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Abstract Selection

Modiolar proximity of three perimodiolar cochlear implant electrodes. Balkany, T. J., Eshraghi, A. A., Yang, N. University of Miami Ear Institute, Florida 33136, USA. tbalkany@miami.edu *Acta Oto Laryngologica* (2002) June, Vol. 122 (4), pp. 363–9.

A new generation of cochlear implant electrodes has been designed to position the stimulating contacts close to the modiolus in order to reduce power consumption and increase stimulation selectivity. The purpose of this study was to assess electrode position in the cochlea for three recently designed electrodes. Fifteen cadaveric temporal bones were implanted with one of three perimodiolar electrode arrays: Nucleus Contour; Med-El Combi40+ PM (developmental version); and Clarion HiFocus II. Image-enhanced videofluoroscopy and computer morphometrics were used to assess stimulating contact position relative to the modiolus. The mean distance (± one standard deviation) to the modiolus for all electrode contacts was 0.33 (± 0.24), 0.30 (±0.27) and 0.16 mm (±0.19) for the Contour, Combi40+ PM and HiFocus II arrays, respectively. In addition, dynamic videofluoroscopy was used to correlate device-specific insertion characteristics with contact-to-modiolus distance. All three devices were successful in terms of locating electrode contacts very close to the modiolar wall.

Usefulness of virtual endoscopic three-dimensional reconstructions of the middle ear. Morra, A., Tirelli, G., Rimondini, A., Cioffi, V., Russolo, M., Giacomarra, V., Pozzi, M. R. Operative Clinical Unit of Radiology, Cattinara Hospital, Trieste, Italy. arrom@libero.it. *Acta Oto-Laryngologica* (2002) June, Vol. 122 (4), pp. 382–5.

This work uses a new programme for producing 3D radiological images acquired by means of CT which enables the internal surfaces of the examined structures to be visualized. This new method, which is able to navigate inside organs in a similar way to fibreoptic endoscopy, is known as virtual endoscopy. CT examinations of the temporal bone were carried out using spiral equipment and endoscopic 3D processing was carried out on a separate workstation equipped with a volume-rendering programme. Once the technical parameters necessary for obtaining a representation of the internal surfaces had been defined, a simulation of a virtual otoscopy was conducted by moving the virtual endoscope from the external auditory canal through the annulus to the tympanic cavity. The simulation can be obtained either by moving the endoscope by hand, using the mouse, or by defining a path along which the software automatically creates an endoscopic 3D reconstruction. The images thus obtained are projected sequentially to give a 'movie' effect, i.e. a continuous progression of the endoscope. The average time required to conduct the procedure ranges from 20 to 30 min. A virtual endoscopic visualization of the middle ear was obtained which, in particular, generated images of the tympanic cavity with the ossicular chain. In our experience, virtual otoscopy shows the anatomy of the structures of the tympanic cavity in excellent detail and may be considered complementary to CT, providing useful images enabling better visual representation and understanding of this complex structure. Although clinical applications of the technique remain to be defined it may have a role to play in presurgical diagnostic evaluation of the ossicular chain, epitympanum and retrotympanum.

Altered cupular mechanics: a cause of peripheral vestibular disorders? Helling, K., Watanabe, N., Jijiwa, H., Mizuno, Y., Watanabe, S., Scherer, H. Department of Otorhinolaryngology, Benjamin Franklin Medical Center, Free University of Berlin, Germany. kai.helling@medizin.fu-berlin.de. *Acta Oto-Laryngologica* (2002) June, Vol. 122 (4), pp. 386–9.

It has taken many decades to arrive at today's concept of cupula mechanics in the stimulation of endolymphatic flows on the hair cells in the ampullae of the semicircular canal. While Steinhausen assumed free swing-door movement of the cupula in the 1930s, Hillman was the first to demonstrate firm cupula attachment to the ampulla wall as a physiological necessity in the 1970s. In contrast to the present clinical concepts of acute peripheral vestibular functional disorders (circulatory disturbances, viral or bacterial infection, altered electrolytes in the endolymph), this study examines the extent to which an impaired attachment mechanism can trigger peripheral vestibular disorders. For this purpose, we used a pigeon model (n = 8), in which mechanical detachment of the cupula from the ampulla wall was achieved by means of a targeted pressure increase in the ampulla of the lateral semicircular canal. In two additional animals the labyrinth was completely destroyed on one side in order to directly compare partial and complete vestibular disorders. In this way partial damage to the lateral semicircular canal ampulla presents a clinical picture whose symptoms are very similar to those of an idiopathic vestibular disorder in humans. Their intensity and course of compensation differ markedly from the symptoms of complete vestibular destruction. Subsequent histological examination revealed that the hair cells remained intact during the experimental detachment of the cupula. Our results thus show that only altered cupula mechanics seem to trigger the clinical picture of a peripheral vestibular disorder. This may result in completely new approaches to differential diagnosis and the therapy of vestibular neuronitis.

Direction of lateral traction in Ejnell's technique: an experimental study and case report of bilateral vocal cord paralysis. Tamura, E., Kitahara, S., Ogura, M., Hiroi, S. Department of Otorhinolaryngology, National Defense Medical College, Tokorozawa City, Saitama, Japan. otamura@me.ndmc.ac.jp. *Acta Oto-Laryngologica* (2002) June, Vol. 122 (4), pp. 420–3.

In order to develop the method of laterofixation of the vocal cord (Ejnell's method) in cases of bilateral vocal cord paralysis, six autopsy specimens of normal larynx were obtained. We inserted traction sutures under conditions of direct visualization and studied the relationship between the direction of the traction exerted by the suture and subsequent enlargement of the glottis. When the vocal cord was pulled perpendicular to the thyroid cartilage wing, the mean glottal area was 106.2 per cent of its area before traction. When the vocal cord was pulled perpendicular to the median line of the glottis, the mean glottal area was 112.7 per cent of its area before traction. The latter angle of traction therefore produced more efficient enlargement of the glottis (p 0.05; paired t-test). Based on an anatomic study of cadaveric laryngeal regions, a formula was developed to predict at which point the needle should be placed in order to produce optimal results using Ejnell's technique. Further clinical studies will be carried out in patients to test the validity of this formula.

Direct application of keratinocyte growth factor, basic fibroblast growth factor and transforming growth factor-alpha during healing of tympanic membrane perforation in glucocorticoid-treated rats. Ishimoto, S. I., Ishibashi, T., Bottaro, D. P., Kaga, K. Department of Otolaryngology, University of Tokyo, Japan. *Acta Oto-Laryngologica* (2002) July, Vol. 122 (5), pp. 468–73.

Peptide growth factors and cytokines modulate both normal and impaired wound healing. Topical application of growth factors in the form of ear drops may counteract impairment of wound healing in the tympanic membrane (TM). We applied keratinocyte growth factor (KGF), transforming growth factor (TGF)-alpha or basic fibroblast growth factor (bFGF) to the perforated TMs of rats in which healing impairment had been caused by systemic administration of a glucocorticoid. Histologic studies of the injured TM, including anti-5-bromo-2′-deoxyuridine immunohistochemistry, were performed on the third day after wounding. In the control ear, epidermal migration was markedly inhibited by glucocorticoid treatment and no hyperplasia was observed in any layer at the perforation edge. TMs treated with KGF showed marked hyperplasia in the epithelial layer at the perforation edge.

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In the bFGF- and TGF-alpha-treated groups, hyperplasia was observed in the epithelial and intermediate layers of the TM near the malleus handle and annulus, while no hyperplasia was seen in any layer at the perforation edge. Only KGF, therefore, improved epidermal migration in the TM, while all the growth factors tested induced hyperplasia in the TM.

Correlations between virtual endoscopy and otoendoscopy of the retrotympanum. Berrettini, S., Neri, E., Ravecca, F., Forli, F., Panconi, M., Franceschini, S. S., Bartolozzi, C. Department of Neuroscience, University of Pisa, Italy, s.berrettini@ent.med.unipi.it. *Acta Oto-Laryngologica* (2002) July, Vol. 122 (5), pp. 474–8.
The aim of this study wsa to examine the anatomical landmarks of the retrotympanum using two different techniques, virtual endoscopy (VE) and fiberoptic endoscopy, and to correlate the results furnished by the two methods. Ten otosclerotic patients who were due to undergo stapedectomy were scanned using high-resolution spiral CT. Selected CT datasets were processed with Navigator 2.0 software to obtain virtual endoscopic views of the retrotympanum. Subsequently, during the surgical procedure, fiberoptic endoscopy was performed with 2.7 mm 0° and 30° rigid endoscopes. The ability of the two imaging methods to identify specific anatomical structures was then compared. In all cases the pyramidal eminence, pyramidal crest and sinus tympani were clearly identified in both VE images and otoendoscopy recordings, while fiberoptic endoscopy seemed to be less satisfactory than VE for studying the facial sinus, sinus of Proctor and fossula of Grivot. The two techniques proved to be equally sensitive for visualizing the ponticulus and subiculum, while the stapedius tendon could be visualized only by means of fiberoptic endoscopy. Overall, VE imaging appears promising for rendering important anatomical details of the retrotympanum, allowing identification of osseous landmarks and exploring recesses that are difficult to visualize via otoendoscopy.

Early structural tympanic membranes reactions to myringotomy: a study in an acute otitis media model. Spratley, J., Hellstroem, S., Eriksson, P. O., Pais, C. M. j.spratley@mail.telepac.pt. *Acta Oto-Laryngologica* (2002) July, Vol. 122 (5), pp. 479–87.
Myringotomy (Myr) is one of the most frequently performed surgical procedures in children. However, events occurring in the early phases, i.e. a matter of hours, following Myr in the acute otitis media (AOM) model have not been described. The aim of the present study was to evaluate the early otomicroscopic and histopathologic reactions of the tympanic membrane (TM) after Myr during the course of AOM (AOM-Myr). The left tympanic bulla from 36 healthy Sprague-Dawley rats was inoculated with Streptococcus pneumoniae type 3. Forty-eight h later, at Day 0, 4 randomized animals were immediately sacrificed and the remaining animals were treated with bilateral Myr. Otomicroscopy and sacrifices were performed in series of four animals at three, six, nine, 12, 24 and 48 h, and four and seven days. The AOM-Myr TMs were compared to non-infected Myr TMs (non-AOM-Myr). The TMs were then dissected free and routinely processed for light and electron microscopy. AOM developed in all inoculated ears at Day 0. In the pars tensa of the AOM-Myr TMs the reaction of the keratinocyte layer of the perforation border was already evident at 6 h. The lamina propria exhibited a strong inflammatory reaction, which became more organized from 12 h onwards. At Day 4 the perforations were closed in three-quarters of cases. At Day 7 all perforations were healed with a distorted scar. In the non-AOM Myr TMs a strong degranulation of mast cells and edema were found in the pars flaccida at six h. A keratin spur at the perforation border was not seen until 24 h. All perforations were patent on Day 7 and myringosclerotic deposits were abundant in these TMs. The infected TMs regenerated faster and closed their perforations at an earlier stage. These findings favour the hypothesis that there is a low risk of chronic perforations when myringotomizing AOM TMs.

Z-pharyngoplasty for sleep disorder and rhonchopathy. Mukai, S., Nitta, M. s.mukai@da2.so-net.ne.jp. *Acta Oto-Laryngologica* (2002) July, Vol. 122 (5), pp. 524–30.
We developed an operation that leaves the uvula intact and opens the pharynx by creating a Z-shaped incision of the palate, a procedure known as a Z-pharyngoplasty (ZPP). Twenty-four patients were studied before and after ZPPs. None of the patients complained of symptoms after the procedure. In terms of subjective changes, 79 per cent of patients felt that they could breathe better after ZPPs and 75 per cent felt that they had slept well upon waking. In terms of differences noted by sleep monitoring, the minimum oxygen saturation (SaO2) level increased significantly ($p = 0.0025$), the number of hours of sleep during which SaO2 was >95 per cent increased significantly ($p = 0.0345$), the apnea index decreased significantly ($p = 0.0316$), snoring decreased ($p = 0.0637$) and pulse rate decreased significantly ($p = 0.0144$) after ZPP.

Anatomy of the tonsillar bed: topographical relationship between the palatine tonsil and the lingual branch of the glossopharyngeal nerve. Ohtsuka, K., Tomita, H., Murakami, G. Department of Otorhinolaryngology–Head and Neck Surgery, Nihon University School of Medicine, Tokyo, Japan. *Acta Oto-Laryngologica* Supplement (2002) (546), pp. 99–109.
Taste disturbance may result from injury to the lingual branch of the glossopharyngeal nerve (LBGN) during tonsillectomy. Because an understanding of the anatomy of this nerve is required in order to avoid injuring it, a gross, histologic anatomic study was undertaken of the topographical relationship between the LBGN and the muscle layer of the palatine tonsillar bed. Evaluation of 107 sides of 83 Japanese adult cadavers (aged 27–88 years) confirmed that the muscular composition and lamination of the tonsillar bed do not change with age or pathological conditions such as inflammation. In about a quarter (23.4 per cent) of cases, the LBGN travelled inferior to the styloglossus muscle and lateral to the superior constrictor pharyngeal muscle over its whole course to the base of the tongue, so that the palatine tonsil was clearly separated from the LBGN. In 55.1 per cent of cases, however, the muscle lining of the tonsillar bed was discontinuous and thin muscle bundles, derived from the stylopharyngeus, palatopharyngeus or superior constrictor pharyngeal muscle, partially covered the tonsillar capsule externally. Moreover, in 21.5 per cent of cases the LBGN was firmly adherent to the tonsillar capsule, due to the complete absence of muscles lining the tonsillar bed. In these cases, and also probably in a similar percentage of patients undergoing tonsillectomy, taste disturbance may occur on removal of the hypertrophic tonsillar capsule. Therefore, minimal disturbance of the tonsillar bed is recommended in all cases of tonsillectomy.

Cochlear function in ears with immunomediated inner ear disorder. Quaranta, A., Scaringi, A., Sallustio, V., Quaranta, N. Department of Ophthalmology and Otorhinolaryngology, ENT Clinic, University of Bari, Italy. otorino1@orl.uniba.it. *Acta Oto-Laryngologica* Supplementum (2002) (548), pp. 15–9.
The aim of the present study was to evaluate the performance of ears with inner ear disorder, responsive to immunosuppressive drugs, in advanced tests designed to assess primary cochlear functions (temporal integration, frequency selectivity, cochlear mechanics). The results of this study suggest that immunomediated inner ear disease results, in the acute clinical stage, in the development of endolymphatic hydrops, which increases the stiffness of the vibrating structures within the inner ear and causes dysfunctions of the outer hair cells. Our patients presented with upsloping or flat sensorineural hearing loss, absence of evoked otoacoustic emissions and distortion-product otoacoustic evoked emissions and abnormal temporal integration, frequency selectivity and cochlear mechanics. Following immunosuppressive treatment, hydrops recovered, hearing subsequently returned to normal, the audiometric curve became flat at low-to-middle frequencies and primary cochlear function tended to normalize. This study seems to support the usefulness of testing primary cochlear functions in order to monitor the clinical course of immunomediated inner ear disorders.

Myringoplasty: does the size of the perforation matter? Lee, P., Kelly, G., Mills, R. P. The Department of Otolaryngology, The Royal Infirmary of Edinburgh, Edinburgh, UK. *Clinical Otolaryngology and Allied Sciences* (2002) October, Vol. 27 (5), pp. 331–4.
Does the size of a tympanic membrane defect influence the success rate in myringoplasty? Many studies which have suggested that size does not affect results have included only small numbers of patients. After a power analysis to identify the size of groups needed to detect a clinically significant difference between the success rate of small and large perforations, a retrospective study

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was carried out to answer the question. A retrospective study of 423 myringoplasty-only operations showed that size does influence success; the success rate for small perforations was 74.1 per cent compared with 56 per cent for large perforations ($p = 0.0003$). Size also influences the change in four-frequency air conduction thresholds (small perforations +7.2 dB, large perforations +10.2 dB; $t = 2.08$, $p = 0.039$) in successful myringoplasties, a positive value indicating an improvement in hearing. This change is unlikely to be clinically significant. Patients should be made aware of these facts when informed consent is being obtained.

Long-term ventilation tubes: results of 726 insertions. Van Heerbeek, N., De Saar, G. M. A. C., Mulder, J. J. S. Department of Otorhinolaryngology, University Medical Center Nijmegen, The Netherlands, N.vanHeerbeek@kno.azn.nl. *Clinical Otolaryngology and Allied Sciences* (2002) October, Vol. 27 (5), pp. 378–83.
Patients with chronic or recurrent otitis media with effusion who do not respond to treatment with conventional ventilation tubes are often treated with long-term ventilation tubes. The aim of this retrospective study was to determine the extrusion and complication rates of long-term ventilation tubes. The median ventilation time of the tubes was 31.5 months. The most common complication was otorrhoea. One episode of otorrhoea occurred after 24 per cent of all tube insertions, and recurrent otorrhoea occurred in 29 per cent. A persisting perforation developed in 19 per cent after extrusion or removal of the tube. Other, mostly minor, complications occurred in 36 per cent with the tube in situ and in three per cent after extrusion or removal of the tube. Long-term ventilation tubes provided prolonged ventilation of the middle ear, but also resulted in a considerable number of complications. For each individual case, one should therefore determine whether the advantages of long-term ventilation tubes outweigh the possible complications in view of the available alternatives for middle ear ventilation.

Function of the great auricular nerve following surgery for benign parotid disorders. Biglioli, F., D'Orto, O., Bozzetti, A., Brusati, R. Department of Maxillo-facial Surgery, University of Milan, San Paolo University Hospital, Milan, Italy. federico@biglioli.com. *Journal of Cranio-Maxillo-Facial Surgery* (2002) October, Vol. 30 (5), pp. 308–17.
The main concern in benign parotid surgery is complete removal of the lesion whilst avoiding any harm to the facial nerve. Some time ago, surgeons also began to spare other structures including the great auricular nerve. The purpose of this paper was to study these procedures prospectively and to evaluate the sensory recovery of this nerve. MATERIAL: Fourteen patients undergoing parotid surgery with preservation of the great auricular nerve (group A) have been studied and compared with 10 patients whose operatoins involved sacrificing the nerve (group B). METHODS: The function of the great auricular nerve has been tested (qualitatively and quantitatively) before the operation, and postoperatively during the first few days and at three, six, nine and 12 months. RESULTS: Twelve months postoperatively, no area of anaesthesia was found in group A, whilst all patients in group B had some degree of sensory loss. In group A, the qualitative and quantitative tests documented complete recovery of various types of surface sensitivity in 80 per cent of cases, with the remaining 20 per cent showing only a moderate reduction in comparison with the unoperated side. CONCLUSION: From this study, it seems reasonable to spare the great auricular nerve during parotid surgery for benign disease because the procedure takes very little time, but guarantees a major improvement of postoperative sensitivity of the region innervated by the great auricular nerve.

Meta-analysis of surgical treatments for temporomandibular articular disorders. Reston, J. T., Turkelson, C. M. Department of Health Technology Assessment, ECRI, Plymouth Meeting, PA 19462-1298, USA. *Journal of Oral and Maxillofacial Surgery* (2003) January, Vol. 61 (1), pp. 3–10.
PURPOSE: Temporomandibular joint articular disorders may cause severe pain and dysfunction. We addressed the following questions. Can any surgical procedures effectively treat these disorders? If so, which procedures are most effective? MATERIALS AND METHODS: We performed meta-analysis of surgical trial results to determine whether certain surgical procedures are effective in specific patient groups. To compensate for the lack of parallel control groups in published studies and for the improvement that has been observed in untreated patients, we used historical data from non-surgical trials to derive three estimates of historical control group improvement (0 per cent, 37.5 per cent and 75 per cent). To our knowledge, this is the first meta-analytic evaluation of surgical treatments for temporomandibular joint disorders. RESULTS: Among patients refractory to nonsurgical therapies, surgical arthrocentesis and arthroscopy were effective for patients with disc displacement without reduction at all assumed control group improvement rates. Disc repair/repositioning had a statistically significant effect at all but the highest improvement rate. In patients with disc displacement with reduction, arthroscopy and disc repair/repositioning had statistically significant effects at all but the highest assumed rate of control group improvement. There were no statistically significant differences between the effects of any treatments. CONCLUSIONS: Surgical treatments appear to provide some benefit to patients refractory to nonsurgical therapies. The most reliable evidence supports the effectiveness of arthrocentesis and arthroscopy for patients with disc displacement without reduction. Better designed trials are needed before one can accurately determine the magnitude of the benefits of surgery.

Possible involvement of keratinocyte growth factor and its receptor in enhanced epithelial-cell proliferation and acquired recurrence of middle-ear cholesteatoma. Yamamoto, F. T., Aoki, D., Hishikawa, Y., Kobayashi, T., Takahashi, H., Koji, T. Division of Otorhinolaryngology, Department of Translational Medical Science, Nagasaki University Graduate School of Biomedical Sciences, Nagasaki, Japan. *Laboratory Investigation* (2003) January, Vol. 83 (1), pp. 123–36.
Middle-ear cholesteatoma is characterized by enhanced proliferation of epithelial cells and granular tissue formation. However, the molecular mechanism underlying these pathological changes is largely unknown. Keratinocyte growth factor (KGF) is a mesenchymal cell-derived paracrine growth factor that specifically stimulates epithelial cell proliferation. In the present study, we investigated the possible involvement of KGF and its receptor, KGFR, in the pathogenesis of cholesteatoma using in situ hybridization and immunohistochemistry, respectively. We examined 56 cholesteatoma specimens, and eight normal skin areas as control. KGF and KGFR expression was examined by immunohistochemistry using rabbit anti-human KGF and anti-human KGFR polyclonal antisera raised in our laboratories against synthetic peptides corresponding to parts of human KGF and KGFR, respectively. KGF protein and mRNA were detected exclusively in stromal fibroblasts and infiltrating T lymphocytes in 80 per cent of cholesteatoma cases, whereas KGFR protein and mRNA were localized in the epithelium in 72 per cent of cases. Assessment of the proliferative activity of cholesteatoma using the labelling index for Ki-67 showed a significantly higher Ki-67 labelling index (66 per cent) in KGF+/KGFR+ cases than other cases. There was a significant correlation between KGF+/KGFR+ expression and recurrence. Our results indicate the possible involvement of both KGF and KGFR in enhanced epithelial cell proliferative activity and recurrence of cholesteatoma.

Fluctuating sensorineural hearing loss in children. Brookhouser, P. E. Boys Town National Research Hospital, 555 North 30th Street, Omaha, NE 68131, USA. peb@boystown.org. *Otolaryngologic Clinics of North America* (2002) August, Vol. 35 (4), pp. 909–23.
Childhood sensorineural hearing loss (SNHL) that fluctuates or is progressive enhances parental concern and complicates medical management, hearing aid selection, and individualized educational planning for the affected child. Despite intensive multidisciplinary evaluation and intervention, continued threshold fluctuation or a gradual decline in auditory acuity may proceed unabated in a significant percentage of these youngsters. With the adoption of universal newborn hearing screening mandates by an increasing number of states, any challenges to the accurate determination of auditory thresholds must be addressed within the first few months of life.

Cochlear and brainstem implantation. Toh, E. H., Luxford, W. M. House Ear Clinic, 8162 Manitoba Street, #316, Playa Del Ray, CA 90293, USA. *Otolaryngologic Clinics of North America* (2002) April, Vol. 35 (2), pp. 325–42.
Cochlear implantation is an established habilitative and rehabilitative option for profoundly deafened individuals over one year of

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age who derive limited benefit from conventional hearing aids. Auditory performance varies among individuals and is determined primarily by age at implantation, pre-existence of speech and language skills, and the time interval between onset of deafness and implantation. Successful implant users generally demonstrate improved auditory abilities and speech production skills beyond those achieved with hearing aids. Multichannel ABIs can provide useful auditory information to patients with NF-2 who have lost integrity of auditory nerves following removal of vestibular schwannomas. The implant allows for awareness of environmental sounds and, potentially, speech recognition. Most patients undergoing implantation demonstrate improved lip-reading skills, and exceptional performers achieve understanding of open-set speech.

Stereotactic radiosurgery of acoustic tumours. Roland, P. S., Eston, D. Department of Otolaryngology–Head and Neck Surgery, University of Texas SW Medical Center, 5323 Harry Hines Boulevard, Dallas, TX 75390-9035, USA. *Otolaryngologic Clinics of North America* (2002) April, Vol. 35 (2), pp. 343–55.
Stereotactic radiotherapy has an inherent disadvantage in that it does not directly reduce tumour volume. In this increasing environment of cost-containment, however, this modality offers several advantages (see box). Some investigators believe that, over the next generation, stereotactic radiotherapy will be the mainstay of vestibular schwannoma care, with microsurgery being the exception and being reserved for patients needing urgent decompression and for very young patients (12). Increasing numbers of patients are undergoing stereotactic radiotherapy as a matter of preference following the provision of sufficient information on the two treatment procedures. When counselling younger patients, it is important to remember that no long-term data about the control rate for stereotactic radiotherapy with the most recent, lower doses are available. Also, surgical salvage, which is necessary in some patients, produces a poor outcome following radiation therapy. Published reports have demonstrated similar facial nerve, hearing preservation, and tumour control rates in the short term only (32, 33). Data is insufficient to assess the risk for inducing a secondary, treatment-related malignancy. Until long-term results are available, stereotactic radiotherapy should be reserved for medically infirm patients, elderly patients, patients with contralateral deafness or bilateral tumours, and patients who have failed prior microsurgery. Radiotherapy is not the preferred primary treatment modality for vestibular schwannoma based on currently published results.

Cough and paradoxical vocal fold motion. Altman, K. W., Simpson, C. B., Amin, M. R., Abaza, M., Balkissoon, R., Casiano, R. R. Department of Otolaryngology, Northwestern University Medical School, Chicago, IL, USA. *Otolaryngology–Head and Neck Surgery* (2002) December, Vol. 127 (6), pp. 501–11.
OBJECTIVES: The differential diagnosis and treatment of patients with chronic cough, paradoxical vocal fold motion, and disordered breathing can be a challenge to most practicing otolaryngologists. Tracheobronchial (i.e., asthma, bronchitis, and tracheal stenosis), laryngeal (i.e. vocal fold paralysis and neoplasms), and rhinologic (i.e. allergies and rhinosinusitis) etiologies are commonly diagnosed and treated effectively. However, occasionally one is faced with patients who are refractory to medical treatment and have no obvious rhinologic, laryngeal or pulmonary cause. STUDY DESIGN AND SETTING: We conducted a review of the literature. METHODS: We present a thorough review of the current medical literature exploring the complex neurologic mechanisms involved in the production of cough and the relationship between gastroesophageal reflux disease, vagal neurapathy, and paradoxical vocal fold motion. RESULTS: The diagnosis and successful treatment of chronic cough can be complex. It requires a thorough understanding of the neurologic mechanisms behind cough excitation and suppression. Successful treatment strategies include aggressive management of the patient's reactive airway disease, gastroesophageal reflux disease, and, in select cases, paradoxical vocal fold motion. This may involve a well-coordinated effort among pulmonologists, otolaryngologists, gastroenterologists, and speech pathologists. CONCLUSION: Gastroesophageal reflux disease, vagal neuropathy, and paradoxical vocal fold motion are additional causes of chronic cough and disordered breathing that need to be considered, in the absence of obvious laryngotracheal and/or rhinologic pathology. A high index of suspicion is essential in making the diagnosis and formulating an effective multidisciplinary treatment plan for these patients.

Smoke exposure and outcome of endoscopic sinus surgery in children. Ramada, H. H., Hinerman, R. A. Department of Otolaryngology–Head and Neck Surgery, West Virginia University, P O Box 9200, Morgantown, WV 26506-9200, USA. *Otolaryngology–Head and Neck Surgery* (2002) December, Vol. 127 (6), pp. 546–8.
OBJECTIVE: The study goal was to determine whether cigarette smoke exposure in children who are undergoing endoscopic sinus surgery (ESS) for chronic sinusitis will have an impact on the outcome. DESIGN: We conducted a cohort study in a tertiary care children's hospital setting. PATIENTS AND METHODS: The study population consisted of 118 patients who underwent ESS between January 1994 and June 1999. The mean age was 6.5 (range, two to 13 years). The outcome of ESS was measured > or =one year after the operation. A questionnaire was mailed to the caretakers to measure success. Those who required revision subsequently were considered as failures. RESULTS: Multivariate logistic regression analysis was performed with smoke exposure as an independent variable and outcome measured as success of procedure. The overall success rate was 83 per cent. Univariate analysis of smoke exposure and outcome of surgery revealed that children exposed to smoke in household had a 70 per cent success rate compared with children not exposed to smoke, who had a 90 per cent success rate ($p = 0.007$). Multivariate analysis revealed smoke exposure continued to be an independent predictor of success. CONCLUSION: ESS in children with cigarette smoke exposure predisposes to a poorer outcome. This needs to be taken into consideration when recommending ESS for those children.

Treatment of recurrent respiratory papillomatosis in children with the microdebrider. Patel, N, Rowe, M., Tunkel, D. Department of Otolaryngology–Head and Neck and Neck Surgery, Johns Hopkins Medical Institutions, 601 N Caroline St, 6th Floor, Baltimore, Maryland 21287-0910, USA. *The Annals of Otology, Rhinology and Laryngology* (2003) January, Vol. 112 (1), pp. 7–10.
The mainstay of treatment of children with recurrent respiratory papillomatosis has been CO2 laser laryngoscopy. Powered microdebriders allow precise removal of laryngeal lesions without thermal damage. The microdebrider may reduce costs by reducing operative time and limiting the need for expensive laser-related equipment. To compare the use of the microdebrider with that of the CO2 laser in children undergoing surgery for recurrent respiratory papillomatosis, we retrospectively reviewed the charts of 18 patients from two institutions covering a treatment period between December 1998 and October 2001. These patients were initially treated with the CO2 laser, but were switched to microdebrider resection during the review period. We recorded the number of procedures, the technique(s) of resection used, and the operative time for each procedure. We identified 18 patients, 11 male and seven female, ages 18 months to 14 years. A total of 127 procedures were performed with the CO2 laser, and a total of 50 procedures were performed with the microdebrider. The mean number of procedures per patient was 10 (range, two to 17 procedures). The mean surgical time per procedure using the CO2 laser was 59.2 minutes (range, eight to 130 minutes). The mean time per procedure with the microdebrider was 32.4 minutes (range, 12 to 47 minutes). This reduction in operative time was clinically and statistically significant ($p = 0.0001$, unpaired Student's t-test). We concluded that microdebrider resection of laryngeal papilloma in children allowed more rapid surgery with potentially reduced treatment costs. Other advantages of this technique include precise excision without thermal injury. Our report details useful refinements of technique with the microdebrider.

In vitro tissue engineering to generate a human-sized auricle and nasal tip. Kamil, S. H., Kojima, K., Vacanti, M. P., Bonassar, L. J., Vacanti, C. A., Eavey, R. D. Department of Otolaryngology, Massachusetts Eye and Ear Infirmary, Boston 02114, USA. *The Laryngoscope* (2003) January, Vol. 113 (1), pp. 90–4.
OBJECTIVES/HYPOTHESIS: Tissue engineering has successfully generated cartilage in a xenograft and an autograft model. However, challenges remain with both of these in vivo techniques before clinical application can be realized. We hypothesized that a

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human-sized cartilagenous structure could be generated completely in vitro as a complementary or an alternative technique. METHODS: Scaffolds were created in the shape of five full-sized human auricles and five nasal tip cartilaginous skeletons. Bovine shoulder chondrocytes at a concentration of 50 million cells/ml were seeded onto the scaffolds had internal support provided by soft acrylic sheets and were later implanted into nude rats. RESULTS: All of the scaffolds maintained shape and size through 12 weeks of in vivo culture. On gross examination the scaffolds were progressively replaced by cartilage, which was confirmed by histological and biochemical analysis. The auricular scaffolds with the acrylic internal support had the most natural rigidity, which was observed by gentle palpation. The nasal scaffolds maintained excellent definition even without internal support. CONCLUSION: An adult human-sized auricle and nasal tip principles of tissue engineering.

Chickenpox and the geniculate ganglion: facial nerve palsy, Ramsay Hunt syndrome and acyclovir treatment. Grose, C., Bonthius, D., Afifi, A. K. Department of Pediatrics, University of Iowa College of Medicine, Iowa City 52242, USA. charles-grose@uiowa.edu. *The Pediatric Infectious Disease Journal* (2002) July, Vol. 21 (7), pp. 615–7.

Facial nerve palsy has long been considered to have an infectious etiology. Recent diagnostic analyses in children and adults have provided convincing evidence that reactivation of varicella-zoster virus (VZV), sometimes during infectious mononucleosis, can lead to cranial nerve VII palsy. The site of reactivation from latency is the geniculate ganglion. Virus most likely enters the ganglion during chickenpox, via the sensory branches of the facial nerve located on the ear and tongue. Retrospective reviews suggest that patients with VZV-related facial nerve palsy have poorer outcomes than other cases of Bell's palsy. Therefore treatment with acyclovir is suggested when VZV reactivation is likely.

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