in the ear, nose, and throat clinic of Children's Hospital of Pittsburgh, Pittsburgh, Pa. PATIENTS: A total of 168 healthy same-sex twin and seven triplet sets were recruited within the first two months of life; zygosity results were available for 140 sets; 138 (99 per cent) of these were followed up for one year and 126 (90 per cent) for two years. MAIN OUTCOME MEASURES: Proportion of time with middle ear effusion, episodes of middle ear effusion, and episodes of AOM by zygosity status. RESULTS: At the two-year end point, the estimate of heritability of time with middle ear effusion was 0.73 ($p < 0.001$). The estimates of discordance for three or more episodes of middle ear effusion were 0.04 for monozygotic twins and 0.37 for dizygotic twins ($p = 0.01$). The estimate of discordance of an episode of AOM in monozygotic twins was 0.04 compared with 0.49 in dizygotic twins ($p = 0.005$). CONCLUSIONS: Our study suggests there is a strong genetic component to the amount of time with middle ear effusion and episodes of middle ear effusion and AOM in children.

Temporomandibular disorders: a review of current understanding. Goldstein, B. H. The University of British Columbia, Department of Oral Biological & Medical Sciences, Faculty of Dentistry, Vancouver, Canada. *Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology and Endodontics* (1999) October, Vol. 88 (4), pp. 379–85.

OBJECTIVE: The purpose of this article is to conduct a narrative review of current evidence regarding the understanding, evaluation, management, and treatment of temporomandibular disorders to provide a broad perspective and updated introduction to an important and controversial subject with rapidly changing developments and limited well-designed research. DATA SOURCES: Studies were identified through a search of MEDLINE for three topics (temporomandibular disorder, temporomandibular joint, and chronic pain) over a 10-year period (January 1988 to August 1998) and of bibliographies of identified studies and review articles. STUDY SELECTION: More than 5000 articles were produced. In-depth review of all of this literature was beyond the scope of the present article, which is intended to provide an overview. The amount and diversity of the literature and the limitations of covering such a broad topic being recognized, the papers selected were those that reviewed limited topics or studied focused areas. This report is not a systematic (qualitative) or meta-analysis (quantitative) review. An acknowledged limitation of this narrative review method lies in the potential for bias in selection. The referenced works do not include all papers reviewed; only pertinent literature and reviews with comprehensive references were selectively included. CONCLUSIONS: Advances in basic and clinical science have resulted in important changes in the understanding and management of temporomandibular disorders. Many treatments are not supported by research, and the role of dentistry is changing to a more diagnostic and management-based model from the hands-on treatment procedures of the past. The present science-based understanding of a biopsychosocial disorder is important in properly and responsibly dealing with patients with temporomandibular disorders.

Vocal fold granuloma: successful treatment with botulinum toxin. Orloff, L. A., Goldman, S. N. University of California, San Diego, CA 92103-8891, USA. *Otolaryngology – Head and Neck Surgery* (1999) October, Vol. 121 (4), pp. 410–3.

Vocal fold granulomas are benign but frequently recurrent lesions that can cause frustration for both the patient and the treating physician. Etiologic factors include endotracheal intubation, vocal abuse, and gastroesophageal reflux. Conventional treatment for granulomas has included medical, voice, and surgical therapy,

none with uniform success. In this study eight patients with vocal fold granulomas were treated with intralaryngeal injection of botulinum toxin. The resultant temporary paresis of the vocal folds allowed for a window of time during which the vocal process could heal and the granulomas could resolve without being exposed to ongoing intermittent contact and friction with the opposing arytenoid. Although the underlying cause of a granuloma must also be addressed, we have found that botulinum toxin can be a useful adjunct to traditional therapy and can lead to avoidance of repetitive surgical procedures.

Treatment of tinnitus with electrical stimulation. Steenerson, R. L., Cronin, G. W. *Atlanta Ear Clinic. Otolaryngology – Head and Neck Surgery* (1999) November, Vol. 121 (5), pp. 511–3.

The purpose of this study was to evaluate the treatment of tinnitus with electrical stimulation. Five hundred patients with tinnitus were treated with probe electrical stimulation. Causes of tinnitus were sensorineural hearing loss (303 patients), Meniere's disease (88), infection (25), head trauma (39), acoustic trauma (25), ototoxicity (four) and chemotherapy (two). Treatment involved six to 10 transcutaneous treatment electrical stimulation sessions biweekly. Fifty-three per cent of patients showed decreases in their tinnitus as measured by a subjective rating scale. With a three-month follow-up, 72 per cent had no loss of benefit. Thirteen patients had temporary increases in their tinnitus. Two patients had permanent increases. Probe electrical stimulation seems to offer some benefit in about half the patients treated for annoying tinnitus.

Management of acute complicated sinusitis: a five-year review. Mortimore, S., Wormald, P. J. Department of Otolaryngology, Groote Schuur Hospital. *Otolaryngology – Head and Neck Surgery* (1999) November, Vol. 121 (5), pp. 639–42.

Acute sinusitis is a relatively common problem; however, sinusitis associated with a complication is less frequent. Currently there is debate as to whether acute complicated sinusitis should be managed by frontal sinus trephine and sinus washout or by immediate frontoethmoidectomy/functional endoscopic sinus surgery. To assess the effectiveness of frontal sinus trephine in the management of acute complicated frontal sinusitis, we reviewed all patients admitted to Groote Schuur Hospital with acute pansinusitis (includes frontal, maxillary, and ethmoid) from 1989 to 1993. Eighty-seven patients were admitted, of whom 43 were treated medically and 44 were treated surgically. Of the surgical patients 38 had frontal trephines and management of associated complications. Thirty (80 per cent) of the patients who received frontal trephines recovered without further surgery, and eight required further sinus surgery for persistent disease. Frontal trephine with management of associated complications is an acceptable management option for patients with acute complicated pansinusitis. Frontoethmoidectomy or functional endoscopic sinus surgery can be held in reserve for those patients with persistent disease that does not resolve after the initial frontal trephine.

Autofibrin glue compound and its utilization during reconstructive operations on the ear. Shatkovskaya, N. Y., Soushko, Y. A., Veremeyenko, K. N., Kizim, A. I., Borissenko, O. N. Institute Kolomiitchenko, Tympanoplastic Department, Kiev, Ukraine. *Revue de Laryngologie – Otologie – Rhinologie* (1999), Vol. 120 (1), pp. 53–6.

A new autofibrin glue compound (AFGC) is suggested. The experiment has demonstrated that the inclusion of antibiotics and lysozyme does not influence its adhesive qualities or sterilization with gamma radiation. It has been revealed that the dose to sterilise the compound was 75 Gy. AFGC was used during tympanoplasties in 55 patients for fixation of ossiculoplasties, fascia autotransplant and skin of the external auditory meatus. Morphological and functional results of tympanoplasties turned out to be better than those of the control group in which the glue was not used.

Advances and refinements in phonosurgery. Ford, C. N. Division of Otolaryngology – Head and Neck Surgery, University of Wisconsin, Madison 53792, USA. *The Laryngoscope* (1999) December, Vol. 109 (12), pp. 1891–900.

Scientific discovery, technological advances, and improved outcomes assessment have resulted in advances and refinements in phonosurgery. Three areas of substantial evolution are phonomicrosurgery, laryngeal framework surgery, and the use of

implantable materials in vocal folds. Discovery of the importance of the superficial layers of the lamina propria has led to increased use of more limited medial microflap approaches and less frequent use of the classic lateral cordotomy flap approach. Alternative approaches to managing vocal fold scarring defects have addressed the separation of body and cover and provided suitable lamina propria replacement. Approaches to sulcus vocalis have been refined to address type II (linear vergeture) and type III (focal invasive pit) sulcus, where there is loss of lamina propria, while still recognizing the common nonpathological type I (physiological) sulcus. Technological advancements such as photodynamic therapy, tuned dye lasers, and laryngeal microdebridement have augmented the armamentarium for mechanical removal of laryngeal papillomata. Careful infusion assisted microexcision and adjunctive medical management have been refined and made more effective. Laryngeal framework surgery has embraced the development of Silastic, hydroxylapatite, expanded polytetrafluoroethylene and titanium shims. Anatomical studies have helped to improve operative precision and safety, and have led to inventive variations in arytenoid repositioning that improve closure of the posterior subunit. Vocal fold augmentation by injection has been facilitated by innovative use of the rigid telescope and intraoperative videostroboscopy. Anatomical studies have focused on the infrafold region and rheological studies have attempted to match viscoelastic properties of injectable substances to those of vocal fold tissues. Alloplastic materials such as Teflon have been largely supplanted by newer bioimplantables such as fat, collagen, and fascia.

Advantages of a new miniature hearing aid for mild to moderate hearing loss. Goode, R. L., Krusemark, J. Stanford University School of Medicine and Palo Alto VA Healthcare System, California, USA. goode@leland.stanford.edu. *The Laryngoscope* (1999) December, Vol. 109 (12), pp. 1919–23.

OBJECTIVES/HYPOTHESIS: To evaluate the performance of a new, miniature, behind-the-ear hearing aid designed for individuals with mild to moderate high-frequency hearing loss who need an aid but are reluctant to try one. The aid is essentially invisible, leaves the ear canal open, and can be fit in less than 30 minutes without an ear impression. The cost is less than \$500. **STUDY DESIGN:** A four-week trial of the aid in 63 ears (62 subjects) with mild to moderate bilateral hearing loss. **METHODS:** A questionnaire was completed at the end of the study by each subject asking them to evaluate several features of the aid (cosmesis, comfort, understanding speech, amplification, and so forth) and to compare with unaided performance in quiet and in noise with the test hearing aid. A rating scale of 1 to 10 was used, with 10 being excellent and one poor. **RESULTS:** Subjective improvement in understanding speech in both quiet (5.8>7.3) and noise (4.6>5.9) occurred with the aid. Cosmesis, comfort, and appearance were highly rated (mean scores, >8). **CONCLUSIONS:** This aid appears to have several features (comfort, cost, performance, and cosmesis) that make it ideal as a first aid for patients with mild to moderate losses.

Prevention of nausea and vomiting after middle ear surgery: granisetron versus ramosetron. Fujii, Y., Tanaka, H., Kobayashi, N. Department of Anesthesiology, Toride Kyodo General Hospital, Toride City, Ibaraki, Japan. *The Laryngoscope* (1999) December, Vol. 109 (12), pp. 1988–90.

OBJECTIVE/HYPOTHESIS: Middle ear surgery is associated with a relatively high incidence of postoperative nausea and vomiting. This study was undertaken to compare the efficacy of ramosetron with granisetron for preventing nausea and vomiting after middle ear surgery. **STUDY DESIGN:** Prospective, randomized, double-blind study. **METHODS:** In a randomized, double-blind manner, 100 ASA I patients (69 women), aged 23 to 65 years, received either ramosetron 0.3 mg or granisetron 3 mg intravenously (n = 50 of each) immediately before the induction of anesthesia. A standard general anesthetic technique and postoperative analgesia were used. Postoperative nausea and vomiting and safety assessments were performed continuously during the first 24 hours (0–24 h) and the next 24 hours (24–48 h) after anesthesia. **RESULTS:** A complete response, defined as no nausea and vomiting and no need for another rescue medication, during the first 24 hours after anesthesia (0–24 h) occurred in 90 per cent of patients receiving ramosetron and in 86 per cent of patients receiving granisetron, respectively ($p = 0.379$); the corresponding

incidence rates in the second 24 hours after anesthesia (24–48 h) were 90 per cent and 66 per cent ($p = 0.003$). No clinically important adverse events were observed in either group. **CONCLUSION:** Prophylactic use of ramosetron is more effective than granisetron for long-term prevention of nausea and vomiting after middle ear surgery.

Utility of laboratory testing in autoimmune inner ear disease. Hirose, K., Wener, M. H., Duckert, L. G. Department of Otolaryngology, University of Washington, Seattle 98195–6515, USA. *The Laryngoscope* (1999) November, Vol. 109 (11), pp. 1749–54.

OBJECTIVES: To assess the utility of various laboratory tests used to diagnose autoimmune inner ear disease. **STUDY DESIGN:** Retrospective study of 82 patients evaluated at the University of Washington Otolaryngology Clinic from 1996 through 1998 with review of clinical history, laboratory tests, audiograms, response to therapy, and final diagnoses. **METHODS:** Charts were reviewed for presenting history and initial workup including test results for erythrocyte sedimentation rate (ESR), C-reactive protein (CRP), C1q binding assay, anticardiolipin antibody (aCL), antineutrophil cytoplasmic antibody (ANCA), microhemagglutinin assay for *Treponema pallidum* (microhemagglutinin assay), Lyme disease titers, and the Western blot for heat shock protein 70 (hsp 70). **RESULTS:** The Western blot for hsp 70 is the best test for predicting corticosteroid responsiveness. The sensitivity was low at 42 per cent, although the specificity was 90 per cent and the positive predictive value of this test was excellent at 91 per cent. The ESR was as good as the CRP in detecting acute-phase reactants. The other, more specific tests in the laboratory panel (aCL, ANCA, MHA, and Lyme disease titers) did not detect any new cases of autoimmune disease in addition to those which were already identified by an abnormal ESR. **CONCLUSIONS:** A diagnostic test panel for autoimmune inner ear disease should include an ESR and the Western blot for hsp70. More specific laboratory testing for systemic disease is warranted when the ESR is elevated. In patients with a positive Western blot, a trial of corticosteroid therapy can be given with good conviction because the test is quite specific. However, many people who are Western blot negative may also respond to corticosteroid therapy because the test lacks sensitivity.

Outcomes of emergency surgical airway procedures in a hospital-wide setting. Gillespie, M. B., Eisele, D. W. Department of Otolaryngology – Head and Neck Surgery, The Johns Hopkins University School of Medicine, Baltimore, Maryland 21203–6402, USA. *The Laryngoscope* (1999) November, Vol. 109 (11), pp. 1766–9.

OBJECTIVE: To review the circumstances, complications, and outcomes of emergency surgical airway procedures and to compare the relative merits of cricothyroidotomy and tracheotomy for airway control in a hospital-wide patient population. **STUDY DESIGN:** Retrospective review. **METHODS:** Patient data were obtained from the inpatient charts and electronic patient records of 35 patients who required an emergency surgical airway over a six-year period at an urban medical center. **RESULTS:** Emergency cricothyroidotomy and tracheotomy were successfully performed in 34 of 35 patients (97 per cent). Orotracheal intubation was successfully achieved in one patient with a failed cricothyroidotomy. The overall complication rates for emergency cricothyroidotomy and tracheotomy were similar (20 per cent and 21 per cent, respectively). Inpatients requiring an emergency surgical airway had a higher complication rate (32 per cent vs. 0 per cent) but better overall survival (91 per cent vs. 46 per cent) than patients treated in the emergency department. No long-term complications were observed from emergency cricothyroidotomies that were not converted to tracheotomies. **CONCLUSION:** The establishment of an emergency surgical airway by either tracheotomy or cricothyroidotomy is effective with low overall morbidity. The need to convert every emergency cricothyroidotomy to a tracheotomy should be reevaluated.

Laryngomalacia and its treatment. Olney, D. R., Greinwald, J. H. Jr., Smith, R. J., Bauman, N. M. Department of Otolaryngology – Head and Neck Surgery, University of Iowa College of Medicine, Iowa City 52242, USA. *The Laryngoscope* (1999) November, Vol. 109 (11), pp. 1770–5.

OBJECTIVE: To determine 1) airway outcome of infants with

laryngomalacia who do not undergo routine direct laryngoscopy (DL) and bronchoscopy (B), 2) the age at resolution of laryngomalacia, and, 3) outcome of supraglottoplasty as a function of the type of laryngomalacia and the presence of concomitant disease. **STUDY DESIGN:** Retrospective chart review. **METHODS:** The records of all infants diagnosed with laryngomalacia by flexible fiberoptic laryngoscopy (FFL) between 1990 and 1998 in the Department of Otolaryngology – Head and Neck Surgery, University of Iowa (Iowa City, IA) were reviewed. The type of laryngomalacia was designated by a new classification scheme (types one to three) based on the site of supraglottic obstruction and the type of supraglottoplasty indicated, should the patient later require surgical intervention. The log rank test was used to compare age at resolution and outcome between types of laryngomalacia and between infants with isolated laryngomalacia versus those with additional congenital abnormalities and/or severe neurological compromise. **RESULTS:** The type of laryngomalacia was evident in 48 of the 58 charts reviewed and included type 1 (57 per cent), type 2 (15 per cent), type 3 (13 per cent), or combined types (15 per cent). Twenty per cent had severe neurological compromise and/or multiple congenital anomalies. The median time to resolution of stridor in these patients was not significantly delayed when compared with infants who had isolated airway anomalies (36 and 72 week, respectively, vs. 36 wk for isolated laryngomalacia; $p < 0.4$). Time to resolution did not correlate with the type of laryngomalacia. In 22 infants, clinical symptoms or findings suggested a synchronous airway lesion, and direct laryngoscopy and bronchoscopy were performed. In 11 infants, a second airway lesion was diagnosed (in four cases by FFL and in seven cases by direct laryngoscopy and bronchoscopy). Complications did not arise in infants who did not undergo direct laryngoscopy and bronchoscopy. Eleven infants with severe laryngomalacia required surgical intervention. The success of supraglottoplasty did not correlate with the type of laryngomalacia or the presence of other congenital anomalies. **CONCLUSIONS:** Routine direct laryngoscopy and bronchoscopy as part of the evaluation of laryngomalacia are not warranted. Performing these procedures should be based on clinical and physical evidence of a concomitant airway lesion. In general, laryngomalacia will resolve within the first year of life, even in children with multiple congenital anomalies and/or severe neurological compromise. The proposed classification scheme is advantageous in that it is simple and correlates the site of obstruction with the surgical procedure most likely to effect a cure, should the patient require a supraglottoplasty. Surgical management is necessary in approximately 15 to 20 per cent of affected infants.

Meniere's disease: the incidence of hydrops in the contralateral asymptomatic ear. Conlon, B. J., Gibson, W. P. Department of Surgery/Otolaryngology, The University of Sydney, Australia. *The Laryngoscope* (1999) November, Vol. 109 (11), pp. 1800–2.

OBJECTIVE: This study analyzes the incidence of endolymphatic hydrops in the asymptomatic contralateral ear of patients with classic Meniere's disease. **STUDY DESIGN:** A retrospective study of 3000 subjects who underwent electrocochleography (ECOG) from 1988 to 1998. **METHODS:** The presence of endolymphatic hydrops was determined by use of ECOG recordings, which were made through a transtympanic recording needle situated in the round window niche. Analysis was made of the 1 kHz toneburst summation potential (SP), and comparison was made between asymptomatic contralateral 'Meniere's ears' ($n = 144$) and asymptomatic normal 'control ears' ($n = 114$). **RESULTS:** Results demonstrated that more than 10 per cent of the contralateral asymptomatic Meniere's ears have an ECOG recording that is highly suggestive of the presence of endolymphatic hydrops. In contrast, less than two per cent of the control population demonstrate abnormal ECOG recordings. Furthermore, 15 per cent of the population of contralateral Meniere's ears lie above the 95th percentile of the control population for 1 kHz tone-burst (100 dB) SP negatively. **CONCLUSIONS:** This study suggests that a high percentage of patients who have what appears to be unilateral Meniere's disease have evidence of endolymphatic hydrops in the contralateral asymptomatic ear. This finding has important clinical relevance for the management of patients in whom destructive surgery is planned and further highlights the importance of electrocochleography in the diagnosis and management of this disease process.

Nasal obstruction: an alternative to ostiomeatal complex dysfunction in sinus disease. Ganjian, E., Gannon, P. J., Fliegelman, L. J., Lawson, W. Department of Otolaryngology – Head and Neck Surgery, Mount Sinai School of Medicine, New York, New York 10029-6574, USA. *The Laryngoscope* (1999) November, Vol. 109 (11), pp. 1848–51.

OBJECTIVES: Ostial patency is thought to be essential to the function of the maxillary sinus. Ostiomeatal complex dysfunction has been implicated as a major factor in the pathogenesis of sinus disease. However, recent work in our laboratory has indicated that other factors may also contribute to this process. The objective of this study was to determine the effect of nasal obstruction in maxillary sinus gas composition, independent of its effect on ostial ventilation. **STUDY DESIGN:** Prospective controlled animal study. **METHOD:** Independent models of nasal obstruction and ostial occlusion in contralateral sinuses were established. Ipsilateral models of nasal obstruction and ostial occlusion were also created. Gas samples from each of the manipulated sinuses were analyzed on a gas chromatogram and compared. **RESULTS:** Results revealed a dramatic and highly significant increase in antral carbon dioxide (CO₂) concentrations in the sinuses ipsilateral to either an occluded ostium or an obstructed nostril, compared with the controls. These effects on CO₂ concentrations were additive when ipsilateral nasal obstruction and ostial occlusion were created. Furthermore, the effect of nasal obstruction in modulation of antral CO₂ levels was found to be beyond its effect on hypoventilation of the sinus and to be independent of ostial functional status. **CONCLUSIONS:** We have established independent models of nasal obstruction and ostial occlusion in the same animal. Our findings suggest that ostiomeatal complex dysfunction might not be the sole underlying factor in the pathogenesis of sinus disease in all individuals. Integrity of nasal airflow seems to have a significant effect on the maintenance of the aerobic antral environment, essential to the maintenance of normal sinus function. Modulation of maxillary sinus gas composition by nasal airflow, independent of ostial patency, may be explained by the possible presence of flow-sensitive receptors in the upper respiratory tract mucosa. Work to identify such receptors is currently in progress.

Videostrobokymography: a new method for the quantitative analysis of vocal fold vibration. Sung, M. W., Kim, K. H., Koh, T. Y., Kwon, T. Y., Mo, J. H., Choi, S. H., Lee, J. S., Park, K. S., Kim, E. J., Sung, M. Y. Department of Otorhinolaryngology, Seoul National University College of Medicine, Chongno-gu, Korea. *The Laryngoscope* (1999) November, Vol. 109 (11), pp. 1859–63.

OBJECTIVES: To develop a new analysis method for the quantitative assessment of vibration of the vocal folds, using conventional videostroboscopic image data. **METHODS:** We used prerecorded videostroboscopic images to evaluate quantitatively the vibration of the vocal folds. Successive images were converted as digital images by means of an image-grabbing board, processed for analysis, and reconstructed as kymograms by rearranging the same lines of all processed images along the time axis. **RESULTS:** We developed a new technique for evaluating the vibration of the vocal folds. The vibrations of multiple vocal fold regions were easily and objectively evaluated by this technique. The objective parameters, such as open quotient and asymmetry index, could be obtained easily using this technique. **CONCLUSIONS:** Videostrobokymography demonstrated objectively the vibrations of several vocal fold regions at the same time. This technique has the potential to be a new tool to analyze and monitor the pathological changes and treatment results of vocal fold movement in a more refined quantitative fashion, using videostroboscopic images.

A method for quantitative assessment of vestibular otopathology. Merchant, S. N. Department of Otolaryngology and Otopathology Laboratory, Massachusetts Eye and Ear Infirmary, Boston 02114, USA. *The Laryngoscope* (1999) October, Vol. 109 (10), pp. 1560–9.

BACKGROUND: Quantitative studies of the vestibular system using serial sections from human temporal bones have been limited because it has been generally difficult to reliably differentiate hair cells from supporting cells and type I from type II hair cells. **OBJECTIVES:** 1. To develop a new method to overcome the above limitations and permit quantitative assessments of types I and II vestibular hair cells in archival temporal

bone sections. 2. To demonstrate that this method is reliable, valid, and repeatable. 3. To describe the advantages of this method compared with other traditional techniques. 4. To discuss the potential of this method to provide new insight into the etiology, pathology, and pathophysiology of vestibular disorders. **STUDY DESIGN:** Examination of archival human temporal sections prepared for conventional light microscopy. **METHODS:** The method used Nomarski (differential interference contrast) microscopy to permit visualization of the cuticular plate and stereociliary bundle, to allow unambiguous identification of hair cells. Types I and II hair cells were distinguished by their morphological characteristics. The method was used to measure the density of types I and II hair cells in each vestibular sense organ. Raw-density counts were corrected for potential double counting using Abercrombie's formula. **RESULTS:** Intrarater and interrater reliability was strong as judged by high Pearson and Spearman correlation values ($p < 0.01$). Abercrombie's formula was shown to be valid by comparison with counts made by an unbiased calibration technique using the optical disector principle (correlation coefficients > 0.9 , $p < 0.01$). **CONCLUSIONS:** The method described in this report has several advantages when compared with alternative techniques such as surface preparations. The method is applicable to archival bones, permits simultaneous evaluation of the rest of the labyrinth, is relatively inexpensive, and does not preclude other techniques of study (e.g. polymerase chain reaction and immunostaining). Case studies of temporal bones with aminoglycoside ototoxicity and Meniere's disease are used to show how this method has the potential to provide new insight into the pathology and pathophysiology of vestibular disorders.

Laryngeal contact granuloma. Wani, M. K., Woodson, G. E. Department of Otolaryngology, University of Tennessee, Memphis, School of Medicine, 38163, USA. *The Laryngoscope* (1999) October, Vol. 109 (10), pp. 1589–93

OBJECTIVE: To report outcomes of treatment for laryngeal contact granuloma. **STUDY DESIGN:** Prospective treatment of 21 patients with laryngeal contact granulomas using proton-pump inhibitor (PPI) medication. **METHODS:** Patients were diagnosed and followed by office endoscopy and patient interview. **RESULTS:** Three patients did not tolerate PPI medication and were managed by treatment with type 2 histamine (H₂) blockers. The lesion completely resolved in 14 of the 18 patients maintained on PPI medication, and significantly regressed in the other four. Residual granulomas were surgically excised in one patient. Lesions resolved in two patients following injection of botulinum toxin into one thyroarytenoid muscle. One patient had a residual lesion, but symptoms were controlled by medication, and he declined treatment with botulinum toxin. Of the three patients treated with H₂-blocker medication, the lesion resolved in only one. **CONCLUSION:** PPI medication is effective in the treatment of laryngeal contact granuloma, even in the absence of identifiable symptoms of gastroesophageal reflux.

Ossiculoplasty in young children with the Applebaum incudostapedial joint prosthesis. Schwetschenau, E. L., Isaacson, G. Department of Otolaryngology, Temple University, Philadelphia, Pennsylvania, USA. *The Laryngoscope* (1999) October, Vol. 109 (10), pp. 1621–5.

OBJECTIVE: To evaluate the performance of the Applebaum incudostapedial joint prosthesis in young children in terms of hearing results and long-term stability despite continuing eustachian tube dysfunction and otitis media. **STUDY DESIGN:** Retrospective review of all Applebaum prostheses placed in children at our institution from June 1993 to June 1998. **RESULTS:** In 1993 Applebaum proposed the use of a hydroxylapatite ossicular prosthesis as an alternative to incus interposition for the repair of incudostapedial discontinuity. We have used this prosthesis exclusively for the repair of such defects in children over the past five years. Among 12 operated ears, all healed, all prostheses remain in place (average duration, 2.6 years), and all children have excellent hearing (mean air-bone gap, 15 dB; range, five–25 dB). **CONCLUSIONS:** The Applebaum incudostapedial joint prosthesis restores conductive hearing even in young children. It has been stable in the face of recurrent otitis media and has not interfered with revision surgery. Placement of the prosthesis at primary cholesteatoma surgery should be considered in children.

Histopathological changes of the eustachian tube cartilage and the tensor veli palatini muscle with aging. Takasaki, K., Sando, I., Balaban, C. D., Haginomori, S., Ishijima, K., Kitagawa, M. Elizabeth McCullough Knowles Otopathology Laboratory, Department of Otolaryngology, University of Pittsburgh School of Medicine, Pennsylvania, USA. *The Laryngoscope* (1999) October, Vol. 109 (10), pp. 1679–83.

OBJECTIVES: The eustachian tube (ET) and the tensor veli palatini muscle (TVPM) are thought to play an important role in ventilatory function. Calcification of the ET cartilage and the replacement of TVPM by fat tissue are often observed histologically in elderly patients. To our knowledge, however, there are no quantitative studies of these pathological findings in relation to age. **STUDY DESIGN:** The calcification of the ET cartilage and the atrophy of the TVPM in 36 normal human temporal bones obtained from 36 individuals with ages ranging from two days to 88 years were investigated. **METHODS:** The number of calcified

chondrocytes in the midportion of the ET cartilage was quantified as the average number of cells per square millimeter. Atrophy of the TVPM was evaluated at the midportion of the site where the TVPM is attached to the tip of lateral lamina of ET cartilage. A grade of 0, one, two, three, or four was assessed for each section, which indicated approximately 0 per cent to five per cent, five to 30 per cent, 30 per cent to 70 per cent, 70 per cent to 95 per cent, or 95 per cent to 100 per cent of the TVPM replacement by fat tissue, respectively. **RESULTS:** A statistically significant correlation was found between the number of the calcified cells and aging ($p < 0.001$). A statistically significant correlation was also found between the degree of the atrophy of TVPM and aging ($p < 0.001$). **CONCLUSIONS:** The calcification of the ET cartilage and the atrophy of the TVPM are closely associated with aging. Therefore, it is suggested that these two findings may be a predisposing factor for ET dysfunction in elderly adults.