The average hearing loss due to bilateral OME was small for all algorithms (range 6–12 dB). The use of different algorithms however resulted in large differences in prevalence rates of bilateral OME (range 11–39%). The implications for studies on epidemiology and sequelae of OME are discussed.

## Ventilation tube insertion in The Netherlands: incidence in children from birth to 12 years of age

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The treatment of otitis media with ventilation tubes is a frequently performed procedure, but the exact incidence is not known in The Netherlands. In order to get better insight into the incidence of the insertion of ventilation tubes in children (age: 0–12 years), data from 1990 to 1994 were studied. Figures from the National Medical Register information system of SIG Health Care Information were combined with demographical data from the National Department of Statistics. The analysed data showed that yearly on average 47 000 children (incidence 2%) were treated with ventilation tubes. Whereas from 1990 to 1992 the incidence rapidly increased in the range of 8 to 20%, the rates slowly decreased in 1993 (1.3%) and 1994 (4.5%).

The incidence is strongly related with age. Incidence peaks were found at the age of 16 months and 5 years, i.e. on average 6000 infants between the age of 12 and 24 months (incidence 3.3%) and 16 000 in 4- to 5-year-old children (incidence 4.4%). The peaks correspond in time with hearing screening at the baby-clinic and at the start of regular schooling, as it is usually performed in the Netherlands.

In conclusion, the incidence of treatment with ventilation tubes is age dependent and appears to be more influenced by hearing-screening than by the incidence of otitis media, as reported in the literature.

## Wedge resection of the external auditory canal–the technique of Feldmann

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For the surgical treatment of cholesteatoma the otologist may perform an 'open' or 'closed' operation. Wedge resection of the external auditory canal is an improvement of Feldmann's technique in which the advantages of open and closed technique are combined. An open cavity is created temporarily, as the wedge will be replaced after the matrix has been removed meticulously under optimal direct vision. At a second operation ossicular chain reconstruction will be possible.

In 31 patients 34 ears have been operated upon. From 31 ears the data after the second look are available.

From these 31 ears 28 (90%) were free from cholesteatoma and had ossicular chain reconstruction. In three (10%) cases radical mastoidectomy was performed because of residual cholesteatoma.

Until now, from 23 ears with middle ear reconstruction a postoperative audiogram was done: 17 (74%) have a Fletcher Index less than 30 dB.

The complication rate is low: in two cases we noted a temporary facial paresis. One case ended in a deaf ear by luxation of the incus–stapes. After this event we decided to remove the incus anyway before starting the wedge resection.

It is concluded that wedge resection of the external auditory canal needs more attention and especially in children it is a worthwhile operative technique to prevent a radical cavity.

## Conditioned orientation response audiometry: both useful and feasible in very young infants

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The maturation of the minimum response level (MRL) to narrow-band noises (NBN) during the first years of life was assessed within the framework of a larger prospective longitudinal study of early otitis media. It was found that at the age of 20–30 weeks, using behavioural observation audiometry (BOA), that the fifth and 95th percentile points of the average response levels in normal hearing full-term newborns were 62 dB and 77 dBHL. When conditioned orientation response audiometry (COR) was used, in other infants of the same age, these points were 22 dB and 39 dBHL.

For further evaluation and comparison of the MRLs for both methods, a group of 50 consecutive infants (age 20–30 weeks) was tested, both with BOA and COR within the same session. When BOA was performed first, the COR-thresholds were $\pm 25$ dB lower. When COR was performed first, the obtained BOA-thresholds obtained afterwards were better due to the sustained effect of the conditioning.

These results indicate that even in infants of 20–30 weeks, COR can be used as an audiological instrument in a clinical setting. The obtained thresholds in COR are better estimates of the true hearing threshold.

## Speech perception and speech production results in prelingually deaf children with a cochlear implant

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A cochlear implant in adults helps restore hearing. Moreover, in children it facilitates the learning of speech and spoken language.

Twenty prelingually deafened children with a cochlear

implant were evaluated for a period of 1–3 years. Six children are congenitally deaf, the remainder are deaf due to meningitis. Four children have a partial insertion of the electrode array.

Speech perception was evaluated with the Gestel–Nijmegen Speech perception test. Speech production was evaluated with the Utrechts Articulatie Onderzoek (UAO) and the Picture SPeech INtelligibility Evaluation (SPINE). There was considerable improvement in speech perception and production. Six months after implantation, 50% of the children were still unintelligible or made 15 errors or more on the UAO. Before implantation this was 80%. Two years after implantation each child, irrespective of age, made five errors or fewer. Almost half of the number of children made no errors at all.

## Early diagnosis and early intervention of speech language disorders in toddlers

R.BUEKERS & J.J.T.HENDRIKS (Maastricht)

In the last decade, children younger than 3 years of age have often been referred to our clinic for speech and language disorders. In 1992 and 1993 about 120 children younger than 3 years of age were referred to our clinic for evaluation of speech and language development. Besides the speech-pathological tests, all children underwent one or more audiological test. If indicated also a psychological investigation was performed. In this retrospective study the following data of this group were analysed: the mean age was 28 months (SD = 4); 78% were boys; nearly 70% was referred by ENT; 84% had otological history (OME mainly) with 50% surgical treatment; the results of the first audiological examination show that 64 children have a normal hearing in at least one ear; 40 children were referred for ENT treatment and two were seen for further diagnosis and hearing aid fitting; in speech-language examination we found 45% children with receptive and expressive language disorders, 38% had only expressive disorders; in 10% of the children revealed the psychological examination that the language impairment was part of a more general development retardation.

The results of this trial offer the prospects of early diagnosis and early intervention. The heterogeneity and complexity of language acquisition disorders in young children are demonstrated in the different intervention strategies. Early diagnosis and treatment is possible but involves multidisciplinary approach.

## Fitting procedures of hearing aids

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The common method of hearing aid fitting in The Netherlands is based on both the pure-tone and speech audiogram. The aim of the method is the optimalization of the speech intelligibility score and the verification of this goal.

In many countries, the procedures used are based on only the pure-tone audiogram (NAL-r, POGO, Articulation Index). The methods are often not based on a measured speech score but on theoretical assumptions, wearing comfort and subjective speech intelligibility.

In a retrospective pilot study on 102 standard fitted patients (41 binaural fits) the Dutch and the NAL-r method were compared on the targets of the methods (Dutch: speech score; NAL: 'target gain') and the relationship between the speech score and the quality of fit was studied.

We found a poor fit for 14% of the sensorineural patents ($n = 98$) and for 35% of the mixed losses ($n = 45$). The quality of fit correlated significantly with the maximum speech discrimination as routinely determined in speech audiometry (full performance curve). It showed a poor fit only in 5% of the ears with the good speech discrimination score and in 32% of the ears with a maximum speech discrimination score of less than 90%. The use of the NAL method with its possible gain in efficiency, could be considered as long as the standard method is used for patients with mixed losses and with a maximum speech discrimination score of less than 90%. The relationship between speech and insertion gain will be further studied.

## Perilymphatic pressure measurement in the guinea-pig inner ear

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Hydrops of the endolymphatic system in the inner ear is considered as the histopathological substrate of Menière's disease. As a result of the disturbance of the endolymph homoeostasis an increase in volume and pressure arises in the endolymphatic compartment leading to inner ear dysfunction. The pathophysiological mechanism however remains unclear.

To obtain more insight into the volume and pressure regulating mechanisms of the inner ear fluids an experimental animal model was developed.

Perilymphatic pressure was measured in 23 normal guinea-pig inner ears by means of the 900A Micropressure System (World Precision Instruments, Inc.). This system uses the dependence of the electrical resistance upon pressure of the tip of a microelectrode, filled with a salt solution. This tip is pierced through the round window of the guinea-pig. To facilitate penetration, the tip was bevelled.

Using this method, perilymphatic pressure values were obtained between 0.5 and 3.1 mmHg in 23 normal guinea-pigs. The distribution of these pressure values had a maximum